

Project Overview

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Austin Housing Price Predictor

This is an in-depth notebook which explores the Austin Housing Dataset through several different models. The notebook includes a thorough EDA and cleaning section, numerous visualizations, exploration of different models, feature selection and engineering methods, nlp, neural networks, transfer learning, and model ensembling to create the final model.

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Business Objective

Build a model that accurately predicts house prices in Austin. Determine the importance of various features both in the home and to include in listing descriptions. Use features to inform intelligent photo recommendations.

Questions

- What are the primary factors influencing housing prices in the Austin metro area?
- What home elements from the listing descriptions are important to the price?
- Do housing images contribute to predictive power?
- Can we effectively use a regression model based system for realtors to determine a proper list price?
- What additional features would strengthen our model?

Package Imports

In [1]:

```
# data processing tools
import pandas as pd
import numpy as np
from numpy import mean, std, argmax
from math import sqrt
import gc, os, shutil, time, cv2, itertools
from collections import Counter
from typing import Iterator, List, Union, Tuple, Any
```

```

from datetime import datetime

# preprocessing
from statsmodels.tsa.stattools import adfuller
from sklearn.compose import ColumnTransformer
from sklearn.preprocessing import StandardScaler, PolynomialFeatures, MinMaxScaler, OneHotEncoder
from sklearn.decomposition import PCA
from sklearn.pipeline import Pipeline
from sklearn.experimental import enable_halving_search_cv
from sklearn.model_selection import train_test_split, cross_validate, HalvingGridSearchCV
from missingpy import MissForest

# scoring and algorithm selection packages
from sklearn.metrics import mean_absolute_error, mean_squared_error, r2_score
from sklearn.inspection import permutation_importance

# model tools
import statsmodels.api as sm
from statsmodels.formula.api import ols

import scipy.stats as stats
from scipy.stats import norm

from sklearn.linear_model import LinearRegression, BayesianRidge, Lars, Ridge
from sklearn.tree import DecisionTreeRegressor
from sklearn.neural_network import MLPRegressor
from sklearn.svm import SVR, LinearSVR, NuSVR
from sklearn.ensemble import GradientBoostingRegressor, RandomForestRegressor, ExtraTreesRegressor
from sklearn.neighbors import KNeighborsRegressor
import xgboost as xgb

# import keras packages
from tensorflow import keras

from tensorflow.keras.preprocessing.image import ImageDataGenerator

from tensorflow.python.keras.preprocessing import sequence, text

from tensorflow.keras.preprocessing.text import Tokenizer
from tensorflow.keras.preprocessing.sequence import pad_sequences

from tensorflow.keras.applications import InceptionV3
from tensorflow.keras.applications.inception_v3 import preprocess_input

from tensorflow.keras.layers import BatchNormalization, Conv2D, Conv1D, MaxPooling2D, MaxPool1D, Flatten, Input, GlobalAveragePooling2D, LSTM, Embedding
from tensorflow.keras.layers.experimental.preprocessing import TextVectorization

from tensorflow.keras.models import Sequential, Model
from tensorflow.keras.regularizers import l2, l1
from tensorflow.keras.optimizers import Adam, SGD, RMSprop
from tensorflow.python.keras.callbacks import TensorBoard, EarlyStopping, ModelCheckpoint
from tensorflow.keras.losses import MeanAbsoluteError, MeanAbsolutePercentageError, MeanSquaredError, MeanSquaredLogarithmicError
from tensorflow.keras.utils import plot_model, Sequence
from tensorflow.keras.initializers import Constant
from tensorflow.keras.optimizers.schedules import ExponentialDecay

# NLP tools
import spacy
import re
import nltk

```

```

from sklearn.feature_extraction.text import CountVectorizer, TfidfVectorizer
from nltk.tokenize import word_tokenize

# visualization packages
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline

# ignore warnings (gets rid of Pandas copy warnings)
import warnings
warnings.filterwarnings('ignore')
pd.options.display.max_columns = None

randomstate=42

```

Notebook Functions

Cleaning Functions

In [2]:

```

# A lot of our variables are not normally shaped, so we can't reliably remove outliers
# We will use IQR to remove our outliers with the following function

def iqr_outliers(column, iqr_rate):
    """return the lower range and upper range for a column based on IQR*rate
    Inputs:
        column: the column to find iqr
        iqr_rate: iqr rate to determine lower and upper bounds

    Outputs:
        lower_range, upper_range: lower and upper bounds for column"""
    Q1,Q3 = np.percentile(column , [25,75]) # get the lower and upper quartiles
    iqr = Q3 - Q1 # find the interquartile range
    lower_range = Q1 - (iqr_rate * iqr) # find the lower range based on iqr rate
    upper_range = Q3 + (iqr_rate * iqr) # find the upper range based on iqr rate
    return lower_range,upper_range

```

Text Processing Functions

In [3]:

```

def text_block_processor(text):
    '''Takes a block of text. Removes all special characters and numbers and
    converts to lower case. Makes words into nlp tokens. For each token, checks
    if stop word. If not, lemmatizes token and appends to line. Returns cleans line.
    Inputs: Block of text
    Outputs: Cleaned block of text with special characters and stop words removed, and
    '''

    line = re.sub(r'[^a-zA-Z\s]', ' ', text).lower() # removes all special characters and
    tokens = nlp(line)
    words = []
    for token in tokens:
        if token.is_stop == False:
            token_preprocessed = preprocessor(token.lemma_)
            if token_preprocessed != '': # only continues if returned word is not empty
                words.append(token_preprocessed) # appends word to list of words
    line = ' '.join(words)

```

```

if 'zestimate' in line: # if the Line only includes "zestimate", it is a default li
    return 'DEFAULT'
else:
    return line

```

Visualization Functions

In [4]:

```

def visualize_training_results(results):
    '''Visualize training results from a neural network history
    parameters:
    results: neural network results'''
    history = results.history
    plt.figure(figsize=(20,10))
    plt.plot(history['val_loss'])
    plt.plot(history['loss'])
    plt.legend(['val_loss', 'train_loss'])
    plt.title('Loss')
    plt.xlabel('Epochs')
    plt.ylabel('Loss')
    plt.show()

```

In [5]:

```

def visualize_augmentations(data_generator, item):
    """Visualizes the keras augmentations with matplotlib in 3x3 grid. This function is
    can be accessed from there.

    This function from https://rosenfelder.ai/keras-regression-efficient-net/

    Parameters:
    data_generator : a setup data generator
    item: one entry from the dataframe to generate a visual sample

    """
    series = pd.DataFrame(item).transpose()

    iterator_visualizations = data_generator.flow_from_dataframe( # type: ignore
        datafram=series,
        x_col="location",
        y_col="price",
        class_mode="raw",
        target_size=(299, 299), # size of the image
        batch_size=1, # use only one image for visualization
    )

    for i in range(9):
        ax = plt.subplot(3, 3, i + 1) # create a 3x3 grid
        batch = next(iterator_visualizations) # get the next image of the generator (a
        img = batch[0] # type: ignore
        img = img[0, :, :, :] # remove one dimension for plotting without issues
        plt.imshow(img)
    plt.show()
    plt.close()

```

Preprocessing Functions

In [6]:

```
# smooth mean function by Max Halford at https://maxhalford.github.io/blog/target-encod
```

```

def calc_smooth_mean(source_df, by, on, m, target_df):
    """Target encodes categoricals using a smooth mean if the target doesn't have enough
    Inputs:
        source_df: source data to use for target encodings (usually train data)
        by: field to be compared for encoding
        on: which field to encode (usually price)
        m: number of samples required before smoothing
        target_df: the target data to be encoded
    Outputs:
        value map for target df
    """
    # Compute the global mean
    mean = source_df[on].mean()

    # Compute the number of values and the mean of each group
    agg = source_df.groupby(by)[on].agg(['count', 'mean'])
    counts = agg['count']
    means = agg['mean']

    # Compute the "smoothed" means
    smooth = (counts * means + m * mean) / (counts + m)

    # Replace each value by the according smoothed mean
    return round(target_df[by].map(smooth), 0)

```

In [7]:

```

# Adding target encoding

def target_encoding(source_df, target_df):
    '''Takes in a source dataframe and a target dataframe to perform target encoding

    Inputs:
        source_df: the source df to get the target encoded values. Should be a training set
        target_df: the target df for the target encodings

    Outputs: target df with target encodings'''

    num_of_samples = source_df.shape[0]

    # determining minimum number of samples for to use their
    # own mean rather than expanding into the full data set mean
    zip_samples = num_of_samples/source_df['zipcode'].unique().shape[0]
    month_samples = num_of_samples/source_df['sale_date'].unique().shape[0]

    # create smooth additive encoded variables for zipcode, year built, and monthsold
    target_df['zip_smooth'] = calc_smooth_mean(source_df, 'zipcode', 'price', zip_samp
    target_df['year_smooth'] = calc_smooth_mean(source_df, 'yearBuilt', 'price', 300, t
    target_df['month_smooth'] = calc_smooth_mean(source_df, 'sale_date', 'price', month

    # Create a wider lat and long zone to calculate an area mean
    target_df['lat_zone'] = round(target_df['latitude'], 2)
    target_df['long_zone'] = round(target_df['longitude'], 2)

    lat_samples = num_of_samples/target_df['lat_zone'].unique().shape[0]
    long_samples = num_of_samples/target_df['long_zone'].unique().shape[0]

    # calculate smooth mean variables for Lat and Long, then create an interactive vari
    target_df['lat_smooth'] = calc_smooth_mean(source_df, 'lat_zone', 'price', lat_samp
    target_df['long_smooth'] = calc_smooth_mean(source_df, 'long_zone', 'price', long_s
    target_df['lat_long'] = (source_df['lat_smooth'] + target_df['long_smooth'])/2

```

```
    return target_df
```

In [8]:

```
def processing_pipeline(train, val, test, categoricals, continuous, poly, drop_fields):
    '''Takes in train, validation and test sets as well as lists of the cat, cont and p
    as well as a list of fields to drop. Returns processed feature sets.

    Inputs:
    train, val, test: feature sets for train, validation and testing
    categoricals: list of categorical features
    continuous: list of continuous features
    poly: list of features that need polynomials
    drop_fields: list of features to drop after target encoding

    Outputs:
    processed_train, processed_val, processed_test: fully processed inputs'''

    # Target encoding
    train = target_encoding(train, train)
    val = target_encoding(train, val)
    test = target_encoding(train, test)

    # drop fields after target encoding
    train_cont = train.drop(drop_fields, axis=1)
    val_cont = val.drop(drop_fields, axis=1)
    test_cont = test.drop(drop_fields, axis=1)

    # continuous pipeline
    cont_pipeline = Pipeline([
        ('imputer', MissForest()),
        ('scaler', StandardScaler()),
    ])

    # polynomials pipeline
    poly_pipeline = Pipeline([
        ('scaler', StandardScaler()),
        ('polynomials', PolynomialFeatures(degree=2, include_bias=False))
    ])

    # Whole pipeline with continuous then categorical transformers
    total_pipeline = ColumnTransformer([
        ('continuous', cont_pipeline, continuous),
        ('polynomials', poly_pipeline, poly),
        ('categorical', OneHotEncoder(drop='if_binary'), categoricals)
    ], sparse_threshold=0)

    # Fit and transform the pipeline on x_train, then transform x_test
    processed_train = total_pipeline.fit_transform(train_cont)
    processed_val = total_pipeline.transform(val_cont)
    processed_test = total_pipeline.transform(test_cont)

    return processed_train, processed_val, processed_test
```

Tuning Functions

In [9]:

```
def stepwise_selection(X, y,
```

```

        initial_list=[],
        threshold_in=0.01,
        threshold_out = 0.05,
        verbose=True):
    """
    Function by David Dale: https://datascience.stackexchange.com/questions/937/does-sc
    Perform a forward-backward feature selection
    based on p-value from statsmodels.api.OLS
    Arguments:
        X - pandas.DataFrame with candidate features
        y - list-like with the target
        initial_list - list of features to start with (column names of X)
        threshold_in - include a feature if its p-value < threshold_in
        threshold_out - exclude a feature if its p-value > threshold_out
        verbose - whether to print the sequence of inclusions and exclusions
    Returns: list of selected features
    Always set threshold_in < threshold_out to avoid infinite looping.
    See https://en.wikipedia.org/wiki/Stepwise\_regression for the details
    """
    included = list(initial_list)
    while True:
        changed=False
        # forward step
        excluded = list(set(X.columns)-set(included))
        new_pval = pd.Series(index=excluded)
        for new_column in excluded:
            modelols = sm.OLS(y, sm.add_constant(pd.DataFrame(X[included+[new_column]])))
            new_pval[new_column] = modelols.pvalues[new_column]
        best_pval = new_pval.min()
        if best_pval < threshold_in:
            best_feature = new_pval.idxmin()
            included.append(best_feature)
            changed=True
        if verbose:
            print('Add  {:30} with p-value {:.6}'.format(best_feature, best_pval))

        # backward step
        modelols = sm.OLS(y, sm.add_constant(pd.DataFrame(X[included]))).fit()
        # use all coefs except intercept
        pvalues = modelols.pvalues.iloc[1:]
        worst_pval = pvalues.max() # null if pvalues is empty
        if worst_pval > threshold_out:
            changed=True
            worst_feature = included[pvalues.argmax()]
            included.remove(worst_feature)
        if verbose:
            print('Drop {:30} with p-value {:.6}'.format(worst_feature, worst_pval))
        if not changed:
            break
    return included

```

In [10]:

```

def grid_optimizer(model, grid, x, y):

    '''Takes in a model and a grid of hyperparameters, and runs a HalvingGridSearchCV
    Inputs: model, parameter grid, x and y to check parameter grid
    returns: best parameters'''

    start=time.time()

```

```

print("Making Search")
grid_search = HalvingGridSearchCV(model, grid, verbose=10, scoring='neg_mean_absolute_error')

print("Running Grid")
grid_search.fit(x, y)

grid_search.best_estimator_

# Best f1
print('Best mae: %.3f' % grid_search.best_score_)

print("Best parameters set found on train set: \n")
print(grid_search.best_params_)
print("\nGrid scores on train set:\n")
means = grid_search.cv_results_['mean_test_score']
stds = grid_search.cv_results_['std_test_score']
for mean, std, params in zip(means, stds, grid_search.cv_results_['params']):
    print("%0.3f (+/-%0.03f) for %r" % (mean, std * 2, params))

print(f'Elapsed Time: {time.time() - start}')

return grid_search.best_params_

```

Scoring Functions

In [11]:

```

def score_model(model, x, y, model_type, score_list):
    '''Scores a model using CV

    Inputs:
        model - instantiated model to score
        x - features
        y - target
        model_type - a str label for the model
        score_list - a list to append scores to

    returns: appended score list'''

    # get accuracy cross val score for cv 5
    scores = cross_validate(model, x, y, cv=5, n_jobs=-1,
                           scoring=('r2', 'neg_mean_absolute_error', 'neg_root_mean_squared_error'),
                           return_train_score=True)
    r2 = round(scores['test_r2'].mean()*100, 2)
    mae = abs(round(scores['test_neg_mean_absolute_error'].mean(), 4))
    rmse = abs(round(scores['test_neg_root_mean_squared_error'].mean(), 4))

    print("\n\n", model_type, " scores")
    print("CV 5 R2 Train Score: {}".format(r2))
    print("CV 5 MAE Train Score: {}".format(mae))
    print("CV 5 RMSE Train Score: {}".format(rmse))

    # append our scores to our lists
    score_list['model'].append(model_type)
    score_list['r2'].append(r2)
    score_list['mae'].append(mae)
    score_list['rmse'].append(rmse)

return score_list

```

In [12]:

```
def final_predictions(x_fit, y_fit, val_pred, test_pred, models):
    '''Take a dictionary of instantiated models. Fit models and make predictions on val

    Inputs:
    x_fit: features to fit
    y_fit: targets to fit
    val_pred: validation set to predict on
    test_pred: test set to predict on
    models: dictionary of instantiated models

    returns: predictions for validation and test data'''

    val_predictions = {}
    test_predictions = {}
    for model in models:
        print("Fitting", model)
        models[model].fit(x_fit, y_fit)
        print("Predicting with", model)
        preds = models[model].predict(val_pred)
        val_predictions[model] = preds
        preds = models[model].predict(test_pred)
        test_predictions[model] = preds

    return val_predictions, test_predictions
```

Stacking Functions

In [141...]

```
def model_selector_val(y_val, meta_model, models_dict, model_label, verbose=True):

    """
    Perform a forward model selection based on MAE improvement on a validation set
    Parameters:
        y_val - validation set targets
        meta_model - meta_model to be used
        models_dict - dictionary of models in format of {model type : validation pred}
        model_label - the label for the current meta model
        verbose - whether to print the sequence of inclusions (True recommended)
    Returns: list of selected models, best MAE
    """

    print("\n\nRunning model selector for ", model_label)
    included_models = []

    while True:

        changed=False # set the flag to False so that the loop will end after this iteration

        # begin the loop
        if verbose: print("\nNEW ROUND - Setting up score charts\n")
        excluded_models = list(set(models_dict.keys())-set(included_models)) # make a list of excluded models
        if verbose: print("Included models: {}\n".format(included_models)) # print the included models
        if verbose: print("Excluded models: {}\n".format(excluded_models)) # print the excluded models
        new_mae = pd.Series(index=excluded_models) # make a series where the index is the excluded models

        if len(included_models) == 0: # run this section only the first time the loop runs
            for excluded in excluded_models: # for each item in the excluded_models list
                if verbose: print("Adding model", excluded, "to stack")
```

```

current_meta_x = np.array(models_dict[excluded]).reshape(-1, 1) # get t

# score the current item
scores = cross_validate(meta_model, current_meta_x, y_val, cv=5, n_jobs=-1)
mae = round(scores['test_score'].mean(), 6) # score to 6 decimal places

if verbose: print("{} score: {}".format(excluded, mae)) #print score fo

new_mae[excluded] = mae # append the mae to the series field

starting_mae = new_mae.max() # evaluate best mae in the set and set that as
if verbose: print("Best mae: {}\n".format(starting_mae)) # print the baseli
best_feature = new_mae.idxmax() # define this as new best feature
included_models.append(str(best_feature)) # append the model name to the in
changed = True # flag that we updated the model stack
if verbose: print('Add {} with mae {}\n'.format(best_feature, starting_mae))

else: # this section will run once the model has a single included model

    current_meta_x=None # make sure the features variable is empty

    for included in included_models: # For each model included already in the s

        entry = np.array(models_dict[included]).reshape(-1, 1) # make and resh
        if np.all(current_meta_x==None): current_meta_x = entry # if current_me
        else: current_meta_x = np.hstack((current_meta_x, entry)) # if a curren
        print("Adding ", included, current_meta_x.shape)

        # score the current item
        scores = cross_validate(meta_model, current_meta_x, y_val, cv=5, n_jobs=-1,
        starting_mae = round(scores['test_score'].mean(), 6)

        if verbose: print("Starting mae: {}\n".format(starting_mae)) # print score

        if len(excluded_models) == 0: # if there are no excluded models, end the lo
            print("Used all available models")
            print(model_label, "model optimized")
            print('resulting models:', included_models)
            print('MAE:', starting_mae)

        return included_models, starting_mae

for excluded in excluded_models: # for each item in the excluded_models li

    new_yhat = np.array(models_dict[excluded]).reshape(-1, 1) # get the cur
    meta_x = np.hstack((current_meta_x, new_yhat)) # add the predictions fo

    # score the current item
    scores = cross_validate(meta_model, meta_x, y_val, cv=5, n_jobs=-1, sco
    mae = round(scores['test_score'].mean(), 4)
    if verbose: print("{} score: {}".format(excluded, mae)) # print score f

    new_mae[excluded] = mae # append the mae to the series field

best_mae = new_mae.max() # evaluate best mae of the excluded_models in this
if verbose: print("Best mae: {}\n".format(best_mae)) # print best mae

if best_mae > starting_mae: # if the best mae is better than the initial m
    best_feature = new_mae.idxmax() # define this as the new best feature

```

```

        included_models.append(str(best_feature)) # append this model name to t
        changed=True # flag that we updated the model stack
        if verbose: print('Add {} with mae {}'.format(best_feature, best_mae

    else: changed = False # if the model stack did not change, make sure the fl

        if not changed: # if the flag is false, pass to the next section and end th
            pass
        else: # otherwise, return to the beginning of the loop
            continue

    print(model_label, "model optimized")
    print('resulting models:', included_models)
    print('MAE:', starting_mae)

    return included_models, starting_mae

```

Neural Net Functions

Basic NN Branch

In [14]:

```

def mlp_test(train, y_train, val, y_val, label, scores_list, nn_function):
    '''Try several different layer combinations in a basic multi-layer perceptron

    Inputs:
    train: training features
    y_train: training targets
    val: validation features
    y_val: validation targets
    label: label to apply to the check
    scores_list: the list to append the scores to
    nn_function: the neural network model to use in the test

    Outputs:
    scores_list: the list with appended scores
    ...

    mlp_baseline, mlp_inputs = nn_function
    results, mlp_model = run_nn(mlp_baseline, train, y_train, val, y_val, 25, "basic")

    mae = min(results.history['val_mean_absolute_error'])
    rmse = np.sqrt(results.history['val_mean_squared_error'][np.argmin(results.history[

    scores_list['model'].append(label)
    scores_list['r2'].append(None)
    scores_list['mae'].append(mae)
    scores_list['rmse'].append(rmse)

    print("MAE: ", mae)
    print("RMSE:", rmse)

    return scores_list

```

In [15]:

```

def mlp_branch(dim, layers_list, multi=False, dropout=False, norm=False):
    '''Creates a basic neural network based on a provided list of layers

    Needs a minimum of 3 integers in the layers_list to work properly

```

Inputs:

dim: the dimensions of the input data (generally the array shape)
layers_list: a list of integers, to be made into dense layers
multi: defaults to False. If True, will output without predictive layer, for use in dropout: defaults to False. If True, will add a dropout layer before the last layer norm: defaults to False. If True, will add Batch Normalization layers before all ac

Outputs:

For multi=True, outputs all but final layer, and input layer
for multi=False, outputs compiled model, and input layer'''

```
num_input = Input(shape=dim) # sets input shape as passed dimension
first_layer = layers_list[0] # marks the first integer in the list for the first la
last_layer = layers_list[-1] # marks the last integer ijn the list for the last lay

print("Adding initial Dense layers with ",first_layer)
if norm: # adds normalization layer only if norm=True
    x = BatchNormalization()(num_input)
    x = Dense(first_layer, activation='relu', kernel_initializer='he_normal')(x)
else: # adds first layer
    x = Dense(first_layer, activation='relu', kernel_initializer='he_normal')(num_i

# adds dense Layer for each Layer in List that is not the first_layer or last_layer
# if norm=True, adds a BatchNormalization Layer in front of each dense layer
for layer in layers_list[1:-1]:
    print("Adding Dense layer with ",layer)
    if norm: x = BatchNormalization()(x)
    x = Dense(layer, activation='relu', kernel_initializer='he_normal')(x)

# adds last dense Layer. if norm=True, adds batch normalization.
print("Adding last layer with ",last_layer)
if norm: x = BatchNormalization()(x)
x = Dense(last_layer, activation='relu', kernel_initializer='he_normal')(x)

# if multi=True indicating this model will be part of a multi-input model, we now r
# the model is not compiled
if multi:
    print("Outputting multi-nn model layer - Tabular")
    return x, num_input

# if multi=False we complete the model with a predictive Layer
else:
    print("Outputting predictive model - Tabular")
    if dropout: x = Dropout(rate=.3)(x) # if dropout=True there is a dropout layer
    last_layer = Dense(1, activation='linear')(x) # prediction layer outputs predic

    # declare the final model inputs and outputs
    final_model = Model(inputs=num_input, outputs=last_layer)

    # print a summary of the model
    print(final_model.summary())

    # set up learning rate decay schedule
    initial_learning_rate = 0.1
    lr_schedule = ExponentialDecay(
        initial_learning_rate,
        decay_steps=100000,
        decay_rate=0.96,
```

```

    staircase=True)

# compile the model
final_model.compile(optimizer=Adam(learning_rate=lr_schedule, epsilon=1), loss=)

# return compiled model and number of inputs
return final_model, num_input

```

NLP Branch

In [16]:

```

def nlp_branch(num_tokens, embedding_matrix, max_words, multi=False):
    '''Creates an NLP network

    Inputs:
        num_tokens: number of words in the word index + 1
        embedding_matrix: map of word index words to embeddings
        mx_words: text sequence length, must match # tokens in transfer file
        multi: defaults to False. If True, will output without predictive layer, for use in

    Outputs:
        For multi=True, outputs all but final layer, and input layer
        for multi=False, outputs compiled model, and input layer'''

    # for text embeddings the input shape can be none
    int_sequences = Input(shape=(None, ), dtype="float64")

    # uses the embedding matrix dictionary to create word embeddings for the inputs
    embedded_sequences = Embedding(
        input_dim = num_tokens, # number of unique tokens
        output_dim = max_words, #number of features
        embeddings_initializer=Constant(embedding_matrix), # initialize
        input_length=max_words,
        trainable=False)(int_sequences)

    # uses two bi-directional LSTM Layers
    x = Bidirectional(LSTM(150, return_sequences=True))(embedded_sequences)
    x = Bidirectional(LSTM(150))(x)
    # adds a dense Layer
    output_embed = Dense(128, activation="relu", kernel_initializer='he_normal')(x)

    # if multi=True indicating this model will be part of a multi-input model,
    # we add a final dense layer then return the layer and the input shape
    # the model is not compiled
    if multi:
        print("Outputting multi-nn model layer - NLP")
        output_embed = Dense(64, activation="relu", kernel_initializer='he_normal')(output_embed)
        return output_embed, int_sequences

    # if multi=False we complete the model with a predictive layer
    else:
        print("Outputting predictive model - NLP")
        last_layer = Dense(1, activation='linear')(output_embed)

    # declare the final model inputs and outputs
    final_model = Model(inputs=int_sequences, outputs=last_layer)

    # print a summary of the model
    print(final_model.summary())

```

```

# set up learning rate decay schedule
initial_learning_rate = 0.1
lr_schedule = ExponentialDecay(
    initial_learning_rate,
    decay_steps=100000,
    decay_rate=0.96,
    staircase=True)

# compile the model
final_model.compile(optimizer=Adam(learning_rate=lr_schedule, epsilon=1), loss="mea

# return compiled model and number of inputs
return final_model, int_sequences

```

Image Branch

In [17]:

```

def basic_cnn_branch():

    '''Creates a basic CNN

    Outputs: compiled model'''

    # manually creates a CNN with layers as follows
    img_input = Input(shape=(299, 299, 3)) # input shape for images will always be 299,
    x = Conv2D(64, 7, activation='relu', padding='same')(img_input)
    x = MaxPooling2D(2)(x)
    x = Conv2D(128, 3, activation='relu', padding='same')(x)
    x = Conv2D(128, 3, activation='relu', padding='same')(x)
    x = MaxPooling2D(2)(x)
    x = Conv2D(256, 3, activation='relu', padding='same')(x)
    x = Conv2D(256, 3, activation='relu', padding='same')(x)
    x = MaxPooling2D(2)(x)
    x = Conv2D(512, 3, activation='relu', padding='same')(x)
    x = Conv2D(512, 3, activation='relu', padding='same')(x)
    x = MaxPooling2D(2)(x)
    x = Flatten()(x)
    x = Dense(128, activation='relu')(x)
    x = Dropout(.5)(x)
    x = Dense(64, activation='relu')(x)
    x = Dropout(.5)(x)
    output = Dense(1, activation='linear')(x)

    # declare the final model inputs and outputs
    final_model = Model(inputs=img_input, outputs=output)

    # print a summary of the model
    print(final_model.summary())

    # set up learning rate decay schedule
    initial_learning_rate = 0.1
    lr_schedule = ExponentialDecay(
        initial_learning_rate,
        decay_steps=100000,
        decay_rate=0.96,
        staircase=True)

    # compile the model
    final_model.compile(optimizer=Adam(learning_rate=lr_schedule, epsilon=1), loss="mea

```

```
# return compiled mode
return final_model
```

In [18]:

```
def inception_cnn_branch(transfer_trainable=False, multi=False):

    '''Creates a CNN using transfer learning based on InceptionV3 pretrained model

    Inputs:
        transfer_trainable=False. Set to true to update InceptionV3 as trainable.

    Outputs:
        For multi=True, outputs all but final layer, and input layer
        for multi=False, outputs compiled model, and input layer'''

    # initializes InceptionV3
    feature_model = InceptionV3(include_top=False, input_shape=(299, 299, 3), weights=''

    # set all layers of the Inception model to be not trainable
    for layer in feature_model.layers:
        layer.trainable=transfer_trainable

    # declares input shape, must be same as inception model
    img_input = Input(shape=(299, 299, 3))

    # add model Layers
    x = feature_model(img_input, training=False) # add Layer for Inception model
    x = GlobalAveragePooling2D(name="avg_pool")(x)
    x = BatchNormalization()(x)
    x = Dense(64, activation='relu', kernel_initializer='he_normal')(x)

    # if multi=True indicating this model will be part of a multi-input model, output t
    # the model is not compiled
    if multi:
        print("Outputting multi-nn model layer - CNN")
        return x, img_input

    # if multi=False we complete the model with a predictive Layer
    else:
        print("Outputting predictive model")
        last_layer = Dense(1, activation='linear')(x)

        # declare the final model inputs and outputs
        final_model = Model(inputs=img_input, outputs=last_layer)

        # print a summary of the model
        print(final_model.summary())

        # set up learning rate decay schedule
        initial_learning_rate = 0.1
        lr_schedule = ExponentialDecay(
            initial_learning_rate,
            decay_steps=100000,
            decay_rate=0.96,
            staircase=True)

        # compile the model
        final_model.compile(optimizer=Adam(learning_rate=lr_schedule, epsilon=1), loss=
```

```
# return compiled mode
return final_model, img_input
```

Concatenated Branches

In [19]:

```
def joined_model(concats, inputs):
    '''Creates a multi-input neural network
    Takes in any number of mid-level model output layers and the corresponding input layers
    Concatenates model output layers into a multi-input neural network

    Inputs:
    concat: list of mid-level model output layers
    inputs: list of input layers corresponding to outputs included in concat

    Outputs:
    final_model: compiled concatenated model'''

    concatenated = concatenate(concats) # concatenate the model branches
    out = Dense(1, activation="linear")(concatenated) # add a predictive layer

    # declare the final model inputs and outputs
    final_model = Model(inputs, out)

    # print a summary of the model
    print(final_model.summary())

    # set up learning rate decay schedule
    initial_learning_rate = 0.1
    lr_schedule = ExponentialDecay(
        initial_learning_rate,
        decay_steps=100000,
        decay_rate=0.96,
        staircase=True)
    # compile the model
    final_model.compile(optimizer=Adam(learning_rate=lr_schedule, epsilon=1), loss="mea

    # return compiled mode
    return final_model
```

In [20]:

```
def run_nn(model, x_train, y_train, x_val, y_val, patience, label, generator=False):
    '''Runs a neural network model with callbacks

    Inputs:
    model: compiled neural network model
    x_train: train features
    y_train: train targets
    x_val: validation features
    y_val: validation targets
    patience: patience for early stopping callback
    label: label for saving model checkpoint callback
    generator=False: defaults to False. If true, uses generators in place of y_train/y_val

    Outputs:
    results: Model results object
    model: fitted model'''

    # define the callbacks
```

```

# stops after 'patience' epochs if no improvement to validation loss
stop = EarlyStopping(monitor="val_loss", patience=patience, restore_best_weights=True)
# saves the best model to file
best = ModelCheckpoint(filepath='models/best_+label+_model.hdf5', save_best_only=True)

# generators use a slightly different fit call, so we fit differently based on if one
if generator==False:

    # train the model
    print("[INFO] training model...")
    results = model.fit(
        x_train,
        y_train,
        epochs=500,
        validation_data=(x_val, y_val),
        batch_size=32,
        callbacks=[stop, best],
    )

if generator:
    # train the model
    print("[INFO] training model...")
    results = model.fit(
        x_train,
        epochs=500,
        validation_data=x_val,
        callbacks=[stop, best],
    )

return results, model

```

Obtaining Our Data

In [274...]

```
# Load and Look at our austin housing data
df = pd.read_csv('austinHousingData.csv')
df.head()
```

Out[274...]

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
0	111373431	pflugerville	14424 Lake Victor Dr	78660	14424 Lake Victor Dr, Pflugerville, TX 78660 i...	30.430632	-97.663078	1.98
1	120900430	pflugerville	1104 Strickling Dr	78660	Absolutely GORGEOUS 4 Bedroom home with 2 full...	30.432673	-97.661697	1.98
2	2084491383	pflugerville	1408 Fort Dessau Rd	78660	Under construction - estimated completion in A...	30.409748	-97.639771	1.98

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
3	120901374	pflugerville	1025 Strickling Dr	78660	Absolutely darling one story home in charming ...	30.432112	-97.661659	1.98
4	60134862	pflugerville	15005 Donna Jane Loop	78660	Brimming with appeal & warm livability! Sleek ...	30.437368	-97.656860	1.98

◀ ▶

In [275...]

```
# Shape of data
df.shape
```

Out[275...]

(15171, 47)

In [276...]

```
# Info on data - get data types and null counts
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 15171 entries, 0 to 15170
Data columns (total 47 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   zpid            15171 non-null   int64  
 1   city             15171 non-null   object  
 2   streetAddress    15171 non-null   object  
 3   zipcode          15171 non-null   int64  
 4   description      15171 non-null   object  
 5   latitude         15171 non-null   float64 
 6   longitude        15171 non-null   float64 
 7   propertyTaxRate  15171 non-null   float64 
 8   garageSpaces     15171 non-null   int64  
 9   hasAssociation   15171 non-null   bool   
 10  hasCooling       15171 non-null   bool   
 11  hasGarage        15171 non-null   bool   
 12  hasHeating       15171 non-null   bool   
 13  hasSpa           15171 non-null   bool   
 14  hasView          15171 non-null   bool   
 15  homeType         15171 non-null   object  
 16  parkingSpaces    15171 non-null   int64  
 17  yearBuilt        15171 non-null   int64  
 18  latestPrice      15171 non-null   float64 
 19  numPriceChanges  15171 non-null   int64  
 20  latest_saledate  15171 non-null   object  
 21  latest_salemonth 15171 non-null   int64  
 22  latest_saleyear  15171 non-null   int64  
 23  latestPriceSource 15171 non-null   object  
 24  numOfPhotos      15171 non-null   int64  
 25  numOfAccessibilityFeatures 15171 non-null   int64  
 26  numOfAppliances  15171 non-null   int64  
 27  numOfParkingFeatures 15171 non-null   int64  
 28  numOfPatioAndPorchFeatures 15171 non-null   int64
```

```

29  numOfSecurityFeatures      15171 non-null  int64
30  numOfWaterfrontFeatures    15171 non-null  int64
31  numOfWindowFeatures        15171 non-null  int64
32  numOfCommunityFeatures     15171 non-null  int64
33  lotSizeSqFt                15171 non-null  float64
34  livingAreaSqFt              15171 non-null  float64
35  numOfPrimarySchools        15171 non-null  int64
36  numOfElementarySchools      15171 non-null  int64
37  numOfMiddleSchools          15171 non-null  int64
38  numOfHighSchools            15171 non-null  int64
39  avgSchoolDistance           15171 non-null  float64
40  avgSchoolRating             15171 non-null  float64
41  avgSchoolSize               15171 non-null  int64
42  MedianStudentsPerTeacher    15171 non-null  int64
43  numOfBathrooms               15171 non-null  float64
44  numOfBedrooms                 15171 non-null  int64
45  numOfStories                  15171 non-null  int64
46  homeImage                     15171 non-null  object
dtypes: bool(6), float64(9), int64(25), object(7)
memory usage: 4.8+ MB

```

Cleaning Our Data

Time Series Trends

We need to check our prices for time trends.

In [277...]

```

# make a new df with just the date and price
temp_df = df[['latest_saledate', 'latestPrice']]

# convert our date field to a proper datetime
temp_df['latest_saledate'] = pd.to_datetime(temp_df['latest_saledate'])

# drop outliers (somewhat arbitrary)
temp_df.drop(temp_df.loc[(temp_df['latestPrice'] > 1000000) | (temp_df['latestPrice'] <
# set the date as our index
temp_df.set_index('latest_saledate', inplace=True)

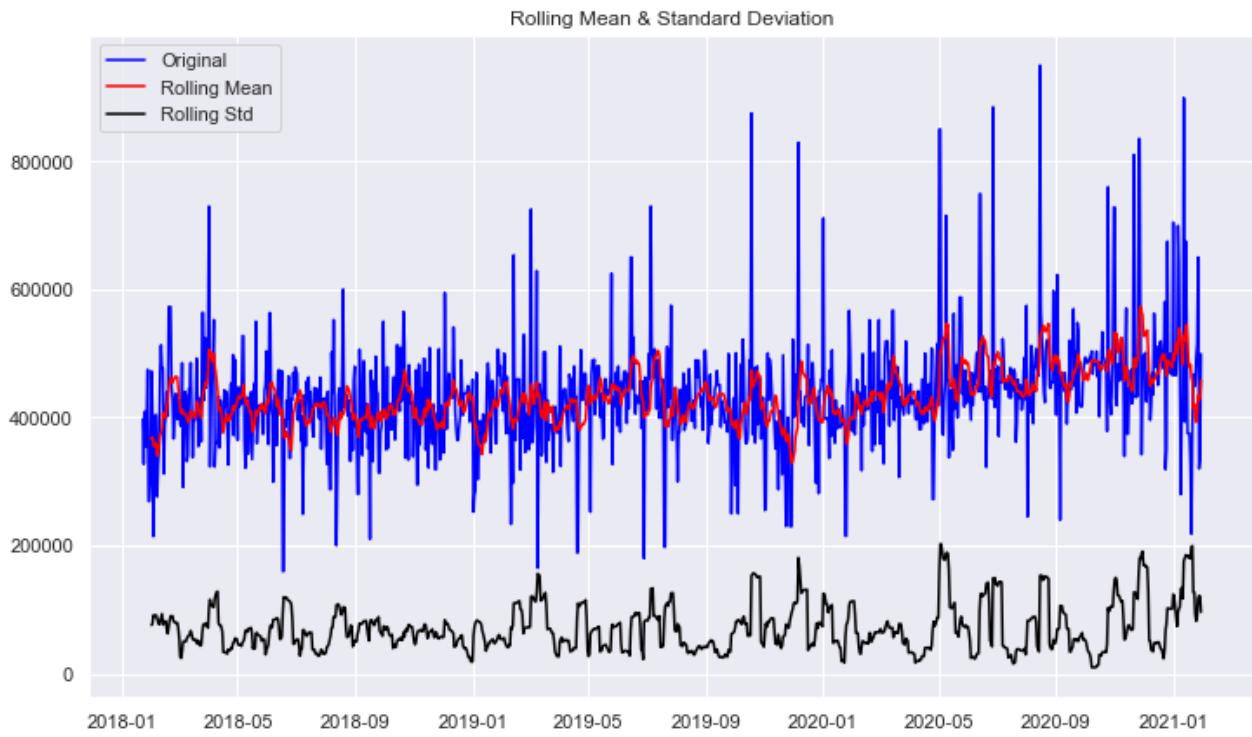
# group our data by day
temp = temp_df.groupby(pd.Grouper(freq='D')).mean()

# backfill any empty days by getting previous day's mean
temp.bfill(inplace=True)

# find the rolling mean and rolling standard deviation
roll_mean = temp.rolling(window=10, center=False).mean()
roll_std = temp.rolling(window=10, center=False).std()

# plot the figure with rolling mean and standard deviation
fig = plt.figure(figsize=(12,7))
plt.plot(temp, color='blue', label='Original')
plt.plot(roll_mean, color='red', label='Rolling Mean')
plt.plot(roll_std, color='black', label = 'Rolling Std')
plt.legend(loc='best')
plt.title('Rolling Mean & Standard Deviation')
plt.show(block=False)

```



We run a Dickey-Fuller hypothesis test on our time series to test for stationarity. The null hypothesis is that the data is not stationary. If we have a p-value below .05, we will reject the null hypothesis.

In [278...]

```
dftest = adfuller(temp)

# Extract and display test results in a user friendly manner
dfoutput = pd.Series(dftest[0:4], index=['Test Statistic', 'p-value', '#Lags Used', 'N
for key,value in dftest[4].items():
    dfoutput['Critical Value (%s)'%key] = value

print ('Results of Dickey-Fuller test: \n')
print(dfoutput)
```

Results of Dickey-Fuller test:

Test Statistic	-8.327194e+00
p-value	3.445082e-13
#Lags Used	8.000000e+00
Number of Observations Used	1.096000e+03
Critical Value (1%)	-3.436331e+00
Critical Value (5%)	-2.864181e+00
Critical Value (10%)	-2.568176e+00
dtype: float64	

The p-value of 3.45e-13 on the Dickey-Fuller test is FAR under .05, so we reject the null hypothesis that there is a trend in the data. Our data set is not exhibiting time series trends, so we don't need to account for this (surprisingly!!)

In [279...]

```
# on our original df, convert the date to a proper date-time, and then drop the day so
df['latest_saledate'] = pd.to_datetime(df['latest_saledate'])
df['latest_saledate'] = df['latest_saledate'].dt.strftime('%Y-%m')
```

In [280...]

```
# rename some columns
```

```
df.rename(columns={'latestPrice':'price', 'latest_saledate':'sale_date'}, inplace=True)
```

```
In [281...]: # drop original unneeded date columns  
df.drop(['latest salemonth', 'latest saleyear'], axis=1, inplace=True)
```

Home Type

```
In [282...]: # what are the homeTypes?
```

```
df['homeType'].value_counts(normalize=True)
```

```
Out[282]:
```

Single Family	0.938699
Condo	0.030980
Townhouse	0.011469
Multiple Occupancy	0.006328
Vacant Land	0.005471
Residential	0.002439
Apartment	0.002439
Mobile / Manufactured	0.001121
MultiFamily	0.000659
Other	0.000395

Name: homeType, dtype: float64

```
In [283...]: # Ultimately, with Single Family, Condo and Townhouse making up most of the data, we are  
df = df.loc[((df['homeType'] == 'Single Family') | (df['homeType'] == 'Condo')) | (df['
```

Duplicate Data

```
In [284...]: # check for duplicate data
```

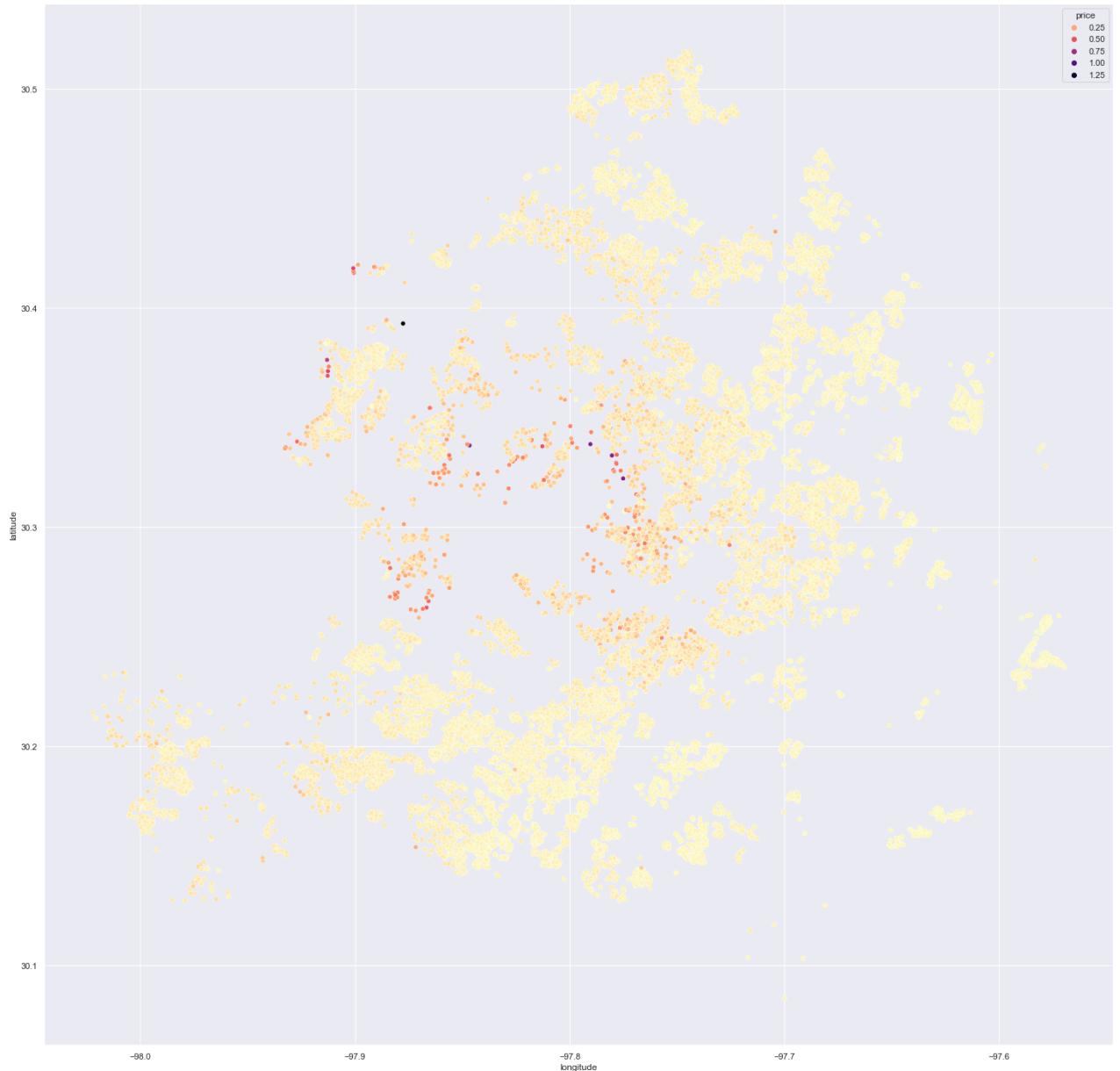
```
df[df.duplicated(subset=['latitude', 'longitude'], keep=False)], sort_values('latitude'))
```

```
# no duplicate data
```

```
Out[284]: zpid city streetAddress zipcode description latitude longitude propertyTaxRate garageSpaces ...
```

Outlier Detection

```
In [285...]: # plotting latitude and longitude as a visual scatter plot to look for location-based outliers  
plt.figure(figsize=(25,25))  
  
sns.scatterplot(data=df, x="longitude", y="latitude", hue="price", palette="magma_r");
```



Using latitude and longitude, we make a visual map of the Austin area that lets us see any map outliers. There don't appear to be any zones that are well outside of the Austin area, except for just a few down in the lower SE area. So we might plan to cut off our latitude just above 30.1.

This visualization suggests that location is very important to home price. We'll check that out more directly.

In [286...]

```
# drop Latitidue below 30.12 to remove the few outliers in the SE
df.drop(df[df['latitude'] < 30.12].index , inplace=True)
```

In [287...]

```
# Looking for outliers in the percentiles
df.describe()
```

Out[287...]

	zpid	zipcode	latitude	longitude	propertyTaxRate	garageSpaces	parking
count	1.488000e+04	14880.000000	14880.000000	14880.000000	14880.000000	14880.000000	14880

	zpid	zipcode	latitude	longitude	propertyTaxRate	garageSpaces	parkingSpaces
mean	1.043332e+08	78736.001075	30.291923	-97.778870	1.994194	1.228159	1
std	3.171262e+08	18.879984	0.097245	0.084904	0.053290	1.342097	1
min	2.858495e+07	78617.000000	30.127161	-98.022057	1.980000	0.000000	0
25%	2.941134e+07	78727.000000	30.202993	-97.838747	1.980000	0.000000	0
50%	2.949518e+07	78739.000000	30.285250	-97.769810	1.980000	1.000000	1
75%	7.033871e+07	78749.000000	30.367340	-97.718283	1.980000	2.000000	2
max	2.146313e+09	78759.000000	30.517174	-97.569504	2.210000	22.000000	22

◀ ▶

We see potential outliers in price, lotSizeSqFt, livingAreaSqFt, and numOfBathrooms, numOfBedrooms, garageSpaces, parkingSpaces.

In [288]:

```
# check how our histograms are Looking
df.hist(figsize=(18,15), bins=100);
```



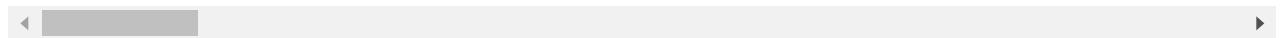
In [289]:

```
#check what is going on with the LotSizeSqFt outliers by sorting descending
df.sort_values('lotSizeSqFt', ascending=False).head(5)
```

```
# This top listing is legitimate. But we have a problem here where condo and townhouse
# size of the overall lot for their lot, and that isn't really accurate/representative
# We'll fix this in a little bit
```

Out[289...]

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
14654	58297775	austin	3200 W 35th St	78703	Fabulous 4 Bed 4 Bath house on one of the larg...	30.314316	-97.768044	1.98
9244	62605548	austin	706 W 22nd St APT 306	78705	Leased for \$1695 though 7/31/2020 - Unique gat...	30.285631	-97.745697	1.98
11116	145652991	austin	4319 Nitschke St	78723	**Subject to City of Austin SMART Housing and ...	30.294910	-97.698997	1.98
2340	124837778	austin	4304 Front Range Ln	78732	4304 Front Range Ln, Austin, TX 78732 is a sin...	30.380476	-97.881027	1.98
4635	202157510	austin	201 Charismatic Pl	78737	201 Charismatic Pl, Austin, TX 78737 is a sing...	30.205276	-98.011406	2.01



In [290...]

```
#check what is going on with the LivingAreaSqFt outliers by sorting ascending
df.sort_values('livingAreaSqFt', ascending=True).head(5)
```

```
# just tiny houses I guess ?
```

Out[290...]

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
1170	94641643	austin	3003 Brass Buttons Trl	78734	Lake Austin Waterfront lot in Apache Shores! O...	30.381195	-97.915985	1.98
3518	29420819	austin	404 Primrose St	78753	404 Primrose St, Austin, TX 78753 is a single ...	30.350330	-97.697739	1.98

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
13314	29330022	austin	1405 Hartford Rd APT 202	78703	Old West Austin Efficiency. Close to metro/UT ...	30.284014	-97.762421	1.98
10118	29385318	austin	2202 E 10th St	78702	Great opportunity to build on your lot in high...	30.264668	-97.717590	1.98
9213	145658912	austin	1011 W 23rd St APT 103	78705	Very desirable location for UT students only 5...	30.287077	-97.748085	1.98

◀ ▶

In [291...]

```
#check what is going on with the LivingAreaSqFt outliers by sorting descending
df.sort_values('livingAreaSqFt', ascending=False).head(5)
```

Out[291...]

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
705	70330356	austin	201 Marly Way	78733	Level building site with great canyon views an...	30.323517	-97.861473	1.98
2557	64523076	austin	9704 Saugus Ln	78733	New Construction, EANES Schools, 4bed 3 bath, ...	30.345898	-97.859985	1.98
2316	125904370	austin	12400 Cedar St	78732	12400 Cedar Street - Villa Del Lago is a unique...	30.392859	-97.877609	1.98
5328	29327226	austin	3509 Lost Creek Blvd	78735	*\$6,762,377 is Tax Value - Set in exclusive Ba...	30.272158	-97.856033	1.98
375	89551873	austin	14800 Flat Top Ranch Rd	78732	GRACIOUS LUXURY ON LAKE AUSTIN\nThis award-w...	30.368996	-97.912720	1.98

◀ ▶

In [292...]

```
# we're dropping the top two listings here. One is a lot, and the other is clearly mist
df.drop(index=[705, 2557], inplace=True)
```

In [293...]

```
#check what is going on with the numOfBathrooms outliers by sorting descending
```

```
df.sort_values('numOfBathrooms', ascending=False).head(5)
```

Out[293...]

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
2838	111972888	austin	4212 Far West Blvd	78731	Well-maintained home in highly desirable North...	30.361406	-97.769707	1.98
2316	125904370	austin	12400 Cedar St	78732	12400 Cedar Street - Villa Del Lago is a uniqu...	30.392859	-97.877609	1.98
184	124843021	austin	13115 Perryton Dr	78732	This highly custom home sits on a well-establish...	30.338959	-97.926979	1.98
5328	29327226	austin	3509 Lost Creek Blvd	78735	*\$6,762,377 is Tax Value - Set in exclusive Ba...	30.272158	-97.856033	1.98
375	89551873	austin	14800 Flat Top Ranch Rd	78732	GRACIOUS LUXURY ON LAKE AUSTIN\r\nThis award-w...	30.368996	-97.912720	1.98

◀ ▶

In [294...]

```
# I'm going to say this top listing has 2.5 bathrooms not 27. That is clearly a typo.  
df.loc[df.index==2838, 'numOfBathrooms'] = 2.5
```

In [295...]

```
#check what is going on with the numOfBathrooms outliers by sorting ascending  
df.sort_values('numOfBathrooms', ascending=True).head(5)
```

Out[295...]

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate	c
6252	29327134	austin	2005 Real Catorce	78746	2005 Real Catorce, Austin, TX 78746 is a singl...	30.269354	-97.818771	1.98	
6646	29503854	austin	8604 Oak Ledge Dr	78748	8604 Oak Ledge Dr, Austin, TX 78748 is a singl...	30.188589	-97.823662	1.98	
1842	94642666	austin	10640 Senna Hills Dr	78733	Wow! Reduced! First time on the market! Move i...	30.312716	-97.900482	1.98	

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate	c
2223	58299964	austin	5138 Mansfield View Ct	78732	5138 Mansfield View Ct, Austin, TX 78732 is a ...	30.390335	-97.882072	1.98	
12993	58315415	austin	4712 Chesney Ridge Dr	78749	This Austin two-story offers a fireplace, an o...	30.197540	-97.862419	1.98	

In [296...]

```
# most listings with 0 bathrooms also have 0 bedrooms. This is clearly wrong, but I'm n
# I will impute typical bathroom count per bedroom count based on year built
# then drop any remaining listings with 0 bathrooms and 0 bedrooms
```

```
df.loc[(df['numOfBathrooms']==0) & (df['numOfBedrooms']>0) & (df['yearBuilt'] > 1989),
df.loc[(df['numOfBathrooms']==0) & (df['numOfBedrooms']>0) & (df['yearBuilt'] <= 1989),
df.loc[(df['numOfBathrooms']==0) & (df['numOfBedrooms']>=3) & (df['yearBuilt'] > 1989),
df.loc[(df['numOfBathrooms']==0) & (df['numOfBedrooms']>=3) & (df['yearBuilt'] <= 1989)

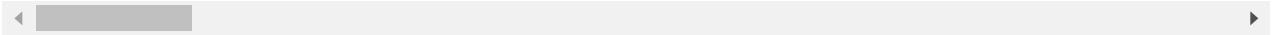
df.drop(df[df['numOfBathrooms']==0].index, inplace=True)
df.drop(df[df['numOfBedrooms']==0].index, inplace=True)
```

In [297...]

```
#check what is going on with the numOfBedrooms outliers by sorting descending
df.sort_values('numOfBedrooms', ascending=False).head(5)
```

Out[297...]

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate	c
8597	2094498207	austin	4902 Duval Rd R2 #R2	78727	Lovely convenient condo, with a private wooded...	30.415489	-97.737213	1.98	
8531	58306332	austin	3906 Hawkshead Dr	78727	Enjoy this home across from The Domain! Comple...	30.416149	-97.722801	1.98	
14435	29401385	austin	4302 Avenue G APT C	78751	Charming 3-unit multifamily property built by ...	30.305981	-97.728012	1.98	
13910	29322655	austin	1608 S 2nd St	78704	Modern luxury by Joseph Design Build with prim...	30.249325	-97.757095	1.98	

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
9314	29384319	austin	1310 E 2nd St	78702	Contact owner for showing, day before advance ...	30.260422	-97.730194	1.98
								
In [298...]	<pre># That condo is supposed to have 2 bathrooms, not 20. df.loc[df.index==8597, 'numOfBedrooms'] = 2</pre>							
In [299...]	<pre>#check what is going on with the garageSpaces outliers by sorting descending df.sort_values('garageSpaces', ascending=False).head(10)</pre>							
Out[299...]	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
6885	145656156	austin	705 Mc Queen St #34	78745	Beautiful 2-story home located in highly sough...	30.189331	-97.792809	1.98
4533	28587235	austin	13100 Rooster Springs Rd	78737	Enjoy country living with the convenience of t...	30.204746	-97.991356	2.01
4777	29331364	austin	3301 Barton Creek Blvd	78735	Privately gated Barton Creek estate on 1.58 Ac...	30.283585	-97.875526	1.98
9240	29396074	austin	908 Keith Ln	78705	Keith Lane is has our homes strategically plac...	30.291706	-97.725502	1.98
6805	29502805	austin	7600 Elm Forest Rd	78745	Gorgeous 3/2 home owner remodel on almost 2/3 ...	30.190971	-97.800804	1.98
6985	29494837	austin	6907 Cherrydale Dr	78745	Beautifully remodeled home in HOT 78745!! This...	30.200857	-97.803902	1.98

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
11108	29409917	austin	1405 Berkshire Dr	78723	Beautifully renovated single story mid-century...	30.317060	-97.697220	1.98
14875	29415933	austin	5804 Bullard Dr	78757	5804 Bullard Dr, Austin, TX 78757 is a single ...	30.336634	-97.750031	1.98
6230	29327172	austin	1814 Randolph Ridge Trl	78746	Stunning home in Eanes, minutes from downtown...	30.272011	-97.821548	1.98
3459	29423855	austin	8909 Georgian Dr	78753	Unique opportunity to own a large lot in an ar...	30.356129	-97.695686	1.98

◀ ▶

In [300...]

```
# a bunch of these garage spaces are definitely just bogus numbers. I'm going to force
df.loc[(df['garageSpaces'] > 3) & (df['price'] < 1000000) & (df['homeType'] == 'Single
df.loc[(df['garageSpaces'] > 5) & (df['price'] > 1000000)& (df['homeType'] == 'Single F
df.loc[df.index==6885, 'garageSpaces'] = 2
```

In [301...]

```
#check what is going on with the parkingSpaces outliers by sorting descending
df.sort_values('parkingSpaces', ascending=False).head(5)
```

Out[301...]

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
6885	145656156	austin	705 Mc Queen St #34	78745	Beautiful 2-story home located in highly sought...	30.189331	-97.792809	1.98
4533	28587235	austin	13100 Rooster Springs Rd	78737	Enjoy country living with the convenience of t...	30.204746	-97.991356	2.01
6985	29494837	austin	6907 Cherrydale Dr	78745	Beautifully remodeled home in HOT 78745!! This...	30.200857	-97.803902	1.98

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate
6805	29502805	austin	7600 Elm Forest Rd	78745	Gorgeous 3/2 home owner remodel on almost 2/3 ...	30.190971	-97.800804	1.98
11108	29409917	austin	1405 Berkshire Dr	78723	Beautifully renovated single story mid-century...	30.317060	-97.697220	1.98

In [302...]

```
# We are going to do the same forced conversions on parking spaces
df.loc[(df['parkingSpaces'] > 3) & (df['price'] < 1000000 & (df['homeType'] == 'Single Family'))] = 2
df.loc[(df['parkingSpaces'] > 5) & (df['price'] > 1000000 & (df['homeType'] == 'Single Family'))] = 2
df.loc[df.index==6885, 'parkingSpaces'] = 2

df.sort_values('parkingSpaces', ascending=False).head(5)
```

Out[302...]

	zpid	city	streetAddress	zipcode	description	latitude	longitude	propertyTaxRate	garageSpaces
6114	29326930	austin	1308 Brians Meadow Cv	78746	Award winning EANES ISD. Cedar Creek Elementar...	30.269625	-97.803162	1.98	2
5605	29361586	austin	12712 Mcnelly Trl	78732	Home is in immaculate condition with loads of ...	30.381527	-97.891388	1.98	2
7073	29488557	austin	6507 Krollton Dr	78745	Beautiful one story home in Cherry Creek. Two...	30.208628	-97.810165	1.98	2
4987	70332724	austin	10901 Strand St	78748	South Austin Gem! This beautifully updated 4 b...	30.167471	-97.843445	1.98	2
3558	29425216	austin	8519 Parkfield Dr	78758	Soak up the sunshine in this remodeled 3BR/4BA...	30.358917	-97.711327	1.98	2

```
In [303...]: # check how our histograms are looking for our columns that seem to have outliers
```

```
df.hist(figsize=(18,15), bins=100);
```



For the square footage variables, I ultimately concluded that extremely large houses and lots are so seriously under-represented in the dataset that we won't be able to reliably predict on them anyway and they are better left off.

Ultimately I opt to remove via IQR on these items.

In order to prevent a lot of data loss in this way, I kept IQR range of 1.6 instead of the standard 1.5

```
In [304...]
```

```
# determining our IQR for price, lot size, sq footage and Longitude
lotlower, lotupper = iqr_outliers(df.lotSizeSqFt, 1.6)
sqftlower, sqftupper = iqr_outliers(df.livingAreaSqFt, 1.6)

# dropping the things outside of our lower and upper range
df.drop(df[ (df.lotSizeSqFt > lotupper) | (df.lotSizeSqFt < lotlower) ].index , inplace=True)
df.drop(df[ (df.livingAreaSqFt > sqftupper) | (df.livingAreaSqFt < sqftlower) ].index , inplace=True)
```

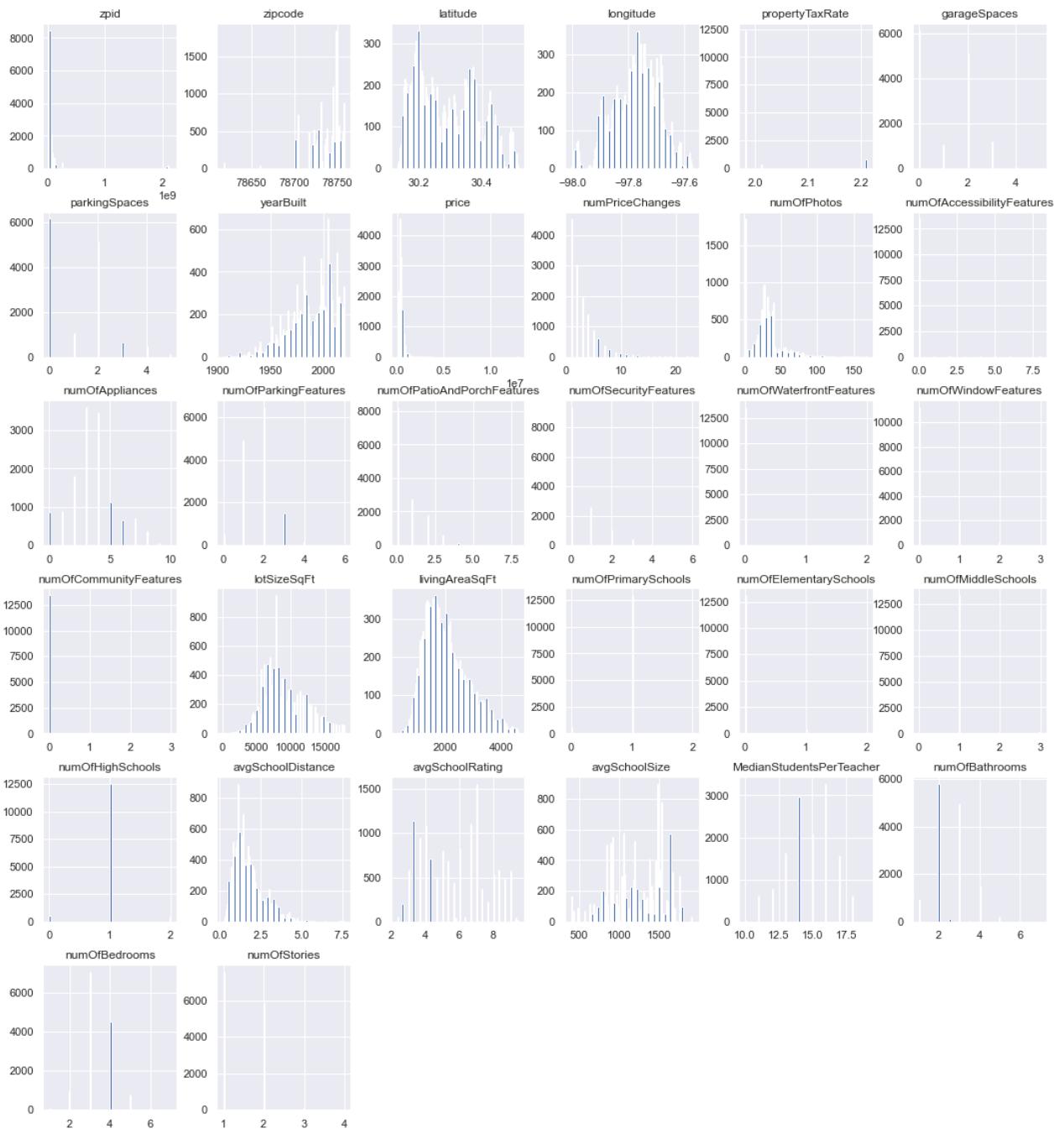
```
In [305...]
```

```
# We'll imputing the median lot size into condo and townhouse listings that are over-lapping
df.loc[(df['homeType']=='Condo') | (df['homeType']=='Townhouse') & (df['livingAreaSqFt'] < lotlower)]
```

```
In [306...]: # check how our histograms are looking
```

```
df.hist(figsize=(18,20), bins=100);
```

```
# much better
```



Manually locating price outliers

```
In [307...]:
```

```
# we're using the median house value for a zip code to determine the zip code's sort, so
```

```
# group our dataframe by zipcode on median home price, sorted ascending.
```

```
zipsorted = pd.DataFrame(df.groupby('zipcode')['price'].median().sort_values(ascending=
```

```
# divide our dataframe into groups with entries per group as specified above,  
# and assign this number to a new column
```

```
zipsorted['rank'] = np.divmod(np.arange(len(zipsorted)), 1)[0]+1
```

```

# function that looks up a segment that a data entry belongs to
def make_group(x, frame, column):
    y = frame.loc[(frame.index == x)][column]
    z = np.array(y)
    z[0]
    return z[0]

# make a new column on our dataframe. Look up each zip entry's group, and append to the
df['zip_rank'] = df['zipcode'].apply(lambda x: make_group(x, zipsorted, 'rank'))

# apply the median home price per zip code to the data frame
df['median_zip'] = df['zipcode'].apply(lambda x: round(df.loc[df['zipcode']==x]['price']

```

In [308...]

```

# visualize zip code as a color function

fig, ax = plt.subplots(figsize=(20, 15))

ax.scatter(df['median_zip'], df['price'] /100000, c=df['zip_rank'], cmap='magma_r')

ax.set_xlabel('Median Home Price per Zip', fontsize=12)
ax.set_ylabel('Price in $100,000', fontsize=12)
ax.set_title('Price per Zip Code Median, by Zip Code Median Rank', fontsize=20)
;
```

Out[308...]



We can see that a few of our zip codes are very high value. There are also some clear outliers in this data set. We'll take care of removing those, and then come back to this visual again later after we've

done some cleanup.

In [309...]

```
# we're dropping the values above 3 million, and the 3 entries from zipcode 78734
df.drop(df[df['price']>3000000].index, inplace=True)
df.drop(df[df['zipcode']==78734].index, inplace=True)

# check price stats by zip code and displaying top 30 zip codes by mean
find_zip_outliers = df.groupby('zipcode')['price'].describe()
find_zip_outliers.sort_values('mean', ascending=False).head(35)
# very suspicious values in many zip codes for min
```

Out[309...]

zipcode	count	mean	std	min	25%	50%	75%	max
78703	264.0	1.018940e+06	494831.316483	6300.0	656750.00	930000.0	1325000.00	2700000.0
78746	114.0	1.009715e+06	467114.608637	7900.0	699999.25	899950.0	1249000.00	2750000.0
78704	667.0	8.367228e+05	445576.067740	7500.0	536250.00	699850.0	999450.00	2995000.0
78731	420.0	7.496376e+05	303215.621686	124000.0	557425.00	725000.0	876000.00	1995000.0
78730	106.0	7.049658e+05	220979.656989	118499.0	569225.00	687250.0	829925.00	1400000.0
78738	1.0	6.970000e+05	NaN	697000.0	697000.00	697000.0	697000.00	697000.0
78756	133.0	6.803116e+05	332268.211346	21500.0	449900.00	599000.0	839000.00	2200000.0
78733	114.0	6.757573e+05	195457.693287	205000.0	549250.00	707450.0	799000.00	1200000.0
78701	7.0	6.395429e+05	252778.413221	415000.0	432450.00	549000.0	799450.00	1049000.0
78735	201.0	6.257530e+05	254162.971563	199900.0	485000.00	550000.0	680580.00	1725000.0
78705	59.0	5.990830e+05	390572.191023	23000.0	276500.00	520000.0	797000.00	1875000.0
78751	168.0	5.649131e+05	251580.281220	149900.0	388000.00	487450.0	696000.00	1324900.0
78750	276.0	5.572360e+05	145014.719606	165000.0	449000.00	567450.0	650000.00	985000.0
78732	471.0	5.288553e+05	168231.742433	5500.0	405000.00	499900.0	625000.00	1400000.0
78739	536.0	5.280328e+05	111451.423540	249900.0	449900.00	519000.0	596861.25	995000.0
78757	511.0	5.166404e+05	195987.852424	139999.0	399000.00	470000.0	599450.00	1750000.0
78702	379.0	5.141074e+05	216991.642138	6000.0	375000.00	475000.0	600000.00	1449900.0
78759	493.0	5.002341e+05	155575.421317	120000.0	398000.00	489000.0	595000.00	1150000.0
78722	93.0	4.924819e+05	142571.747486	250000.0	385000.00	475000.0	585000.00	899500.0
78726	162.0	4.790106e+05	94657.006093	125000.0	425500.00	479450.0	549800.00	714900.0
78737	400.0	4.768737e+05	100718.771064	179990.0	399996.75	467995.0	539000.00	819995.0
78723	524.0	4.332709e+05	163034.832533	54900.0	338675.00	415000.0	489900.00	1275000.0
78717	495.0	4.245748e+05	118653.200909	147900.0	347888.50	409000.0	499000.00	925000.0
78736	139.0	3.941405e+05	97790.381776	169997.0	329000.00	379000.0	478750.00	599900.0
78749	757.0	3.919731e+05	82732.933602	139900.0	346000.00	395000.0	439900.00	710000.0
78652	4.0	3.753398e+05	79883.093499	299500.0	321718.00	360929.5	414551.25	480000.0

	count	mean	std	min	25%	50%	75%	max
zipcode								
78741	211.0	3.695421e+05	151969.613344	86000.0	265000.00	349900.0	429900.00	899990.0
78721	229.0	3.609774e+05	125868.083355	8000.0	289900.00	349900.0	429999.00	799000.0
78727	385.0	3.603069e+05	90211.443597	114900.0	299900.00	369000.0	419900.00	605000.0
78752	145.0	3.590740e+05	136425.941671	82900.0	265000.00	349900.0	424900.00	1040000.0
78745	982.0	3.551464e+05	90065.987799	81000.0	300000.00	349250.0	399000.00	799000.0
78729	302.0	3.372419e+05	71750.444958	94900.0	290850.00	330000.0	387375.00	575000.0
78758	383.0	3.362563e+05	99359.028765	69000.0	269949.50	339000.0	395000.00	785000.0
78748	1086.0	3.165200e+05	76709.560443	97500.0	269900.00	309945.0	353625.00	699000.0
78728	223.0	3.008534e+05	60360.332339	99950.0	275000.00	305000.0	339900.00	469500.0

In [310...]

```
# anything under 75k is no way a legitimate market value sale.
# anything in this range is certainly a inter-family sale,
# non-commercial, some weird sale type.
# We are dropping all of those.
df.drop(df.loc[(df['price'] <= 75000)].index, axis=0, inplace=True)
```

In [311...]

```
# Eliminating outliers on a per-zipcode basis using our IQR 1.6

zipcodes = df['zipcode'].unique()

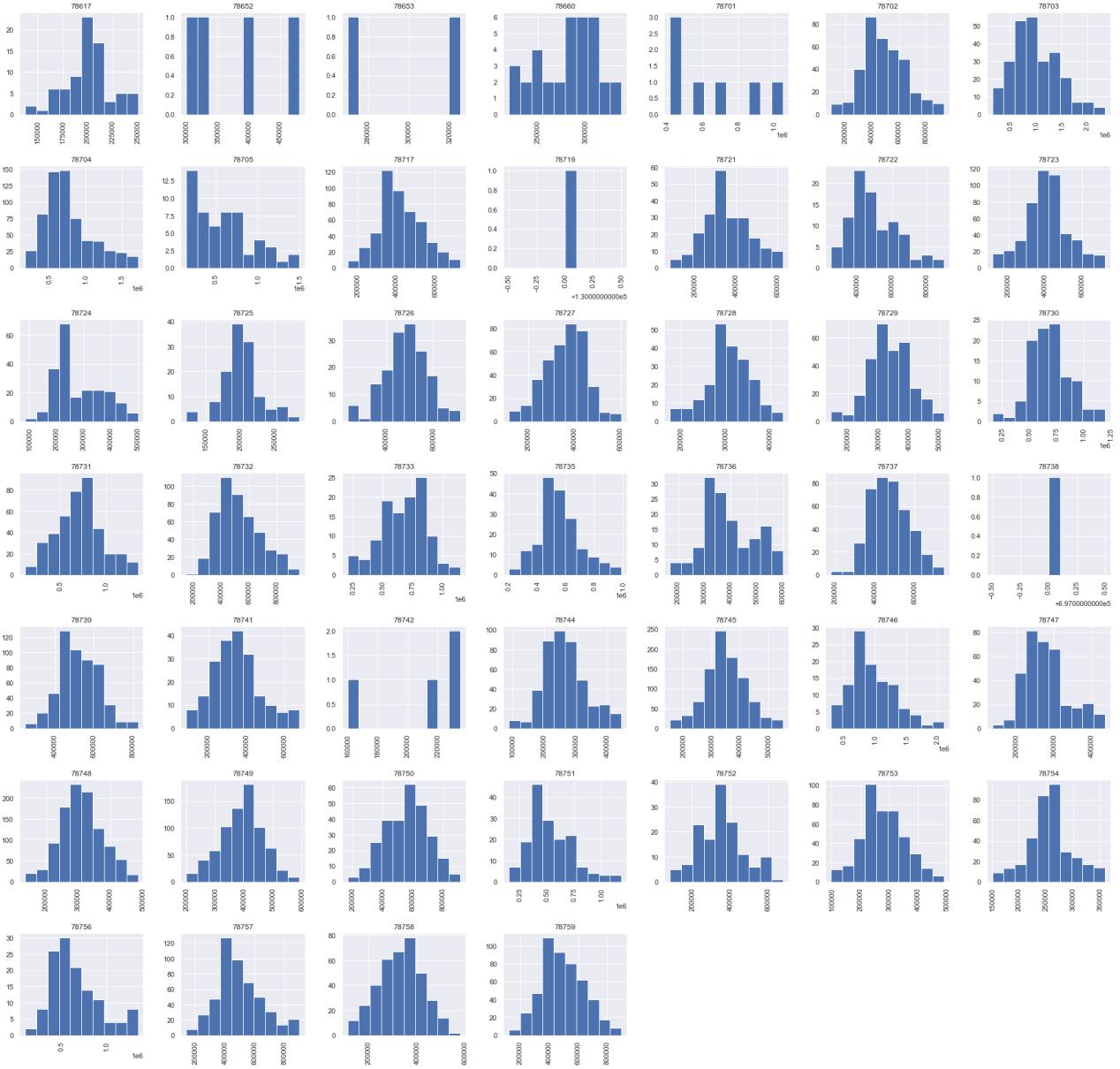
for i in zipcodes:
    lower, upper = iqr_outliers(df[df['zipcode'] == i]['price'], 1.6)
    df.drop(df[ (df.price > upper) & (df['zipcode'] == i) ] | (df.price < lower) &
```

In [312...]

```
#We can check our price per zip code histograms.

df['price'].hist(by=df['zipcode'], figsize=(30,30));

# some of our zip codes don't have enough sales to give us information
```



In [313...]

```
# We're going to drop our few zip codes where we have only a couple of data points
```

```
df.drop( df.loc[(df['zipcode']==78653) | (df['zipcode']==78738) | (df['zipcode']==78719)
```

In [314...]

```
# redo our zip code medians and rankings after outlier removal
```

```
# apply the median home price per zip code to the data frame again after outlier removal
df['median_zip'] = df['zipcode'].apply(lambda x: round(df.loc[df['zipcode']==x]['price'])
```

```
# group our dataframe by zipcode on median home price, sorted ascending. We want to bin
zipsorted = pd.DataFrame(df.groupby('zipcode')['price'].median().sort_values(ascending=
```

```
# divide our dataframe into groups with entries per group as specified above,
# and assign this number to a new column
zipsorted['rank'] = np.divmod(np.arange(len(zipsorted)), 1)[0]+1
```

```
# make a new column on our dataframe. Look up each zip entry's group, and append to the
df['zip_rank'] = df['zipcode'].apply(lambda x: make_group(x, zipsorted, 'rank'))
```

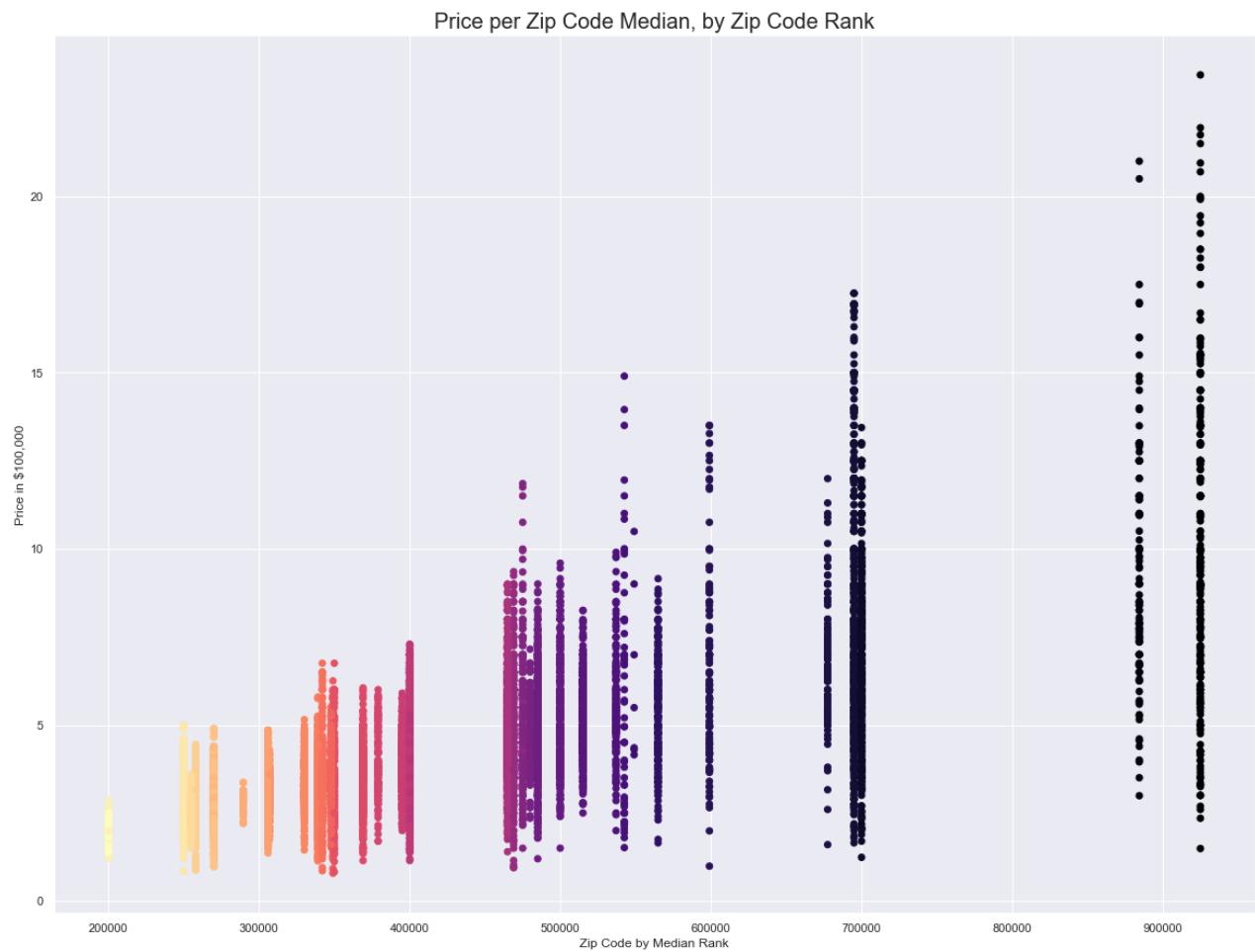
```
In [315...]: # re-visualize zip code as a color function, using the median zip after outlier removal

fig, ax = plt.subplots(figsize=(20, 15))

ax.scatter(df['median_zip'], df['price'] / 100000, c=df['zip_rank'], cmap='magma_r')

ax.set_xlabel('Zip Code by Median Rank', fontsize=12)
ax.set_ylabel('Price in $100,000', fontsize=12)
ax.set_title('Price per Zip Code Median, by Zip Code Rank', fontsize=20);

# save visualization to png
plt.savefig('images/zip_prices.png')
```



Cleanup

```
In [316...]: # combine all school counts into a single field
df['numOfSchools'] = df['numOfPrimarySchools'] + df['numOfElementarySchools'] + df['numOfHighSchools']

In [317...]: # there is only ONE listing with 5 schools, so we will change that one to 4
df.loc[df['numOfSchools']==5, 'numOfSchools'] = 4

In [318...]: # convert original boolean columns to binary 0/1
boolean = ['hasAssociation', 'hasCooling', 'hasHeating', 'hasSpa', 'hasView']

for item in boolean:
    df[boolean] = df[boolean].astype(int)
```

In [319]:

```
# reset indices on original data frame before making a copy
df.reset_index(inplace=True)
df.drop('index', axis=1, inplace=True)
```

Images Dataframe

In [67]:

```
# Make a data frame of our images

df_images = pd.DataFrame(df['homeImage'])
df_images
```

Out[67]:

	homeImage
0	111373431_ffce26843283d3365c11d81b8e6bdc6f-p_f...
1	120900430_8255c127be8dcf0a1a18b7563d987088-p_f...
2	2084491383_a2ad649e1a7a098111dcea084a11c855-p_...
3	120901374_b469367a619da85b1f5ceb69b675d88e-p_f...
4	60134862_b1a48a3df3f111e005bb913873e98ce2-p_f.jpg
...	...
13084	29504086_f55db59cbebad30d475f31e6aee0d020-p_f.jpg
13085	29512934_ff9b6eefa7e2eb4e9ef983da13a23098-p_f.jpg
13086	241937773_66d3e483bd783eac5a52ff5f938d2a2e-p_f...
13087	29473281_9e90ec4652c4b3b6592a7fdd09f1ea6d-p_f.jpg
13088	29390174_9580c60e14870498b2ce98b5f889471e-p_f.jpg

13089 rows × 1 columns

Visualizing our Data

In [320]:

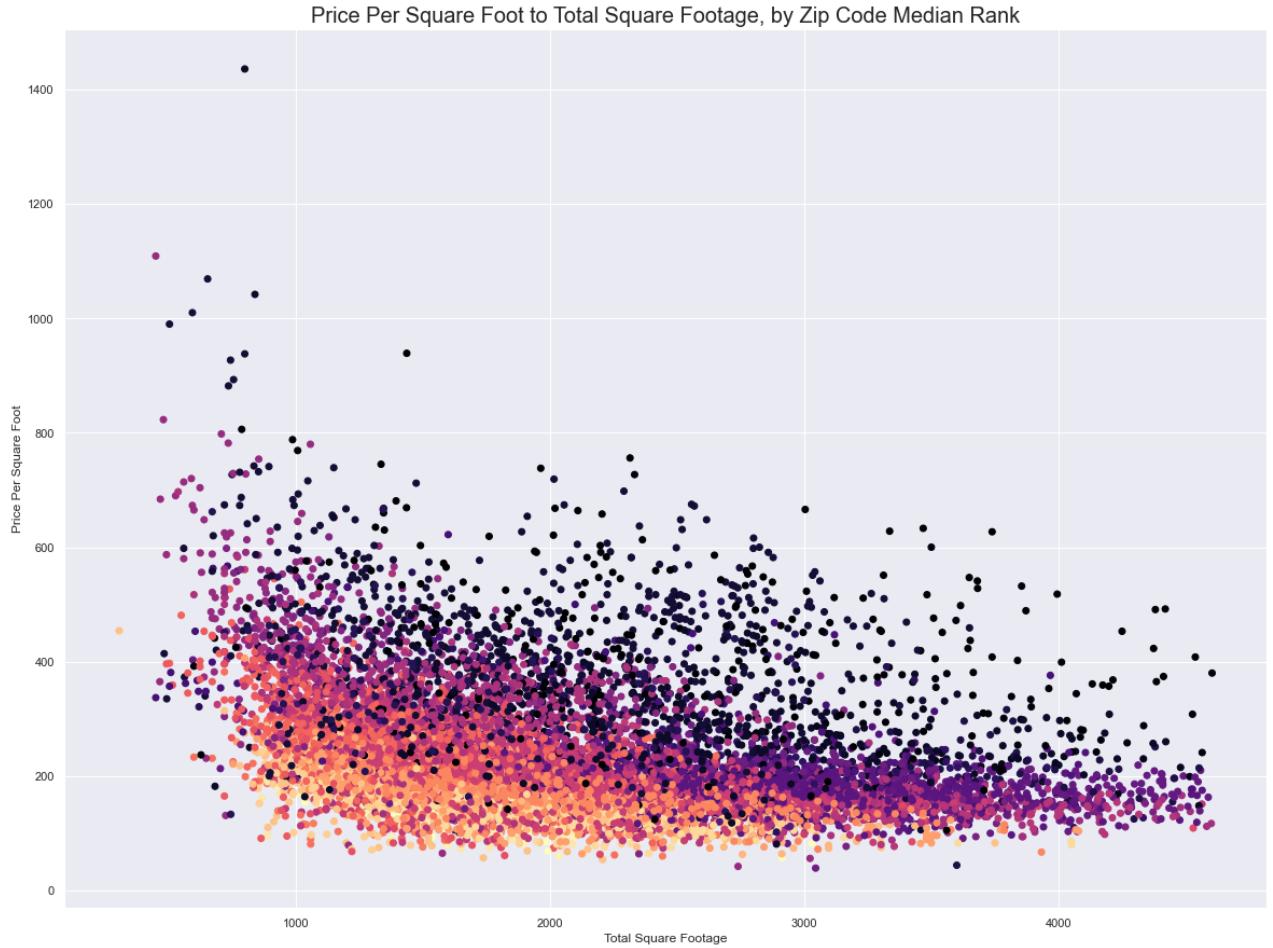
```
# apply the median price per square foot per zip code to the data frame
df['pr_sqft'] = df.apply(lambda x: round( (x['price'] / x['livingAreaSqFt'] ), 0), axis=1)

fig, ax = plt.subplots(figsize=(20, 15))

ax.scatter(df['livingAreaSqFt'], df['pr_sqft'], c=df['zip_rank'], cmap='magma_r')

ax.set_xlabel('Total Square Footage', fontsize=12)
ax.set_ylabel('Price Per Square Foot', fontsize=12)
ax.set_title('Price Per Square Foot to Total Square Footage, by Zip Code Median Rank', fontsize=12)

# save visualization to png
plt.savefig('images/sf_zip_prices.png')
```



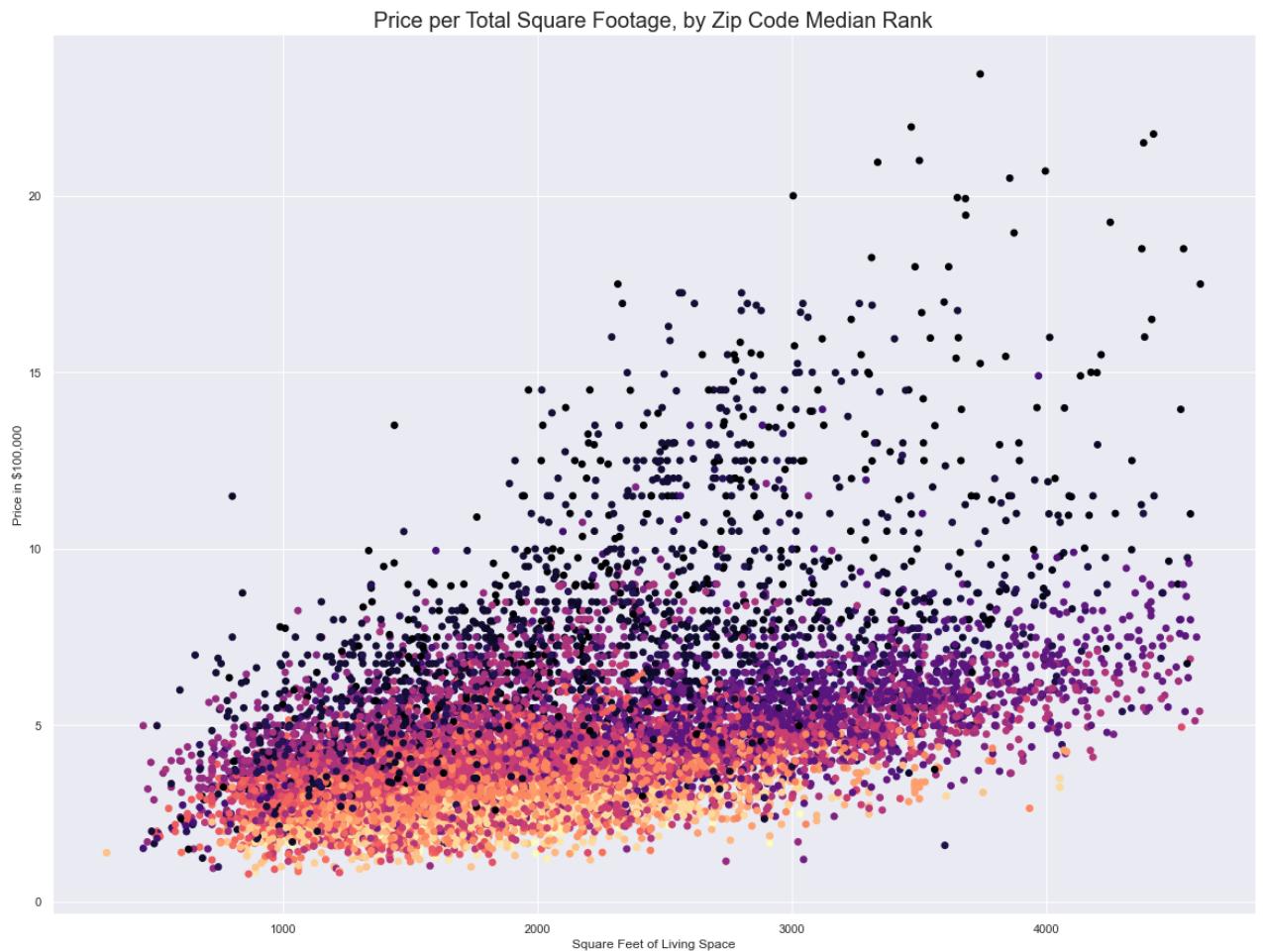
In [321...]

```
# visualize zip code as a color function, on a plot of price per square footage
fig, ax = plt.subplots(figsize=(20, 15))

ax.scatter(df['livingAreaSqFt'], df['price'] /100000, c=df['zip_rank'], cmap='magma_r')

ax.set_xlabel('Square Feet of Living Space', fontsize=12)
ax.set_ylabel('Price in $100,000', fontsize=12)
ax.set_title('Price per Total Square Footage, by Zip Code Median Rank', fontsize=20)
;

# save visualization to png
plt.savefig('images/price_sf.png')
```



Here's a fun way to see the improvements to our data quality after we clean outliers! A much deeper color map.

In [327]:

```
# plotting Latitude and Longitude as a visual scatter plot. The improved color map actually
# the removal of extreme price outliers.

plt.figure(figsize=(25,25))

sns.scatterplot(data=df, x="longitude", y="latitude", hue="price", palette="magma_r");

plt.title("Sales Map of Austin, colored by Price", fontsize=30)

# save visualization to png
plt.savefig('images/geo_scatter.png')
```

Sales Map of Austin, colored by Price



In [328]:

```
# we can also map our zip codes in this way.

plt.figure(figsize=(25,25))

sns.scatterplot(data=df, x="longitude", y="latitude", hue="zip_rank", palette="magma_r")

plt.title("Sales Map of Austin, colored by Zip Code Rank", fontsize=30)

# save visualization to png
plt.savefig('images/geo_scatter2.png')
```



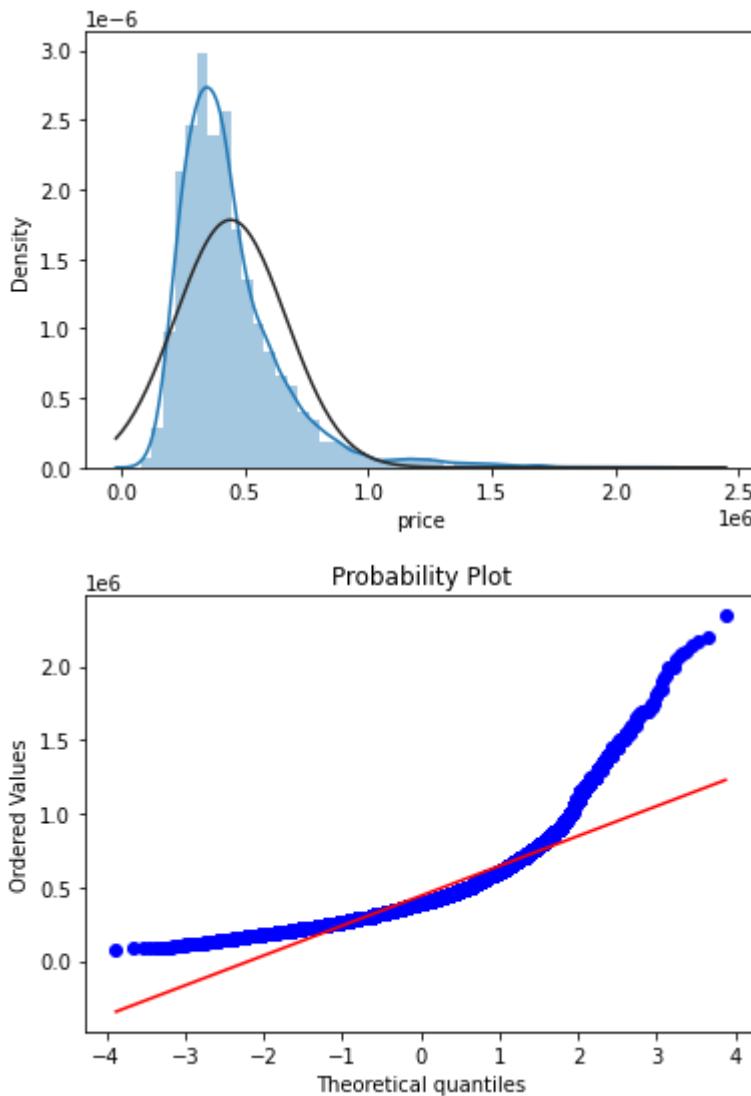
Study Target Variable

In [72]:

```
#histogram and normal probability plot
sns.distplot(df['price'], fit=norm);
fig = plt.figure()

res = stats.probplot(df['price'], plot=plt)

# our sales price histogram is positively skewed and has a high peak
# Our QQ-plot shows that we have heavy tails with right skew
```



In [73]:

```
#skewness and kurtosis
print("Skewness: %f" % df['price'].skew())
print("Kurtosis: %f" % df['price'].kurt())

# price is highly right skewed
# very positive kurtosis, indicating lots in the tails. We can see those tails in the r
```

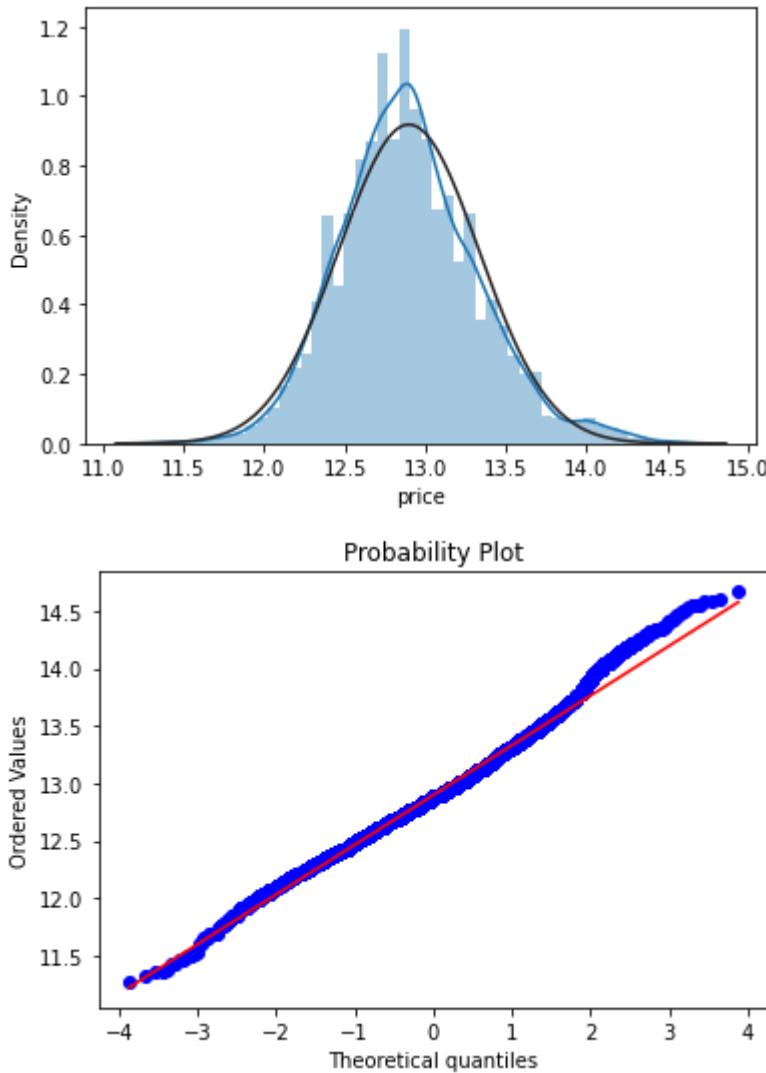
Skewness: 2.281054
 Kurtosis: 8.373716

In [74]:

```
# log transform our target price to improve normality of distribution
df_target_log = np.log(df['price'])

#histogram and normal probability plot
sns.distplot(df_target_log, fit=norm);
fig = plt.figure()
res = stats.probplot(df_target_log, plot=plt)

# Our target price is more normally distributed when Log transformed, so we'll be doing
```



Correlations/Multicollinearity

```
In [75]: # We are TEMPORARILY doing target encoding on the ENTIRE data set.
# We will be overwriting these encodings later in order to avoid data leakage!
# We're doing it now for EDA purposes ONLY.
df = target_encoding(df, df)
```

```
In [76]: sns.set(font_scale = 1)
df_c = df.corr()

# plot a heat map for all correlations in our data set

# make our figure
fig, ax = plt.subplots(figsize=(20, 20))

# we want our heatmap to not show the upper triangle, which is redundant data
df_c_mask = np.triu(np.ones_like(df_c, dtype=bool))

# adjust mask and df to hide center diagonal
df_c_mask = df_c_mask[1:, :-1]
corr = df_c.iloc[1:,:-1].copy()

# color map
```

```

cmap = sns.diverging_palette(220, 20, as_cmap=True)

# plot heatmap
sns.heatmap(corr, mask=df_c_mask, annot=False, fmt=".2f", cmap=cmap,
             vmin=-1, vmax=1, cbar_kws={"shrink": .8}, square=True)

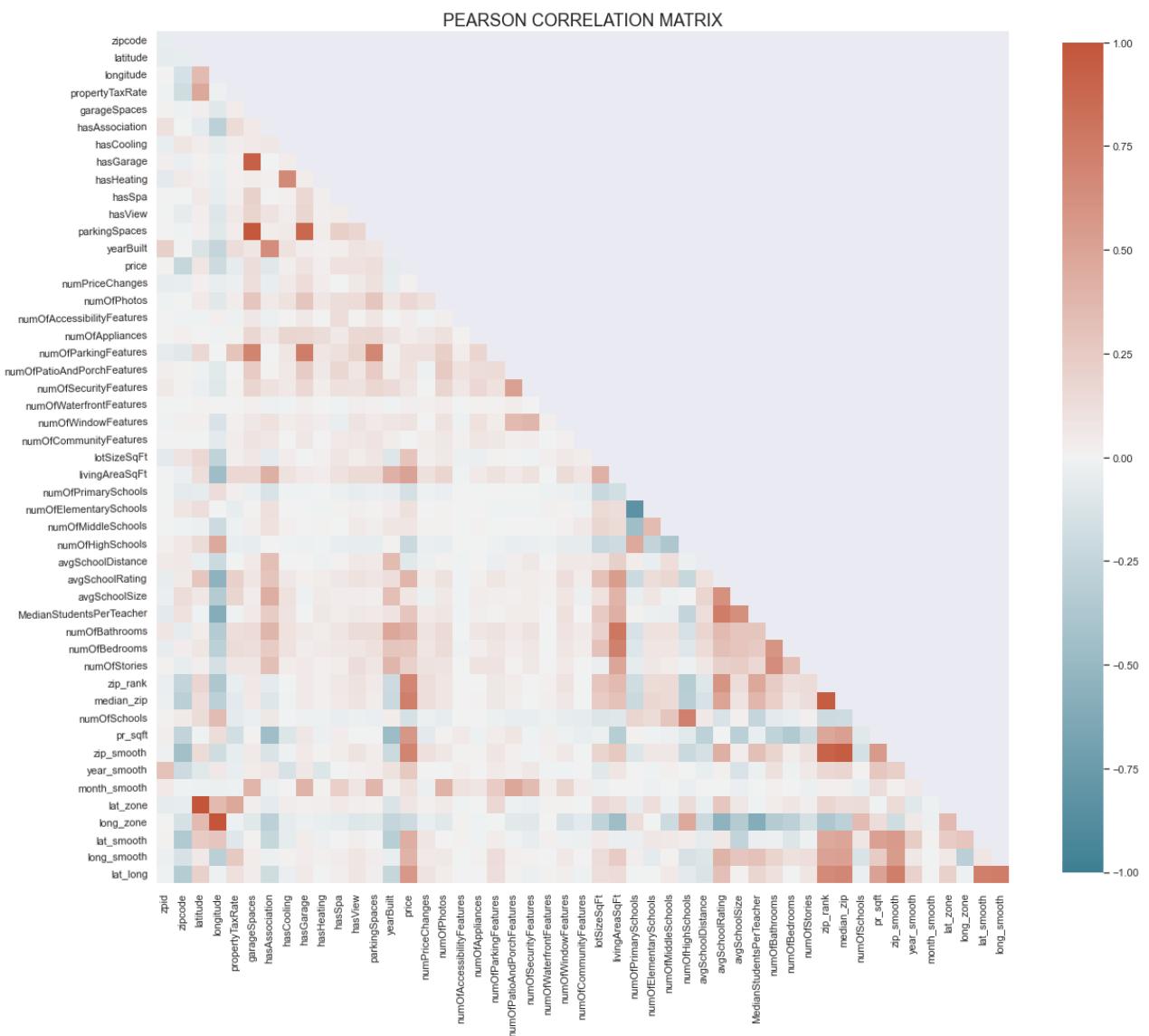
# yticks rotate
plt.yticks(rotation=1)

# title
title = 'PEARSON CORRELATION MATRIX'
plt.title(title, fontsize=18)

#plt.savefig('images/heatmap.png')

plt.show()

```



In [77]: #Get our list of highly correlated feature pairs with following steps:

```

# save correlation matrix as a new data frame
# converts all values to absolute value
# stacks the row:column pairs into a multindex
# reset the index to set the multindex to seperate columns

```

```

# sort values. 0 is the column automatically generated by the stacking
df_correlations = df.corr().abs().stack().reset_index().sort_values(0, ascending=False)

# zip the variable name columns in a new column named "pairs"
df_correlations['pairs'] = list(zip(df_correlations.level_0, df_correlations.level_1))

# set index to pairs
df_correlations.set_index(['pairs'], inplace = True)

# rename our results column to correlation
df_correlations.rename(columns={0: "correlation"}, inplace=True)

# Drop 1:1 correlations to get rid of self pairs
df_correlations.drop(df_correlations[df_correlations['correlation'] == 1.000000].index,

# view pairs above 75% correlation and below 90% correlation (engineered features will
df_correlations[(df_correlations.correlation>.75) & (df_correlations.correlation<.99)]
```

Out[77]:

		level_0	level_1	correlation
pairs				
(garageSpaces, parkingSpaces)		garageSpaces	parkingSpaces	0.980635
(parkingSpaces, garageSpaces)		parkingSpaces	garageSpaces	0.980635
(median_zip, zip_rank)		median_zip	zip_rank	0.952605
(zip_rank, median_zip)		zip_rank	median_zip	0.952605
(median_zip, zip_smooth)		median_zip	zip_smooth	0.947095
(zip_smooth, median_zip)		zip_smooth	median_zip	0.947095
(garageSpaces, hasGarage)		garageSpaces	hasGarage	0.923351
(hasGarage, garageSpaces)		hasGarage	garageSpaces	0.923351
(zip_smooth, zip_rank)		zip_smooth	zip_rank	0.913875
(zip_rank, zip_smooth)		zip_rank	zip_smooth	0.913875
(parkingSpaces, hasGarage)		parkingSpaces	hasGarage	0.878039
(hasGarage, parkingSpaces)		hasGarage	parkingSpaces	0.878039
(numOfElementarySchools, numOfPrimarySchools)		numOfElementarySchools	numOfPrimarySchools	0.831121
(numOfPrimarySchools, numOfElementarySchools)		numOfPrimarySchools	numOfElementarySchools	0.831121
(livingAreaSqFt, numOfBathrooms)		livingAreaSqFt	numOfBathrooms	0.782737
(numOfBathrooms, livingAreaSqFt)		numOfBathrooms	livingAreaSqFt	0.782737

In [78]:

```

# Check out our variables correlationg with price
df_correlations = df.corr().abs().stack().reset_index().sort_values(0, ascending=False)
df_correlations.loc[df_correlations['level_0'] == 'price'].sort_values(0, ascending=False)
```

Out[78]:

level_0	level_1	0
---------	---------	---

	level_0	level_1	0
714	price	price	1.000000
739	price	median_zip	0.728198
742	price	zip_smooth	0.700368
738	price	zip_rank	0.686132
741	price	pr_sqft	0.574434
749	price	lat_long	0.565190
726	price	livingAreaSqFt	0.500354
747	price	lat_smooth	0.430516
735	price	numOfBathrooms	0.418796
748	price	long_smooth	0.402620
732	price	avgSchoolRating	0.385059
725	price	lotSizeSqFt	0.295673
734	price	MedianStudentsPerTeacher	0.283002
736	price	numOfBedrooms	0.272314
743	price	year_smooth	0.264455
701	price	zipcode	0.235549
730	price	numOfHighSchools	0.213056
737	price	numOfStories	0.210799
746	price	long_zone	0.199865
703	price	longitude	0.199852
716	price	numOfPhotos	0.159085
727	price	numOfPrimarySchools	0.148756
740	price	numOfSchools	0.145586
705	price	garageSpaces	0.130039
712	price	parkingSpaces	0.121900
728	price	numOfElementarySchools	0.114151
744	price	month_smooth	0.110617
719	price	numOfParkingFeatures	0.110393
720	price	numOfPatioAndPorchFeatures	0.107849
710	price	hasSpa	0.107551
711	price	hasView	0.106469
731	price	avgSchoolDistance	0.092605
708	price	hasGarage	0.091880

	level_0	level_1	0
706	price	hasAssociation	0.090326
723	price	numOfWindowFeatures	0.090245
729	price	numOfMiddleSchools	0.082816
702	price	latitude	0.081620
745	price	lat_zone	0.081395
721	price	numOfSecurityFeatures	0.072561
733	price	avgSchoolSize	0.072149
704	price	propertyTaxRate	0.060315
713	price	yearBuilt	0.055267
718	price	numOfAppliances	0.042193
717	price	numOfAccessibilityFeatures	0.031296
722	price	numOfWaterfrontFeatures	0.029389
709	price	hasHeating	0.027070
707	price	hasCooling	0.026036
715	price	numPriceChanges	0.012059
700	price	zpid	0.008802
724	price	numOfCommunityFeatures	0.000745

We'll use:

- Keep garageSpaces (highest correlation with Price) and drop parkingSpaces, hasGarage, numOfParkingFeatures
- Keep numOfHighSchools and drop numOfPrimarySchools, numOfElementarySchools, numOfMiddleSchools
- Keep zip_smooth and drop median_zip, zip_rank
- Keep lat_long and drop lat_smooth, long_smooth
- numOfBathrooms correlates with square footage, but I'm not dropping either

We can get a sense of the most important features to our price from our correlation table. Zipcode as a plain variable does not correlate, which makes sense, because without some sort of transformation it is an arbitrary unordered number. We can see how as a smooth target encoding, it becomes the MOST important contributor to price. We can see here that big contributors to price include

```
* zip code in a target encoded form
* Lat/long in a target encoded form
* livingAreaSqFt
* numBathrooms
* avgSchoolRating
* lotSizeSqFt
```

Fields Cleanup

```
In [79]: # Drop unneeded fields

df.drop(['zpid', 'city', 'streetAddress', 'latestPriceSource', 'homeImage',
       'numOfElementarySchools', 'numOfMiddleSchools', 'numOfPrimarySchools', 'numOfSch
       'median_zip', 'zip_rank',
       'parkingSpaces', 'hasGarage', 'numOfParkingFeatures'], axis=1, inplace=True)
```

Visualizing Categoricals and Continuous

```
In [80]: categoricals = ['hasAssociation', 'hasCooling', 'hasHeating', 'hasSpa', 'hasView']

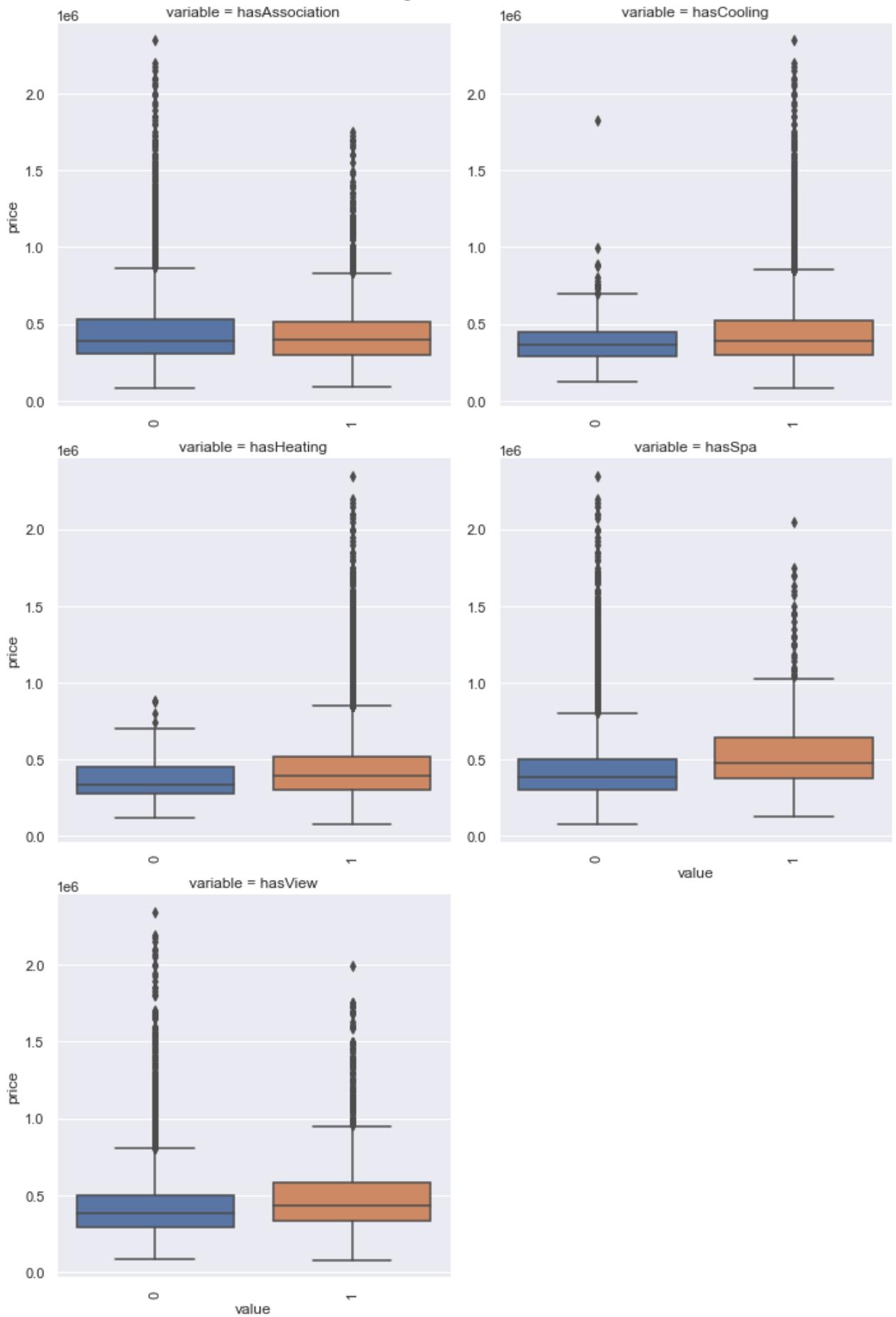
df_categoricals = df[categoricals]
df_categoricals['price'] = df['price']

# plot our categoricals as box plots vs price
def boxplot(x, y, **kwargs):
    sns.boxplot(x=x, y=y)
    x=plt.xticks(rotation=90)

f = pd.melt(df_categoricals, id_vars=['price'], value_vars=categoricals)
g = sns.FacetGrid(f, col="variable", col_wrap=2, sharex=False, sharey=False, size=5)
g = g.map(boxplot, "value", "price")

g.fig.subplots_adjust(top=0.95) # adjust the Figure
g.fig.suptitle('Categoricals vs Price');
```

Categoricals vs Price



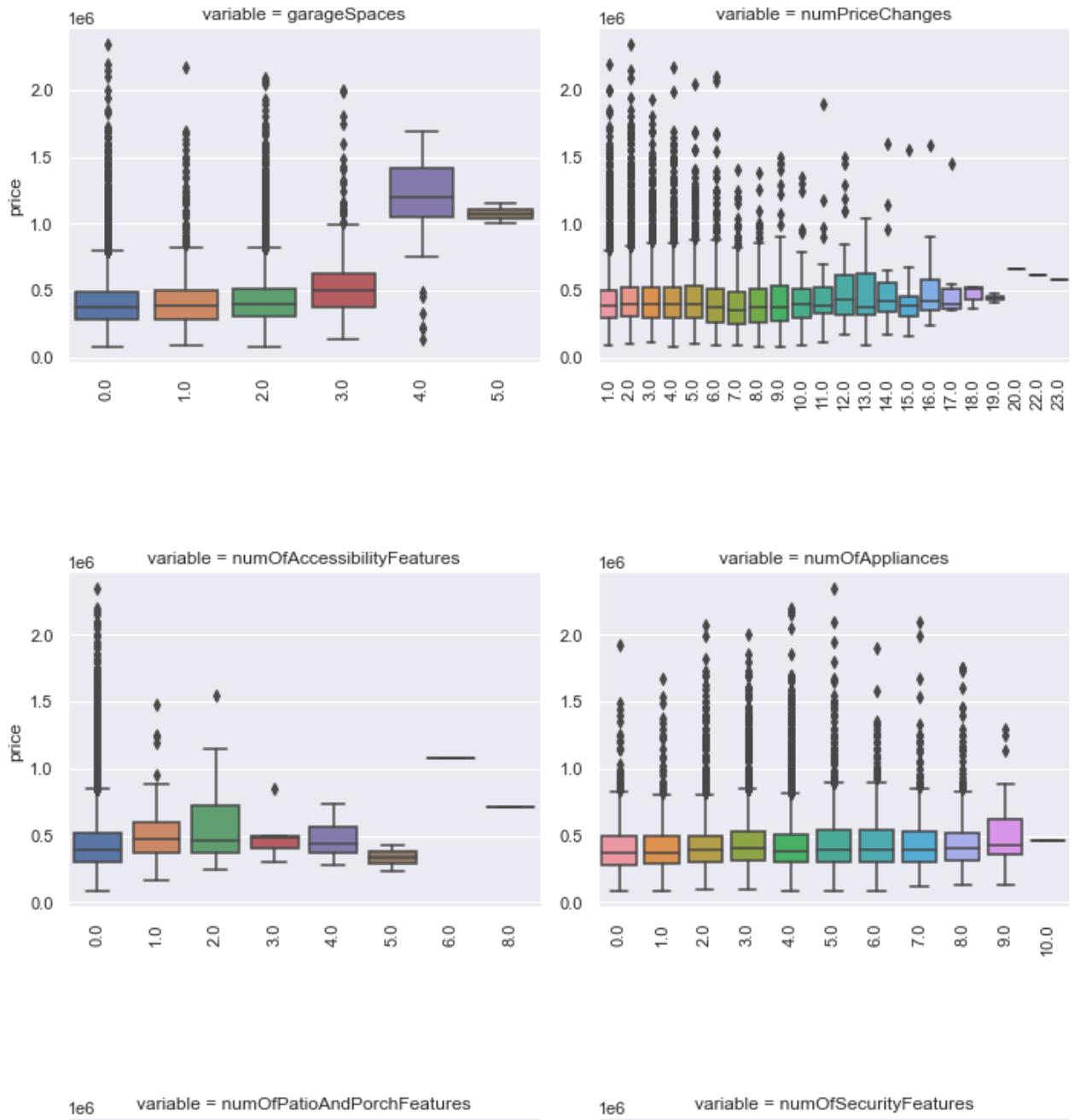
```
In [81]: small_cont = ['garageSpaces', 'numPriceChanges', 'numOfAccessibilityFeatures', 'numOfApp
    'numOfPatioAndPorchFeatures', 'numOfSecurityFeatures',
    'numOfWaterfrontFeatures', 'numOfWindowFeatures',
    'numOfCommunityFeatures', 'avgSchoolRating',
    'numOfBedrooms', 'numOfStories']

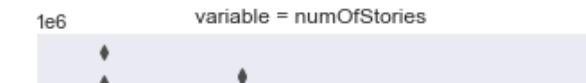
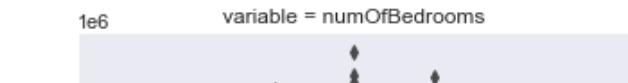
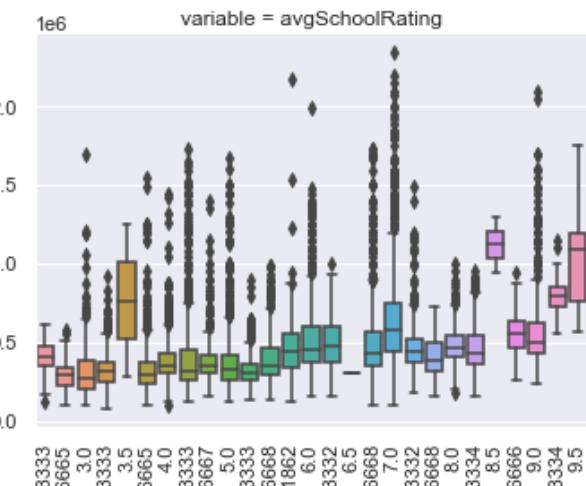
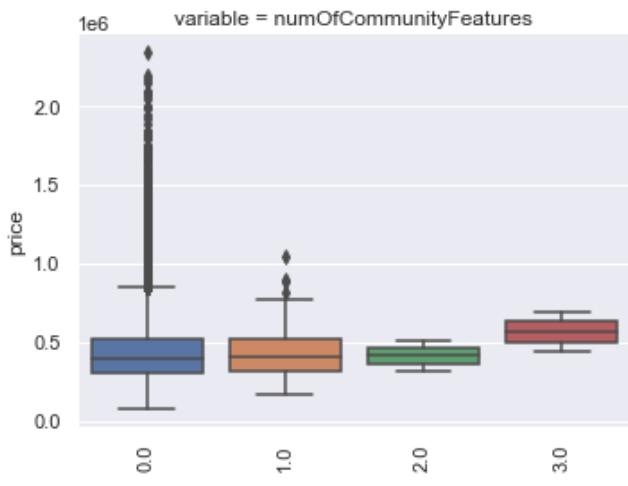
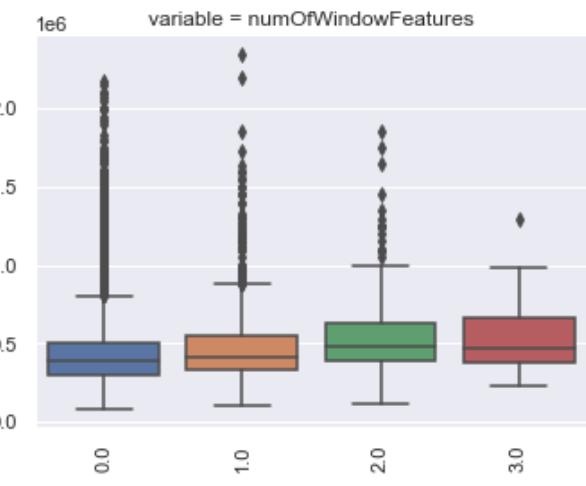
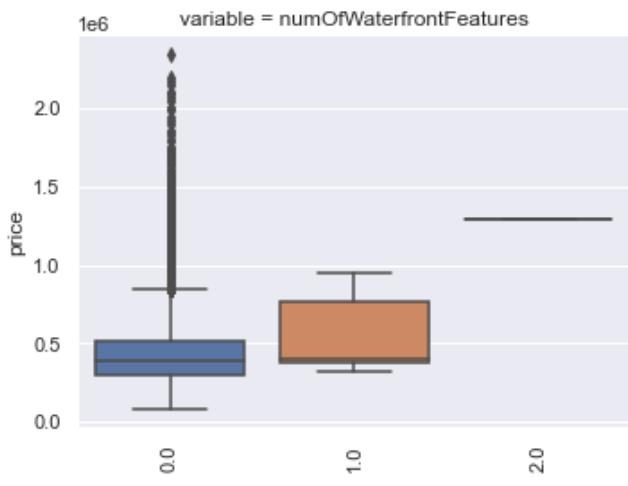
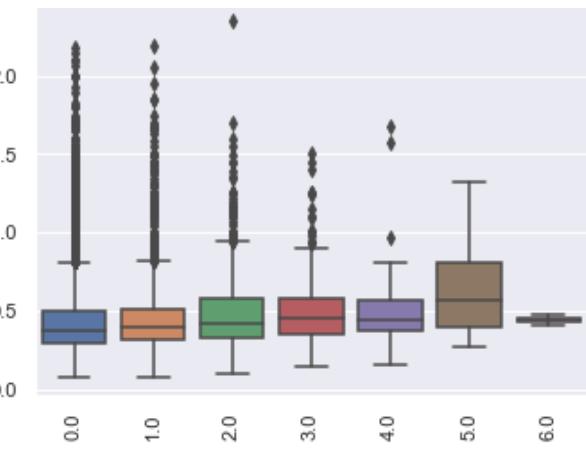
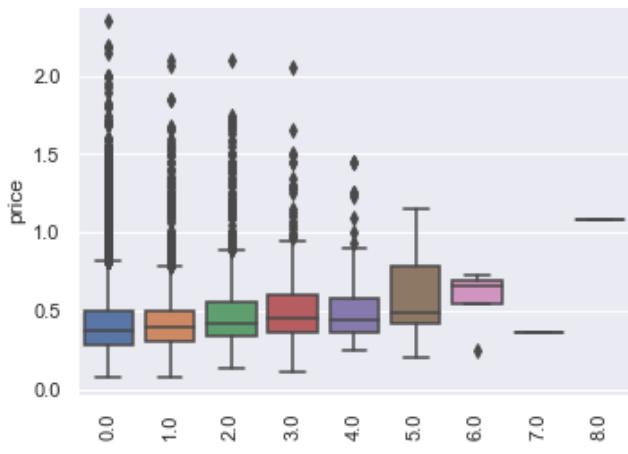
# plot our continuous as box plots vs price
def boxplot(x, y, **kwargs):
    sns.boxplot(x=x, y=y)
    plt.xticks(rotation=90)

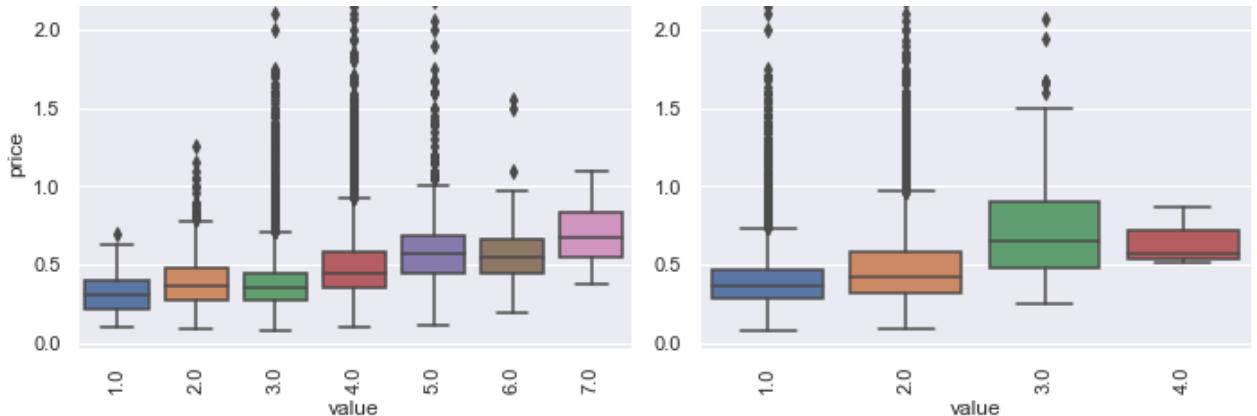
f = pd.melt(df, id_vars=['price'], value_vars=small_cont)
g = sns.FacetGrid(f, col="variable", col_wrap=2, sharex=False, sharey=False, size=5)
g = g.map(boxplot, "value", "price")

g.fig.subplots_adjust(top=0.95) # adjust the Figure
g.fig.suptitle('Small Continuous vs Price');
```

Small Continuous vs Price







In [82]:

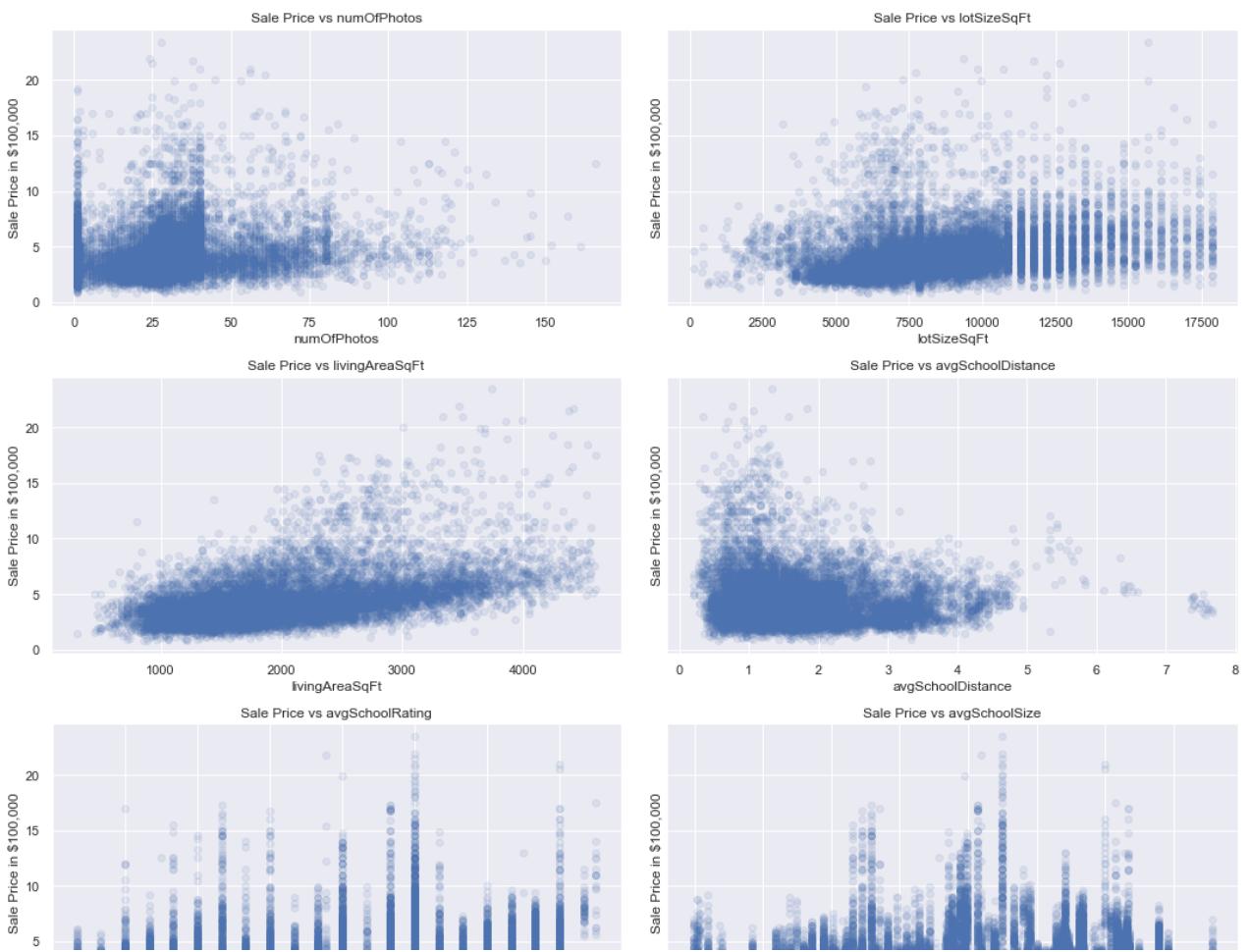
```
column = ['numOfPhotos', 'lotSizeSqFt', 'livingAreaSqFt',
          'avgSchoolDistance', 'avgSchoolRating', 'avgSchoolSize',
          'lat_long', 'month_smooth', 'zip_smooth', 'year_smooth', 'yearBuilt', 'num']

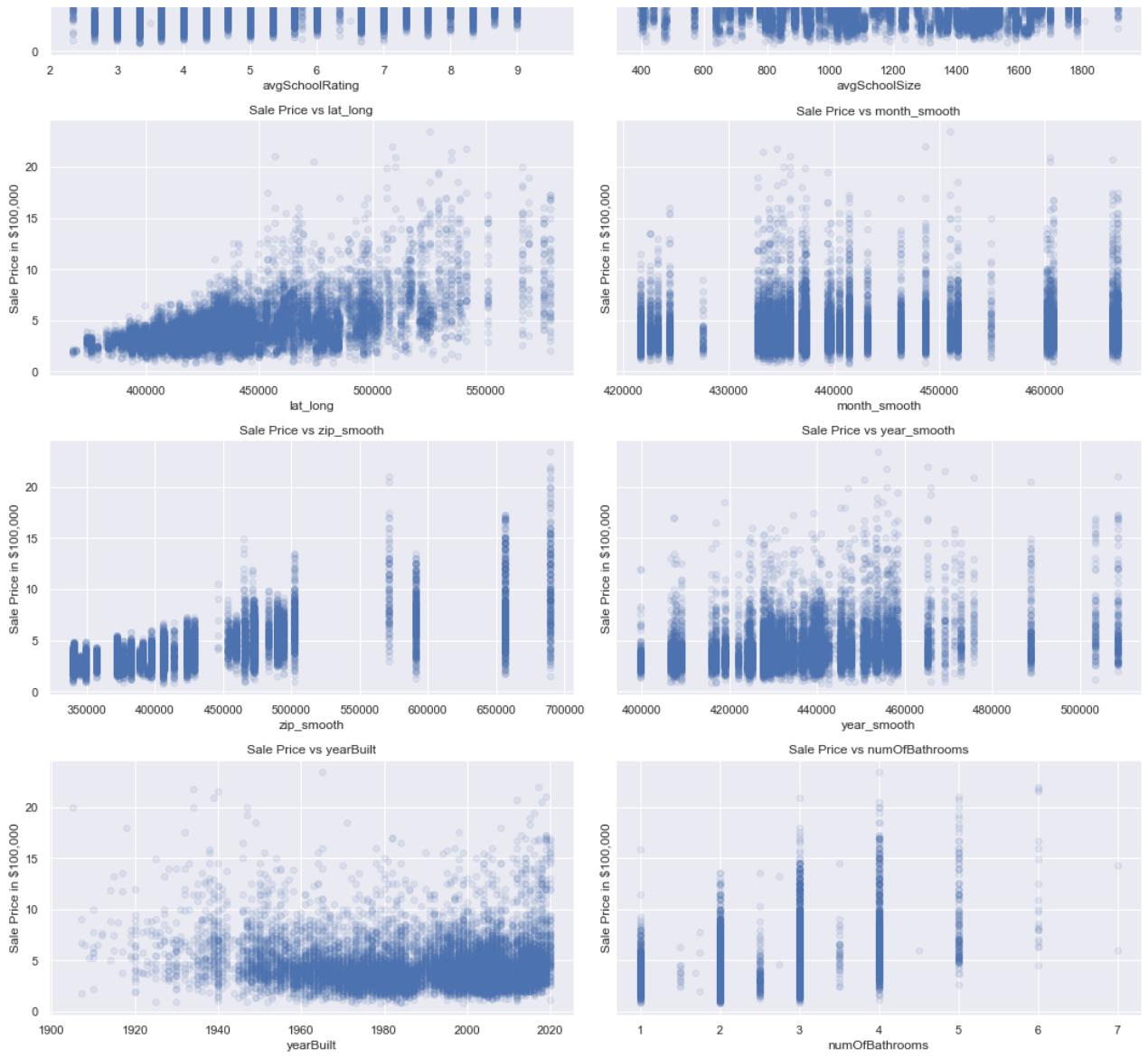
# check linearity of continuous predictors

fig, axes = plt.subplots(nrows=6, ncols=2, figsize=(15,25), sharey=True)

for ax, column in zip(axes.flatten(), column):
    ax.scatter(df[column], df['price']/100000, label=column, alpha=.1)
    ax.set_title(f'Sale Price vs {column}')
    ax.set_xlabel(column)
    ax.set_ylabel('Sale Price in $100,000')

fig.tight_layout()
```





Positive relationship observed with:

- lot size
- square footage
- school rating
- number of bedrooms
- lat/long

Negative relationship observed with:

- number of price changes

Others seem neutral/uncertain

Looking for Polynomials

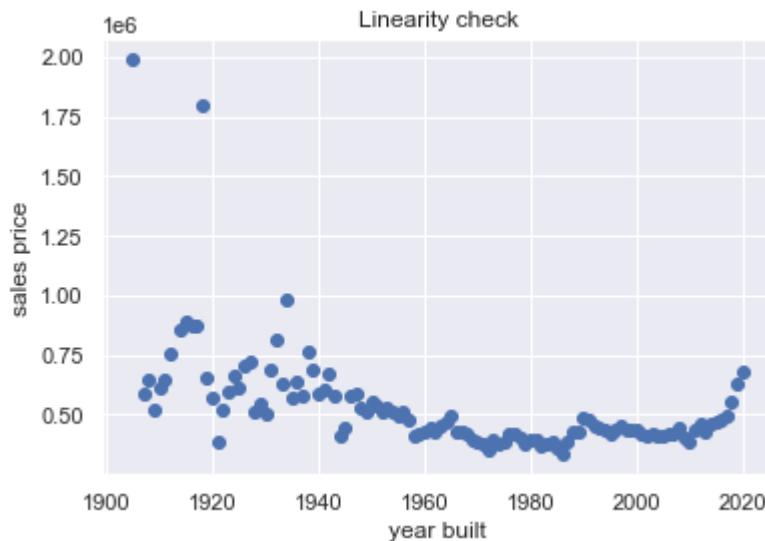
In [83]:

```
# Checking out our mean sales price for year built scattered versus price shows a polynomial
yearly_prices = df.groupby('yearBuilt')['price'].mean()
```

```

plt.scatter(yearly_prices.index, yearly_prices)
plt.title("Linearity check")
plt.xlabel('year built')
plt.ylabel('sales price')
plt.show()

```



Looks somewhat polynomial

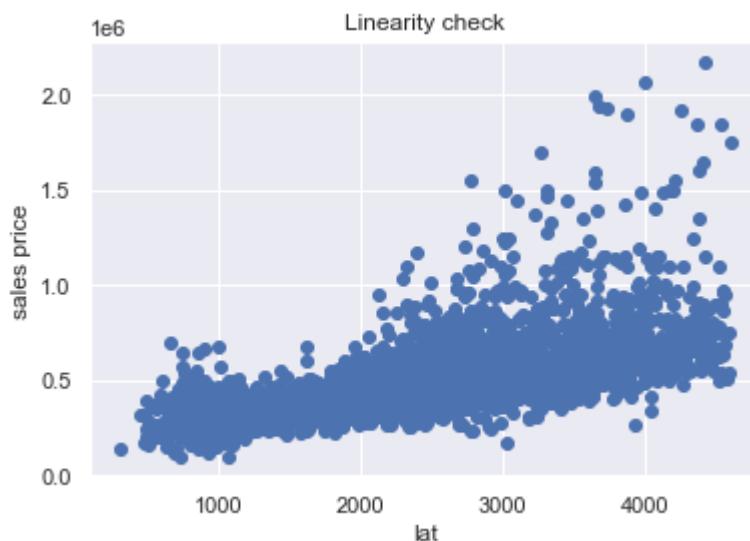
In [84]:

```

# Checking out our mean sales price for square footage scattered versus price shows a
lat_prices = df.groupby('livingAreaSqFt')['price'].mean()

plt.scatter(lat_prices.index, lat_prices)
plt.title("Linearity check")
plt.xlabel('lat')
plt.ylabel('sales price')
plt.show()

```



This looks linear

In [85]:

```

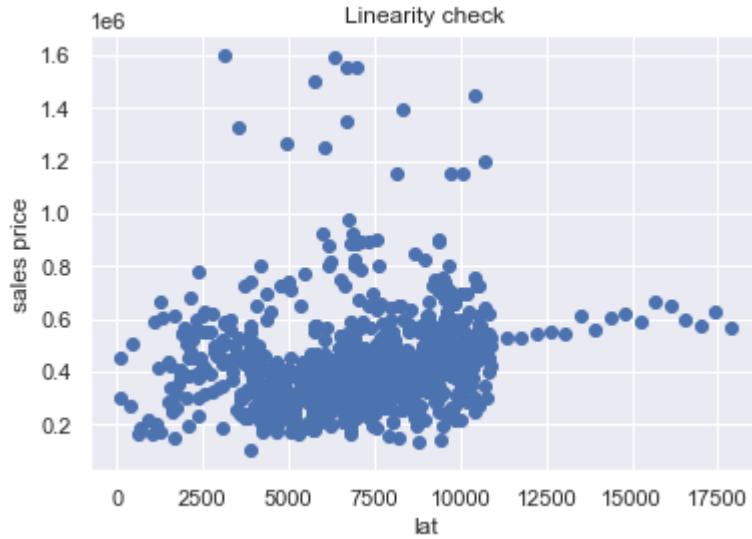
# Checking out our mean sales price for Lot size scattered versus price shows a polynomial
lat_prices = df.groupby('lotSizeSqFt')['price'].mean()

```

```

plt.scatter(lat_prices.index, lat_prices)
plt.title("Linearity check")
plt.xlabel('lat')
plt.ylabel('sales price')
plt.show()

```



This looks somewhat linear

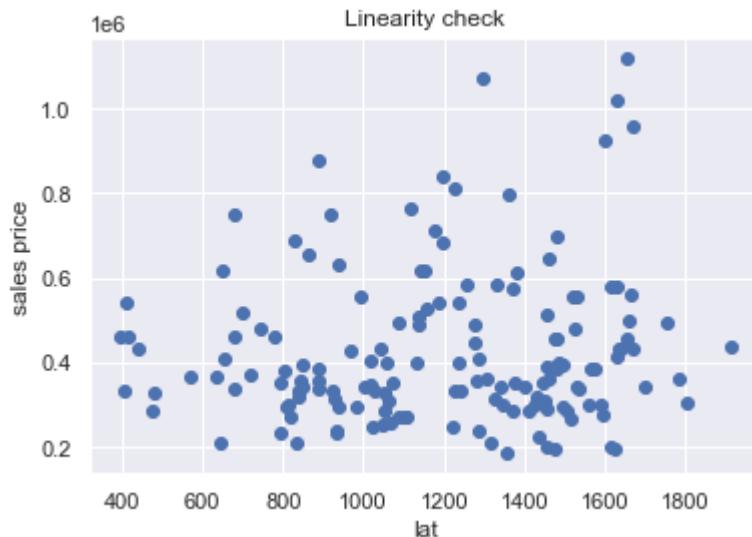
In [86]:

```

# Checking out our mean sales price for average school size, scattered versus price show
lat_prices = df.groupby('avgSchoolSize')['price'].mean()

plt.scatter(lat_prices.index, lat_prices)
plt.title("Linearity check")
plt.xlabel('lat')
plt.ylabel('sales price')
plt.show()

```



This looks meaningless

Standard Models

Data Preprocessing

Creating our train, validation, and test sets

In [87]:

```
# Split our x and y
y = pd.DataFrame(np.log(df['price']))
x = df.drop('description', axis=1)

# split into train, validation and test
train, remaining_20, y_train, y_remaining = train_test_split(x, y, test_size=0.2, random_state=42)
val, test, y_val, y_test = train_test_split(remaining_20, y_remaining, test_size=.5, random_state=42)

# reset indices to prevent any index mismatches
train.reset_index(inplace=True, drop=True)
val.reset_index(inplace=True, drop=True)
test.reset_index(inplace=True, drop=True)
y_train = np.array(y_train.reset_index(drop=True))
y_val = np.array(y_val.reset_index(drop=True))
y_test = np.array(y_test.reset_index(drop=True))
```

In [88]:

```
# define categorical fields, continuous fields, polynomial fields, and drop fields
categoricals = ['zipcode', 'homeType', 'sale_date',
                 'numOfHighSchools', 'propertyTaxRate',
                 'hasAssociation', 'hasCooling', 'hasHeating', 'hasSpa', 'hasView']
continuous = ['garageSpaces', 'numPriceChanges',
               'numOfPhotos', 'numOfAccessibilityFeatures', 'numOfAppliances', 'numOfPatioAndPorch',
               'numOfSecurityFeatures', 'numOfWaterfrontFeatures', 'numOfWindowFeatures', 'numOfBedrooms',
               'lotSizeSqFt', 'livingAreaSqFt', 'avgSchoolDistance', 'avgSchoolRating',
               'avgSchoolSize', 'MedianStudentsPerTeacher', 'numOfBathrooms', 'numOfBedrooms',
               'zip_smooth', 'year_smooth', 'month_smooth', 'lat_long']
poly = ['yearBuilt']
drop_fields = [
    'price', 'latitude', 'longitude', 'lat_zone', 'long_zone', 'lat_smooth']
```

We call our processing pipeline on our train, val and test sets

- standardize our continuous variables
- target encoding specific categoricals
- adding a polynomial feature
- dropping unneeded fields after target encoding

In [89]:

```
# call our processing pipeline function to clean our inputs
processed_train, processed_val, processed_test = processing_pipeline(train, val, test,
```

```
Iteration: 0
Iteration: 1
Iteration: 2
```

We're going to evaluate many model types. In order to keep track of our results, we'll be making a dictionary to store our model results.

In [90]:

```
# prepare dictionary to store score results

models = {}
models['model'] = []
```

```
models['r2'] = []
models['mae'] = []
models['rmse'] = []
```

Spot Check Models

In [91]:

```
# Set up spot check models

baseline_models = {
    "LR": LinearRegression(),
    "Extra Trees": ExtraTreesRegressor(random_state = randomstate),
    "Gradient Boosted": GradientBoostingRegressor(random_state = randomstate),
    "KNN": KNeighborsRegressor(),
    "Lars": Lars(random_state = randomstate, copy_X=True, normalize=False),
    "LinearSVR": LinearSVR(random_state = randomstate),
    "MLPRegressor": MLPRegressor(random_state = randomstate),
    "Bayesian Ridge": BayesianRidge(),
    "Nu SVR": NuSVR(),
    "Ridge": Ridge(random_state = randomstate, tol=1e-3, normalize=False),
    "SVR": SVR(),
    "XGB Regressor": xgb.XGBRegressor(random_state = randomstate),
    "Random Forest Regressor": RandomForestRegressor(random_state=randomstate)
}

# run spot check on each model inline
for model in baseline_models:
    this_model = baseline_models[model]
    label = model
    spot_check = score_model(this_model, processed_train, y_train, label, models)
```

```
LR scores
CV 5 R2 Train Score: 77.14
CV 5 MAE Train Score: 0.1457
CV 5 RMSE Train Score: 0.2075
```

```
Extra Trees scores
CV 5 R2 Train Score: 78.79
CV 5 MAE Train Score: 0.1346
CV 5 RMSE Train Score: 0.1997
```

```
Gradient Boosted scores
CV 5 R2 Train Score: 77.38
CV 5 MAE Train Score: 0.148
CV 5 RMSE Train Score: 0.2064
```

```
KNN scores
CV 5 R2 Train Score: 70.13
CV 5 MAE Train Score: 0.1699
CV 5 RMSE Train Score: 0.2372
```

```
Lars scores
CV 5 R2 Train Score: -1.4016346105481372e+27
CV 5 MAE Train Score: 249625273791.754
```

```
CV 5 RMSE Train Score: 745106495150.006
```

```
LinearSVR scores
CV 5 R2 Train Score: 76.41
CV 5 MAE Train Score: 0.144
CV 5 RMSE Train Score: 0.2108
```

```
MLPRegressor scores
CV 5 R2 Train Score: 62.1
CV 5 MAE Train Score: 0.1742
CV 5 RMSE Train Score: 0.2633
```

```
Bayesian Ridge scores
CV 5 R2 Train Score: 77.15
CV 5 MAE Train Score: 0.1458
CV 5 RMSE Train Score: 0.2074
```

```
Nu SVR scores
CV 5 R2 Train Score: 78.56
CV 5 MAE Train Score: 0.1346
CV 5 RMSE Train Score: 0.2009
```

```
Ridge scores
CV 5 R2 Train Score: 77.17
CV 5 MAE Train Score: 0.1456
CV 5 RMSE Train Score: 0.2073
```

```
SVR scores
CV 5 R2 Train Score: 78.53
CV 5 MAE Train Score: 0.1373
CV 5 RMSE Train Score: 0.2011
```

```
XGB Regressor scores
CV 5 R2 Train Score: 78.5
CV 5 MAE Train Score: 0.1391
CV 5 RMSE Train Score: 0.2012
```

```
Random Forest Regressor scores
CV 5 R2 Train Score: 78.87
CV 5 MAE Train Score: 0.1365
CV 5 RMSE Train Score: 0.1994
```

```
In [92]: # make data frame from our models dictionary
target = pd.DataFrame(models).reset_index(drop=True)

# sort data frame by mae and reset index
target.sort_values('mae', ascending=True).head(20)
```

	model	r2	mae	rmse
1	Extra Trees	7.879000e+01	1.346000e-01	1.997000e-01

	model	r2	mae	rmse
8	Nu SVR	7.856000e+01	1.346000e-01	2.009000e-01
12	Random Forest Regressor	7.887000e+01	1.365000e-01	1.994000e-01
10	SVR	7.853000e+01	1.373000e-01	2.011000e-01
11	XGB Regressor	7.850000e+01	1.391000e-01	2.012000e-01
5	LinearSVR	7.641000e+01	1.440000e-01	2.108000e-01
9	Ridge	7.717000e+01	1.456000e-01	2.073000e-01
0	LR	7.714000e+01	1.457000e-01	2.075000e-01
7	Bayesian Ridge	7.715000e+01	1.458000e-01	2.074000e-01
2	Gradient Boosted	7.738000e+01	1.480000e-01	2.064000e-01
3	KNN	7.013000e+01	1.699000e-01	2.372000e-01
6	MLPRegressor	6.210000e+01	1.742000e-01	2.633000e-01
4	Lars	-1.401635e+27	2.496253e+11	7.451065e+11

Feature Selectors

In [93]:

```
# Unless we specify a different model, this is our baseline model
model = ExtraTreesRegressor(random_state = randomstate)
```

In [94]:

```
# use statsmodels to check our feature p-values
predictors_train = sm.add_constant(processed_train)
modelols = sm.OLS(y_train, predictors_train).fit()
modelols.summary()
```

Out[94]:

OLS Regression Results

Dep. Variable:	y	R-squared:	0.777
Model:	OLS	Adj. R-squared:	0.775
Method:	Least Squares	F-statistic:	328.5
Date:	Mon, 08 Nov 2021	Prob (F-statistic):	0.00
Time:	14:38:01	Log-Likelihood:	1738.7
No. Observations:	10471	AIC:	-3255.
Df Residuals:	10360	BIC:	-2450.
Df Model:	110		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	6.1380	0.017	357.275	0.000	6.104	6.172
x1	0.0084	0.002	3.466	0.001	0.004	0.013

x2	-0.0683	0.002	-32.296	0.000	-0.072	-0.064
x3	0.0213	0.002	8.811	0.000	0.017	0.026
x4	0.0043	0.002	2.074	0.038	0.000	0.008
x5	0.0029	0.002	1.362	0.173	-0.001	0.007
x6	0.0120	0.003	4.244	0.000	0.006	0.017
x7	0.0048	0.003	1.893	0.058	-0.000	0.010
x8	0.0022	0.002	1.106	0.269	-0.002	0.006
x9	-0.0006	0.002	-0.267	0.789	-0.005	0.004
x10	-0.0011	0.002	-0.522	0.602	-0.005	0.003
x11	0.0301	0.003	11.065	0.000	0.025	0.035
x12	0.2014	0.005	41.181	0.000	0.192	0.211
x13	0.0086	0.003	2.831	0.005	0.003	0.015
x14	0.0549	0.006	9.512	0.000	0.044	0.066
x15	-0.0313	0.006	-5.598	0.000	-0.042	-0.020
x16	0.0129	0.006	2.281	0.023	0.002	0.024
x17	0.0269	0.004	6.876	0.000	0.019	0.035
x18	-0.0067	0.003	-2.148	0.032	-0.013	-0.001
x19	-0.0244	0.003	-8.570	0.000	-0.030	-0.019
x20	0.2262	0.005	46.449	0.000	0.217	0.236
x21	0.0155	0.003	5.513	0.000	0.010	0.021
x22	0.0075	0.003	2.545	0.011	0.002	0.013
x23	0.0392	0.004	9.708	0.000	0.031	0.047
x24	0.0527	0.004	13.281	0.000	0.045	0.061
x25	0.0376	0.003	14.444	0.000	0.033	0.043
x26	-0.1557	0.029	-5.455	0.000	-0.212	-0.100
x27	-0.1192	0.039	-3.035	0.002	-0.196	-0.042
x28	0.6170	0.091	6.746	0.000	0.438	0.796
x29	0.3132	0.016	19.659	0.000	0.282	0.344
x30	0.0553	0.015	3.641	0.000	0.026	0.085
x31	0.0843	0.014	5.941	0.000	0.057	0.112
x32	0.3659	0.033	11.245	0.000	0.302	0.430
x33	0.1776	0.035	5.127	0.000	0.110	0.246
x34	0.2871	0.018	15.765	0.000	0.251	0.323
x35	0.3095	0.026	11.852	0.000	0.258	0.361
x36	0.2942	0.013	22.513	0.000	0.269	0.320

x37	0.0487	0.021	2.320	0.020	0.008	0.090
x38	-0.1105	0.022	-5.118	0.000	-0.153	-0.068
x39	-0.0124	0.020	-0.633	0.527	-0.051	0.026
x40	0.2012	0.013	15.277	0.000	0.175	0.227
x41	0.1363	0.016	8.285	0.000	0.104	0.169
x42	0.3085	0.034	9.140	0.000	0.242	0.375
x43	0.0783	0.024	3.243	0.001	0.031	0.126
x44	0.0663	0.013	5.268	0.000	0.042	0.091
x45	-0.1513	0.013	-11.458	0.000	-0.177	-0.125
x46	0.1148	0.032	3.601	0.000	0.052	0.177
x47	0.1047	0.019	5.529	0.000	0.068	0.142
x48	0.0348	0.022	1.579	0.114	-0.008	0.078
x49	-0.1424	0.056	-2.524	0.012	-0.253	-0.032
x50	-0.0682	0.014	-5.044	0.000	-0.095	-0.042
x51	0.2430	0.017	14.424	0.000	0.210	0.276
x52	0.1098	0.013	8.484	0.000	0.084	0.135
x53	0.3547	0.010	34.962	0.000	0.335	0.375
x54	0.3057	0.030	10.093	0.000	0.246	0.365
x55	0.0173	0.014	1.252	0.210	-0.010	0.044
x56	0.2719	0.010	26.556	0.000	0.252	0.292
x57	0.2008	0.011	18.690	0.000	0.180	0.222
x58	0.1412	0.016	8.868	0.000	0.110	0.172
x59	0.2513	0.020	12.387	0.000	0.212	0.291
x60	0.2298	0.020	11.423	0.000	0.190	0.269
x61	0.1570	0.013	12.134	0.000	0.132	0.182
x62	-0.0094	0.030	-0.311	0.756	-0.068	0.050
x63	0.3135	0.021	15.131	0.000	0.273	0.354
x64	0.2853	0.012	23.619	0.000	0.262	0.309
x65	0.2801	0.013	21.117	0.000	0.254	0.306
x66	0.1476	0.012	11.863	0.000	0.123	0.172
x67	1.9428	0.012	166.308	0.000	1.920	1.966
x68	2.1322	0.009	239.259	0.000	2.115	2.150
x69	2.0631	0.015	136.637	0.000	2.033	2.093
x70	0.0914	0.026	3.482	0.000	0.040	0.143
x71	0.0948	0.015	6.164	0.000	0.065	0.125

x72	0.1204	0.012	10.167	0.000	0.097	0.144
x73	0.1298	0.012	11.069	0.000	0.107	0.153
x74	0.1233	0.011	11.049	0.000	0.101	0.145
x75	0.1236	0.011	11.348	0.000	0.102	0.145
x76	0.1210	0.012	10.468	0.000	0.098	0.144
x77	0.1228	0.012	10.343	0.000	0.100	0.146
x78	0.1600	0.013	12.197	0.000	0.134	0.186
x79	0.1661	0.013	12.780	0.000	0.141	0.192
x80	0.1540	0.014	11.198	0.000	0.127	0.181
x81	0.1643	0.014	11.665	0.000	0.137	0.192
x82	0.1463	0.015	9.729	0.000	0.117	0.176
x83	0.1868	0.013	14.019	0.000	0.161	0.213
x84	0.1555	0.012	12.855	0.000	0.132	0.179
x85	0.1655	0.011	15.158	0.000	0.144	0.187
x86	0.1759	0.011	16.264	0.000	0.155	0.197
x87	0.1645	0.011	15.416	0.000	0.144	0.185
x88	0.1741	0.011	16.282	0.000	0.153	0.195
x89	0.1799	0.011	16.352	0.000	0.158	0.201
x90	0.1731	0.012	14.323	0.000	0.149	0.197
x91	0.1876	0.012	15.218	0.000	0.163	0.212
x92	0.1876	0.013	14.105	0.000	0.162	0.214
x93	0.1850	0.013	14.501	0.000	0.160	0.210
x94	0.1843	0.016	11.470	0.000	0.153	0.216
x95	0.1817	0.013	14.008	0.000	0.156	0.207
x96	0.1901	0.012	15.617	0.000	0.166	0.214
x97	0.2013	0.013	15.499	0.000	0.176	0.227
x98	0.1793	0.013	14.064	0.000	0.154	0.204
x99	0.1791	0.011	16.929	0.000	0.158	0.200
x100	0.1809	0.010	18.600	0.000	0.162	0.200
x101	0.1895	0.011	17.281	0.000	0.168	0.211
x102	0.1919	0.011	17.401	0.000	0.170	0.214
x103	0.1744	0.011	16.212	0.000	0.153	0.195
x104	0.1869	0.012	16.120	0.000	0.164	0.210
x105	0.2057	0.013	16.329	0.000	0.181	0.230
x106	0.2395	0.030	8.040	0.000	0.181	0.298

x107	2.0240	0.019	108.444	0.000	1.987	2.061
x108	2.0639	0.012	165.220	0.000	2.039	2.088
x109	2.0502	0.025	81.876	0.000	2.001	2.099
x110	2.1412	0.021	103.271	0.000	2.101	2.182
x111	2.1028	0.045	46.704	0.000	2.015	2.191
x112	1.8941	0.030	62.847	0.000	1.835	1.953
x113	-0.0675	0.007	-9.969	0.000	-0.081	-0.054
x114	0.0656	0.022	2.999	0.003	0.023	0.109
x115	0.0574	0.031	1.870	0.062	-0.003	0.118
x116	0.0351	0.009	3.731	0.000	0.017	0.053
x117	-0.0016	0.005	-0.314	0.754	-0.012	0.009

Omnibus: 2978.951 **Durbin-Watson:** 2.029

Prob(Omnibus): 0.000 **Jarque-Bera (JB):** 16562.251

Skew: -1.253 **Prob(JB):** 0.00

Kurtosis: 8.629 **Cond. No.** 1.11e+16

Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

[2] The smallest eigenvalue is 6.21e-28. This might indicate that there are strong multicollinearity problems or that the design matrix is singular.

Feature selectors are different methods to help us pick which features we want to use in our model. In our example above where we used ALL predictors in our linear regression, several of our features had a p-value over .05, which indicates that there is more than a 5% chance that the changes attributed to that feature were actually by random chance. We want features where our p-value is below a threshold that we specify where we are reasonably confident that the feature is contributing to the model and not by random chance.

Forward-Backward Selector

Now we'll try a simple forward-backward feature selection model based on p-value, using a statsmodel OLS linear regression model. This selector starts with zero features, internally runs the model for each feature individually, and adds the lowest p-value feature to its list to include. It then runs the model again with the original feature included and tries adding each other feature individually. It will either add the next best feature under the threshold or remove an existing feature if it is no longer within the threshold. This process iterates until all features in the model are under the p-value threshold.

This model takes quite some time to run, so is commented out with the results replicated in markdown following.

```
In [95]: #result = stepwise_selection(pd.DataFrame(processed_train), y_train, verbose=True)

#print('resulting features:', result)

result = [11, 19, 112, 1, 20, 21, 109, 37, 25, 24, 44, 13, 49, 52, 54, 22, 51, 5, 2, 67]

Add          11 with p-value 0.0
Add          19 with p-value 0.0
Add          112 with p-value 9.12756e-192
Add          1 with p-value 2.60446e-138
Add          20 with p-value 7.16903e-106
Add          21 with p-value 4.54759e-78
Add          109 with p-value 3.57763e-41
Add          37 with p-value 1.07257e-43
Add          25 with p-value 6.13284e-43
Add          108 with p-value 1.15586e-33
Add          24 with p-value 1.83366e-37
Add          44 with p-value 3.86482e-33
Add          13 with p-value 1.09407e-33
Add          49 with p-value 7.89242e-49
Add          52 with p-value 6.63119e-48
Add          54 with p-value 2.74602e-31
Add          22 with p-value 1.3631e-24
Add          51 with p-value 1.48653e-30
Add          5 with p-value 2.75956e-24
Add          2 with p-value 1.65035e-17
Add          67 with p-value 3.14482e-18
Add          23 with p-value 6.0269e-19
Add          10 with p-value 1.91535e-20
Add          35 with p-value 1.69988e-18
Add          38 with p-value 1.52239e-16
Add          26 with p-value 5.12543e-17
Add          47 with p-value 1.6278e-15
Add          60 with p-value 5.1596e-13
Add          53 with p-value 2.01598e-13
Add          14 with p-value 3.81126e-13
Add          63 with p-value 2.8575e-11
Add          48 with p-value 3.53338e-11
Add          62 with p-value 4.45649e-10
Add          113 with p-value 1.6081e-08
Add          28 with p-value 1.02508e-08
Add          40 with p-value 2.67156e-08
Add          18 with p-value 1.10187e-07
Add          16 with p-value 3.64798e-11
Add          36 with p-value 5.63795e-07
Add          61 with p-value 5.86813e-18
Drop         108 with p-value 0.577469
Add          66 with p-value 3.33401e-06
Add          31 with p-value 9.93984e-07
Add          115 with p-value 6.00144e-06
Add          27 with p-value 6.23234e-05
Add          32 with p-value 0.000148666
Add          0 with p-value 0.000143778
Add          34 with p-value 0.000277367
Add          6 with p-value 0.000635737
Add          58 with p-value 0.000802199
Add          70 with p-value 0.000898821
Add          71 with p-value 0.00169146
Add          74 with p-value 0.00146419
Add          73 with p-value 0.00137789
```

```

Add                               76 with p-value 0.00116697
Add                               33 with p-value 0.00289854
Add                               64 with p-value 0.00131118
Add                               15 with p-value 0.00125786
Add                               72 with p-value 0.00357221
Add                               75 with p-value 0.00159021
Add                               30 with p-value 0.00568903
Add                               29 with p-value 4.02677e-05
Add                               69 with p-value 0.00881601
resulting features: [11, 19, 112, 1, 20, 21, 109, 37, 25, 24, 44, 13, 49, 52, 54, 22, 5
1, 5, 2, 67, 23, 10, 35, 38, 26, 47, 60, 53, 14, 63, 48, 62, 113, 28, 40, 18, 16, 36, 6
1, 66, 31, 115, 27, 32, 0, 34, 6, 58, 70, 71, 74, 73, 76, 33, 64, 15, 72, 75, 30, 29, 6
9]

```

In [96]:

```
# Run our linear regression again, using only the features recommended by our feature s

X_train_refined = pd.DataFrame(processed_train)[result]

predictors_int = sm.add_constant(X_train_refined)
model1 = sm.OLS(y_train, predictors_int).fit()

model1.summary()
```

Out[96]:

OLS Regression Results

Dep. Variable:	y	R-squared:	0.775			
Model:	OLS	Adj. R-squared:	0.774			
Method:	Least Squares	F-statistic:	589.3			
Date:	Mon, 08 Nov 2021	Prob (F-statistic):	0.00			
Time:	14:39:34	Log-Likelihood:	1698.6			
No. Observations:	10471	AIC:	-3273.			
Df Residuals:	10409	BIC:	-2823.			
Df Model:	61					
Covariance Type:	nonrobust					
	coef	std err	t	P> t	[0.025	0.975]
const	12.6332	0.030	427.339	0.000	12.575	12.691
11	0.1937	0.004	44.430	0.000	0.185	0.202
19	0.1534	0.006	25.857	0.000	0.142	0.165
112	-0.0699	0.006	-10.809	0.000	-0.083	-0.057
1	-0.0682	0.002	-32.412	0.000	-0.072	-0.064
20	0.0161	0.003	5.811	0.000	0.011	0.021
21	0.0129	0.003	4.641	0.000	0.007	0.018
109	0.1674	0.015	11.209	0.000	0.138	0.197
37	-0.3557	0.022	-16.259	0.000	-0.399	-0.313
25	-0.3939	0.028	-14.016	0.000	-0.449	-0.339

24	0.0390	0.003	15.166	0.000	0.034	0.044
44	-0.2777	0.013	-21.952	0.000	-0.303	-0.253
13	0.0492	0.005	10.031	0.000	0.040	0.059
49	-0.1984	0.013	-15.802	0.000	-0.223	-0.174
52	0.1095	0.011	10.375	0.000	0.089	0.130
54	-0.2299	0.014	-16.559	0.000	-0.257	-0.203
22	0.0387	0.004	10.633	0.000	0.032	0.046
51	-0.1542	0.013	-11.686	0.000	-0.180	-0.128
5	0.0151	0.003	5.849	0.000	0.010	0.020
2	0.0205	0.002	8.930	0.000	0.016	0.025
67	0.0635	0.019	3.306	0.001	0.026	0.101
23	0.0542	0.004	13.979	0.000	0.047	0.062
10	0.0300	0.003	11.207	0.000	0.025	0.035
35	0.0960	0.013	7.342	0.000	0.070	0.122
38	-0.1753	0.020	-8.952	0.000	-0.214	-0.137
26	-0.3307	0.040	-8.253	0.000	-0.409	-0.252
47	-0.1418	0.022	-6.594	0.000	-0.184	-0.100
60	-0.1050	0.014	-7.673	0.000	-0.132	-0.078
53	0.2108	0.024	8.621	0.000	0.163	0.259
14	-0.0289	0.005	-5.899	0.000	-0.039	-0.019
63	0.1240	0.012	10.086	0.000	0.100	0.148
48	-0.1878	0.023	-8.343	0.000	-0.232	-0.144
62	0.1824	0.022	8.419	0.000	0.140	0.225
113	0.0909	0.017	5.363	0.000	0.058	0.124
28	0.1461	0.016	8.885	0.000	0.114	0.178
40	-0.0852	0.016	-5.197	0.000	-0.117	-0.053
18	-0.0236	0.003	-8.336	0.000	-0.029	-0.018
16	0.0265	0.004	6.872	0.000	0.019	0.034
36	-0.1874	0.018	-10.387	0.000	-0.223	-0.152
61	-0.2700	0.016	-16.636	0.000	-0.302	-0.238
66	-0.1194	0.022	-5.453	0.000	-0.162	-0.076
31	0.2053	0.033	6.130	0.000	0.140	0.271
115	0.0394	0.009	4.560	0.000	0.022	0.056
27	0.4272	0.093	4.570	0.000	0.244	0.610
32	-0.0866	0.018	-4.869	0.000	-0.121	-0.052

0 0.0095 0.002 4.140 0.000 0.005 0.014

34 0.1355 0.027 5.043 0.000 0.083 0.188

6 0.0060 0.002 2.480 0.013 0.001 0.011

58 0.0948 0.021 4.502 0.000 0.054 0.136

70 -0.0730 0.016 -4.526 0.000 -0.105 -0.041

71 -0.0513 0.012 -4.203 0.000 -0.075 -0.027

74 -0.0465 0.011 -4.104 0.000 -0.069 -0.024

73 -0.0469 0.012 -4.031 0.000 -0.070 -0.024

76 -0.0466 0.012 -3.784 0.000 -0.071 -0.022

33 0.0779 0.018 4.223 0.000 0.042 0.114

64 0.0462 0.013 3.441 0.001 0.020 0.073

15 0.0144 0.005 3.152 0.002 0.005 0.023

72 -0.0397 0.012 -3.249 0.001 -0.064 -0.016

75 -0.0427 0.013 -3.310 0.001 -0.068 -0.017

30 0.0825 0.018 4.672 0.000 0.048 0.117

29 0.0868 0.021 4.095 0.000 0.045 0.128

69 -0.0740 0.028 -2.620 0.009 -0.129 -0.019

Omnibus: 2955.119 **Durbin-Watson:** 2.030

Prob(Omnibus): 0.000 **Jarque-Bera (JB):** 16400.246

Skew: -1.242 **Prob(JB):** 0.00

Kurtosis: 8.605 **Cond. No.** 110.

Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

In [97]:

```
# Set upline models
baseline_models = {
    "Extra Trees w/forward-backward": ExtraTreesRegressor(random_state = randomstate),
    "Gradient Boosted w/forward-backward" : GradientBoostingRegressor(random_state = ra
    "Nu SVR w/forward-backward": NuSVR(),
    "XGB Regressor w/forward-backward" : xgb.XGBRegressor(random_state = randomstate),
    "Random Forest Regressor w/forward-backward" : RandomForestRegressor(random_state=r
}

# run spot check on each model inline with forward-backward selected features
for model in baseline_models:
    this_model = baseline_models[model]
    label = model
    spot_check = score_model(this_model, X_train_refined, y_train, label, models)
```

```
Extra Trees w/forward-backward scores
CV 5 R2 Train Score: 79.1
CV 5 MAE Train Score: 0.1345
CV 5 RMSE Train Score: 0.1983
```

```
Gradient Boosted w/forward-backward scores
CV 5 R2 Train Score: 77.15
CV 5 MAE Train Score: 0.1494
CV 5 RMSE Train Score: 0.2074
```

```
Nu SVR w/forward-backward scores
CV 5 R2 Train Score: 78.71
CV 5 MAE Train Score: 0.1338
CV 5 RMSE Train Score: 0.2002
```

```
XGB Regressor w/forward-backward scores
CV 5 R2 Train Score: 78.58
CV 5 MAE Train Score: 0.1388
CV 5 RMSE Train Score: 0.2007
```

```
Random Forest Regressor w/forward-backward scores
CV 5 R2 Train Score: 78.62
CV 5 MAE Train Score: 0.138
CV 5 RMSE Train Score: 0.2005
```

Permutation Importance

Now we will use permutation importance to determine which of these words is actually relevant to our model. This is a great model-agnostic method that you can use with any model type, and the way it works is very easy to understand. After fitting the model, it calculates a baseline R^2 score. Then for each feature, it scrambles the inputs of that feature, turning its contribution into noise. The model is evaluated again with the feature scrambled, and the change in overall R^2 is logged as the importance for that feature. After scrambling all features, each feature has been assigned an importance based on the R^2 reduction. You can then select the features that had an effect on R^2 based on your own threshold (I kept anything $\geq .001$) and throw out the remaining features.

You can learn more about this underrated feature selection method here: <https://explained.ai/rf-importance/> The article focuses on Random Forest, but discusses permutation importance as an excellent feature selection method for any model type.

```
In [98]: x_train_df = pd.DataFrame(processed_train)

model1 = LinearRegression()
model1.fit(x_train_df, y_train)

from sklearn.inspection import permutation_importance
r = permutation_importance(model1, x_train_df, y_train,
                            n_repeats=15,
                            random_state=0,
                            n_jobs=-1)

for i in r.importances_mean.argsort()[:-1]:
    if r.importances_mean[i] >= 0.001:
```

```

print(f"\t{x_train_df.columns[i]}:<8> "
      f"\t\tImportance: {r.importances_mean[i]:.3f} ")

importances = {}

for i in r.importances_mean.argsort()[:-1]:
    if r.importances_mean[i] >= 0.001:
        importances[x_train_df.columns[i]] = r.importances_mean[i]
    else: continue

importances

important_features = list(importances.keys())
print(important_features)

```

109	Importance: 237997297843182272512.000
111	Importance: 166538378385308549120.000
19	Importance: 104985541586884870144.000
110	Importance: 81812136759169449984.000
21	Importance: 49575120597323767808.000
30	Importance: 44207340632039981056.000
29	Importance: 23692999819995521024.000
107	Importance: 22715658552049483776.000
75	Importance: 15222018996144893952.000
43	Importance: 14887639580680103936.000
106	Importance: 13402403931102369792.000
83	Importance: 10817233876257941504.000
77	Importance: 10659886409309917184.000
108	Importance: 10266286892060510208.000
82	Importance: 8159034761280723968.000
73	Importance: 7577184691310565376.000
74	Importance: 7417390400094042112.000
86	Importance: 6993449343572182016.000
72	Importance: 6978402957657062400.000
84	Importance: 6535223607285642240.000
94	Importance: 6181961149974023168.000
76	Importance: 5962561231028106240.000
92	Importance: 5871123011578392576.000
88	Importance: 5844052122582748160.000
90	Importance: 5164841632409243648.000
89	Importance: 5009538799909850112.000
71	Importance: 4703566734424521728.000
78	Importance: 4679196477325274112.000
70	Importance: 4551382704732387840.000
49	Importance: 4494387157382986240.000
79	Importance: 4410755601069749248.000
81	Importance: 4119863829118787072.000
93	Importance: 4103158931565987840.000
44	Importance: 3798550262606182400.000
53	Importance: 3732761621547062272.000
87	Importance: 3425322191464934912.000
55	Importance: 3282114608729078784.000
91	Importance: 3050133606244251648.000
63	Importance: 2706169221511272448.000
57	Importance: 2602603553003674112.000
97	Importance: 2530953745340038656.000
65	Importance: 2505173100472718848.000
80	Importance: 2358980653007713280.000
69	Importance: 2091931500674295040.000
95	Importance: 1653492681802380800.000
85	Importance: 1601922420174277888.000

51 Importance: 1554540292651122688.000
98 Importance: 1550345392120621824.000
48 Importance: 1526039394876377856.000
28 Importance: 1507170360515642624.000
62 Importance: 1420113133949008896.000
45 Importance: 1366532775420409600.000
46 Importance: 1314629866029669888.000
60 Importance: 1039204696199757568.000
42 Importance: 1028835109999687296.000
61 Importance: 935200483548587904.000
58 Importance: 817243855673519872.000
102 Importance: 738710002001899392.000
67 Importance: 663276858835663488.000
54 Importance: 628880050961038080.000
52 Importance: 612723456084160896.000
96 Importance: 517249894090885568.000
38 Importance: 504168787046493312.000
66 Importance: 485940412843126784.000
103 Importance: 426402835610013248.000
32 Importance: 399692072074144384.000
35 Importance: 327689394632332288.000
101 Importance: 246210429033189216.000
34 Importance: 244165296797238176.000
31 Importance: 232355189730393472.000
68 Importance: 189769272725047840.000
104 Importance: 143213980515184896.000
37 Importance: 117202112103512336.000
47 Importance: 97557477330164976.000
36 Importance: 91265048985708960.000
64 Importance: 84208998875875600.000
105 Importance: 76749716418003744.000
99 Importance: 38440048142257720.000
40 Importance: 38412181343136728.000
56 Importance: 30304237309272704.000
59 Importance: 30232033938704056.000
26 Importance: 27841018089296904.000
41 Importance: 25455938348059716.000
100 Importance: 24292544049259172.000
27 Importance: 13375140996939550.000
33 Importance: 12922503027052320.000
50 Importance: 9616222196155076.000
25 Importance: 1601539107460093.750
39 Importance: 569727049299.341
11 Importance: 0.428
1 Importance: 0.049
13 Importance: 0.032
23 Importance: 0.029
24 Importance: 0.028
22 Importance: 0.016
112 Importance: 0.012
14 Importance: 0.010
10 Importance: 0.009
16 Importance: 0.008
18 Importance: 0.006
2 Importance: 0.005
20 Importance: 0.003
15 Importance: 0.002
5 Importance: 0.002
[109, 111, 19, 110, 21, 30, 29, 107, 75, 43, 106, 83, 77, 108, 82, 73, 74, 86, 72, 84, 9
4, 76, 92, 88, 90, 89, 71, 78, 70, 49, 79, 81, 93, 44, 53, 87, 55, 91, 63, 57, 97, 65, 8
0, 69, 95, 85, 51, 98, 48, 28, 62, 45, 46, 60, 42, 61, 58, 102, 67, 54, 52, 96, 38, 66,

```
103, 32, 35, 101, 34, 31, 68, 104, 37, 47, 36, 64, 105, 99, 40, 56, 59, 26, 41, 100, 27,  
33, 50, 25, 39, 11, 1, 13, 23, 24, 22, 112, 14, 10, 16, 18, 2, 20, 15, 5]
```

```
In [79]: important_features = [109, 111, 19, 110, 21, 30, 29, 107, 75, 43, 106, 83, 77, 108, 82,
```

```
In [99]: # make permutation importance data set  
x_train_df = pd.DataFrame(processed_train)  
permutation_x_train = x_train_df[important_features]
```

```
In [100...]: # Set upline models  
baseline_models = {  
    "Extra Trees w/permuation": ExtraTreesRegressor(random_state = randomstate),  
    "Gradient Boosted w/permuation" : GradientBoostingRegressor(random_state = randomstate),  
    "Nu SVR w/permuation": NuSVR(),  
    "XGB Regressor w/permuation" : xgb.XGBRegressor(random_state = randomstate),  
    "Random Forest Regressor w/permuation" : RandomForestRegressor(random_state=randomstate)  
}  
  
# run spot check on each model inline  
for model in baseline_models:  
    this_model = baseline_models[model]  
    label = model  
    spot_check = score_model(this_model, permutation_x_train, y_train, label, models)
```

```
Extra Trees w/permuation scores  
CV 5 R2 Train Score: 78.57  
CV 5 MAE Train Score: 0.1355  
CV 5 RMSE Train Score: 0.2008
```

```
Gradient Boosted w/permuation scores  
CV 5 R2 Train Score: 77.32  
CV 5 MAE Train Score: 0.1482  
CV 5 RMSE Train Score: 0.2066
```

```
Nu SVR w/permuation scores  
CV 5 R2 Train Score: 78.8  
CV 5 MAE Train Score: 0.1322  
CV 5 RMSE Train Score: 0.1998
```

```
XGB Regressor w/permuation scores  
CV 5 R2 Train Score: 78.43  
CV 5 MAE Train Score: 0.1392  
CV 5 RMSE Train Score: 0.2015
```

```
Random Forest Regressor w/permuation scores  
CV 5 R2 Train Score: 78.62  
CV 5 MAE Train Score: 0.1377  
CV 5 RMSE Train Score: 0.2006
```

Principal Component Analysis

We can attempt to perform dimensionality reduction on our dataset while still retaining variance.

```
In [101...]: # Visualize components

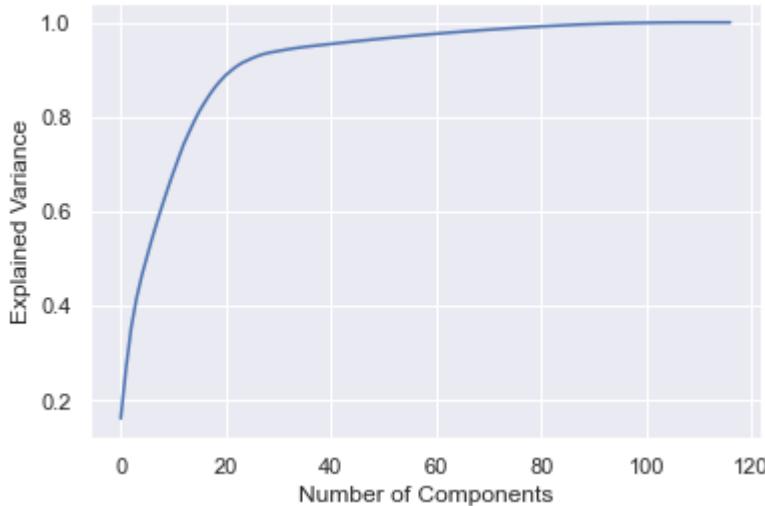
pca_all = PCA(n_components=processed_train.shape[1], random_state=randomstate)
x_pca = pca_all.fit_transform(processed_train)

print("Explained variance with all components is ", sum(pca_all.explained_variance_ratio_))
print("1 component explains ", np.cumsum(pca_all.explained_variance_ratio_ * 100)[0])
print("1st and 2nd components explains ", np.cumsum(pca_all.explained_variance_ratio_ * 100)[1])
print("1st to 3rd components explains ", np.cumsum(pca_all.explained_variance_ratio_ * 100)[2])
print("1st to 4th components explains ", np.cumsum(pca_all.explained_variance_ratio_ * 100)[3])

plt.plot(np.cumsum(pca_all.explained_variance_ratio_))
plt.xlabel("Number of Components")
plt.ylabel("Explained Variance")
```

```
Explained variance with all components is  99.99999999999991
1 component explains  16.08204036618756
1st and 2nd components explains  26.672796045078456
1st to 3rd components explains  35.41793186951252
1st to 4th components explains  41.544918047848626
```

```
Out[101...]: Text(0, 0.5, 'Explained Variance')
```



```
In [102...]: # Reducing the dataset into principal components that explain 95% of the variance

pca_95th = PCA(n_components=.95, random_state=randomstate)
x_pca_95 = pca_95th.fit_transform(processed_train)

print(x_pca_95.shape[1],"components, starting from all features")
```

```
38 components, starting from all features
```

```
In [103...]: model = ExtraTreesRegressor(random_state=randomstate)
models = score_model(model, x_pca_95, y_train, "Extra Trees PCA", models)
```

```
Extra Trees PCA scores
CV 5 R2 Train Score: 74.99
CV 5 MAE Train Score: 0.152
CV 5 RMSE Train Score: 0.217
```

Check Scores after Feature Selectors

```
In [104...]: # make data frame from our models dictionary
target = pd.DataFrame(models).reset_index(drop=True)

# sort data frame by mae and reset index
target.sort_values('mae', ascending=True).head(20)
```

		model	r2	mae	rmse
20		Nu SVR w/permuation	78.80	0.1322	0.1998
15		Nu SVR w/forward-backward	78.71	0.1338	0.2002
13		Extra Trees w/forward-backward	79.10	0.1345	0.1983
1		Extra Trees	78.79	0.1346	0.1997
8		Nu SVR	78.56	0.1346	0.2009
18		Extra Trees w/permuation	78.57	0.1355	0.2008
12		Random Forest Regressor	78.87	0.1365	0.1994
10		SVR	78.53	0.1373	0.2011
22		Random Forest Regressor w/permuation	78.62	0.1377	0.2006
17		Random Forest Regressor w/forward-backward	78.62	0.1380	0.2005
16		XGB Regressor w/forward-backward	78.58	0.1388	0.2007
11		XGB Regressor	78.50	0.1391	0.2012
21		XGB Regressor w/permuation	78.43	0.1392	0.2015
5		LinearSVR	76.41	0.1440	0.2108
9		Ridge	77.17	0.1456	0.2073
0		LR	77.14	0.1457	0.2075
7		Bayesian Ridge	77.15	0.1458	0.2074
2		Gradient Boosted	77.38	0.1480	0.2064
19		Gradient Boosted w/permuation	77.32	0.1482	0.2066
14		Gradient Boosted w/forward-backward	77.15	0.1494	0.2074

NLP - TF-IDF

Our data set includes the listing text for each sale. We're going to use Natural Language Processing methods to extract relevant information from the listing text to boost the effectiveness of our model.

Clean Listing Text

```
In [130...]: # Load spaCy with English Language processor
nlp = spacy.load("en_core_web_sm")

# add real estate related stop words to default stop word list
nlp.Defaults.stop_words |= {"bedroom", "bathroom", "bath", "home", "austin", "tx", "pron"
                            "w", "bed", 'single', 'family', 'contain', 'st', 'dr', 'squ"}
```

```

'-pron-', 'garage', 'pflugerville', 'story', '1st', '1story'
'2story', '3rd', '4th', '5th', '6th', '7th', '8th', '9th',
'sac',

}

nlp.Defaults.stop_words.remove('is')
nlp.Defaults.stop_words.remove('as')

```

In [106...]

```

'''# copy the description column to a new data frame for text processing
listing_text = pd.DataFrame(df['description'])

listing_text['sentences'] = None

listing_text['sentences'] = listing_text['description'].apply(lambda x: text_block_proc

# drop the description field and save our listing_text to file so we don't have to run
listing_text.drop('description', axis=1, inplace=True)

listing_text.to_pickle("listing_text.pkl")'''

```

In [131...]

```

# Loading our cleaned Listing descriptions from file and saving those to a data frame
listing_desc = pd.read_pickle("listing_text.pkl")
listing_desc

```

Out[131...]

	sentences
0	DEFAULT
1	absolutely gorgeous bath locate tuck away comm...
2	construction estimate completion august pionee...
3	absolutely darle charming book like lake north...
4	brim appeal warm livability sleek stylish mode...
...	...
13084	nestle mature shade tree locate establish neig...
13085	beautiful texas oak bedroom bath huge cover pa...
13086	contemporary threestory detach condo convenien...
13087	original bungalow modern addition large corner...
13088	DEFAULT

13089 rows × 1 columns

In [132...]

```

# splitting our text descriptions in same form as previous train/test
nlp_train, nlp_remain = train_test_split(listing_desc, test_size=0.2, random_state=randomstate)
nlp_val, nlp_test = train_test_split(nlp_remain, test_size=.5, random_state=randomstate)
nlp_train.reset_index(inplace=True, drop=True)
nlp_val.reset_index(inplace=True, drop=True)
nlp_test.reset_index(inplace=True, drop=True)

```

```
del nlp_remain  
gc.collect()
```

Out[132... 2154

TF-IDF Vectorizer

We're going to pull relevant information from the listing descriptions with the following parameters:

- sublinear_tf = True: A weight scaler that reduces the bias of assuming that an ngram that appears x times more frequently is x times more important
- use_idf = True: use Inverse Document Frequency, so that ngrams that appear very frequently to the extent they appear in most document (i.e., a bad indicator) get weighted less compared to ngrams that appear less frequently but they appear in specific documents only (i.e., a good indicator)(citation: <https://stackoverflow.com/questions/34435484/tfidfvectorizer-normalisation-bias>)
- max_df: the maximum % of documents where an ngram can appear to be utilized
- min_df: the minimum % of documents where an ngram must appear to be utilized
- ngram_range=(x,y): the types of ngrams we will create, from x to y
- max_features: the maximum number of features that will be created

TfidfVectorizer then creates a binary array for all of the features selected, and assigns the word a weight based on its frequency and importance.

In [243...]

```
# prepare the vectorizer with the chosen parameters  
tfid_proc = TfidfVectorizer(sublinear_tf=True, use_idf=True, max_df=0.9, min_df=.005, n  
  
# fit the vectorizer to the train data, transform train and holdout  
train_vectors = tfid_proc.fit_transform(nlp_train['sentences'])  
val_vectors = tfid_proc.transform(nlp_val['sentences'])  
test_vectors = tfid_proc.transform(nlp_test['sentences'])  
  
# cast the vector array to a data frame with columns named by the features selected by  
train_vectors = pd.DataFrame(train_vectors.toarray(), columns=tfid_proc.get_feature_names()  
val_vectors = pd.DataFrame(val_vectors.toarray(), columns=tfid_proc.get_feature_names())  
test_vectors = pd.DataFrame(test_vectors.toarray(), columns=tfid_proc.get_feature_names)
```

ERROR! Session/line number was not unique in database. History logging moved to new session 3484

In [224...]

```
# Run permutation importance on the TF-IDF vectors  
  
model = LinearRegression()  
model.fit(train_vectors, y_train)  
  
from sklearn.inspection import permutation_importance  
r = permutation_importance(model, train_vectors, y_train,  
                           n_repeats=10,  
                           random_state=0,  
                           n_jobs=-1)  
  
importances = {}  
  
for i in r.importances_mean.argsort()[:-1]:
```

```

if r.importances_mean[i] >= 0.002:
    importances[train_vectors.columns[i]] = r.importances_mean[i]
else: continue

print(importances)
important_ngrams = list(importances.keys())
print(important_ngrams)

{'sprinkler sysye': 4.9250324027015024e+20, 'sysye': 4.9250324026842376e+20, 'nt long': 3.650726808526988e+20, 'wo nt long': 3.6507268085243845e+20, 'default': 0.04736266735669538, 'pool': 0.013893326805870531, 'hardwood': 0.009830560238408226, 'main': 0.00955475882294267, 'laminate': 0.009381858723336734, 'zilker': 0.008987925639910032, 'brand new': 0.008936774833462635, 'country': 0.008491603130041847, 'barton': 0.008160520058342146, 'conveniently': 0.007658212548061582, 'brand': 0.00732270274993827, 'stainless steel': 0.007238133557641168, 'conveniently locate': 0.007234286437748283, 'abundance natural light': 0.006925602038992085, 'open concept': 0.0065340672352155234, 'outdoor': 0.006379283274245262, 'condo': 0.006312023147487478, 'ton natural light': 0.005667962412556416, 'round rock': 0.005584163721320245, 'tankless water heater': 0.0054813046604412444, 'natural': 0.005236404497032887, 'large corner lot': 0.005022334443236054, 'hill country': 0.004984760756112805, 'heart': 0.004814201738303226, 'view': 0.004791143189326252, 'south': 0.004703391780043631, 'natural light': 0.004697250859584034, 'abundance natural': 0.0045043190582137686, 'corner': 0.004278026862857364, 'community': 0.0039247254626256, 'office': 0.003844203590133488, 'ton natural': 0.0038211425770096176, 'washer': 0.003780864679684448, 'builtin': 0.0037244681981503103, 'large corner': 0.0034704823067731707, 'concept': 0.003454880905500468, 'breakfast bar': 0.0034453203988760615, 'ut': 0.0034013754334174416, 'lake': 0.0033594320512195684, 'design': 0.003303266692172757, 'hill': 0.003219831255823158, 'water heater': 0.0031740620004597764, 'isd': 0.0030497658329814658, 'movein ready': 0.0030462408835273402, 'steel appliance': 0.002937738089827402, 'classic': 0.00292893809448016, 'wine': 0.0029080197618868487, 'freshly paint': 0.0029038560322607763, 'great': 0.0028931488318170717, 'steel': 0.002887641248099382, 'corner lot': 0.002853711053695396, 'park pool': 0.0028314809072811586, 'congress': 0.0027966080959199724, 'garden tub': 0.0026309017597572204, 'branch': 0.002591054223878153, 'northwest': 0.002502937945619088, 'bike trail': 0.0025013502417233656, 'gourmet kitchen': 0.002492428319915341, 'convenient': 0.0024903183567576816, 'minute': 0.0024856668937144, 'community pool': 0.0024599403793720944, 'mckinney': 0.002407291409495793, 'walkable': 0.0023664664588234573, 'easy access': 0.0023638536562890613, 'restaurant': 0.0023596058752121674, 'original': 0.0023553300546700685, 'washer dryer': 0.002317839390193899, 'wood': 0.002312296194404728, 'finish': 0.0022750102970889086, 'fire pit': 0.0021953758991322793, 'level': 0.0021757936249159116, 'tankless water': 0.0021622877558253204, 'paint': 0.0021582396684506565, 'set': 0.0021339778130287645, 'marble': 0.002083225847163683, 'airport': 0.020620999816148957, 'luxury': 0.002036966250316574, 'hike bike trail': 0.0020047938245277286}

['sprinkler sysye', 'sysye', 'nt long', 'wo nt long', 'default', 'pool', 'hardwood', 'main', 'laminate', 'zilker', 'brand new', 'country', 'barton', 'conveniently', 'brand', 'stainless steel', 'conveniently locate', 'abundance natural light', 'open concept', 'outdoor', 'condo', 'ton natural light', 'round rock', 'tankless water heater', 'natural', 'large corner lot', 'hill country', 'heart', 'view', 'south', 'natural light', 'abundance natural', 'corner', 'community', 'office', 'ton natural', 'washer', 'builtin', 'large corner', 'concept', 'breakfast bar', 'ut', 'lake', 'design', 'hill', 'water heater', 'isd', 'movein ready', 'steel appliance', 'classic', 'wine', 'freshly paint', 'great', 'steel', 'corner lot', 'park pool', 'congress', 'garden tub', 'branch', 'northwest', 'bike trail', 'gourmet kitchen', 'convenient', 'minute', 'community pool', 'mckinney', 'walkable', 'easy access', 'restaurant', 'original', 'washer dryer', 'wood', 'finish', 'fire pit', 'level', 'tankless water', 'paint', 'set', 'marble', 'airport', 'luxury', 'hike bike trail']

```

In [244...]

Our List of important words and word sets

```
important_ngrams = ['sprinkler sysye', 'sysye', 'nt long', 'wo nt long', 'default', 'po
```

```
In [245...]: # make data sets with the important n-grams
```

```
train_vectors_tfidf = np.array(train_vectors[important_ngrams])
val_vectors_tfidf = np.array(val_vectors[important_ngrams])
test_vectors_tfidf = np.array(test_vectors[important_ngrams])
```

Model Spot Checks

```
In [136...]:
```

```
# add the important n-grams to our features sets
X_train_all = np.hstack((processed_train, train_vectors_tfidf))
X_val_all = np.hstack((processed_val, val_vectors_tfidf))
X_test_all = np.hstack((processed_test, test_vectors_tfidf))
```

```
In [137...]:
```

```
# Set up tuned models
baseline_models = {
    "Extra Trees w/text": ExtraTreesRegressor(random_state = randomstate),
    "Gradient Boosted w/text" : GradientBoostingRegressor(random_state=randomstate),
    "Nu SVR w/text": NuSVR(gamma='auto', kernel='rbf'),
    "XGB Regressor w/text" : xgb.XGBRegressor(seed=randomstate),
    "Random Forest Regressor w/text" : RandomForestRegressor(random_state=randomstate),
    "Linear Regression w/text": LinearRegression()
}

# run spot check on each model inline
for model in baseline_models:
    this_model = baseline_models[model]
    label = model
    spot_check = score_model(this_model, X_train_all, y_train, label, models)
```

```
Extra Trees w/text scores
CV 5 R2 Train Score: 78.92
CV 5 MAE Train Score: 0.1344
CV 5 RMSE Train Score: 0.1992
```

```
Gradient Boosted w/text scores
CV 5 R2 Train Score: 79.0
CV 5 MAE Train Score: 0.1328
CV 5 RMSE Train Score: 0.1988
```

```
Nu SVR w/text scores
CV 5 R2 Train Score: 78.54
CV 5 MAE Train Score: 0.1352
CV 5 RMSE Train Score: 0.201
```

```
XGB Regressor w/text scores
CV 5 R2 Train Score: 80.29
CV 5 MAE Train Score: 0.1322
CV 5 RMSE Train Score: 0.1926
```

```
Random Forest Regressor w/text scores
CV 5 R2 Train Score: 78.88
CV 5 MAE Train Score: 0.1363
CV 5 RMSE Train Score: 0.1993
```

```
Linear Regression w/text scores
CV 5 R2 Train Score: 77.76
CV 5 MAE Train Score: 0.1433
CV 5 RMSE Train Score: 0.2046
```

Forward-Backward Selection

In [138...]

```
# run forward-backward selection with the TF-IDF vectors

#nlp_fb_result = stepwise_selection(pd.DataFrame(X_train_all), y_train, verbose=True)

#print('resulting features:', nlp_fb_result)

nlp_fb_result = [11, 19, 112, 1, 20, 21, 109, 37, 25, 24, 44, 13, 49, 52, 54, 22, 51, 5
x_train_df = pd.DataFrame(X_train_all)
X_train_tab_tfidf = pd.DataFrame(X_train_all)[nlp_fb_result]
```

```
Add           11 with p-value 0.0
Add           19 with p-value 0.0
Add           112 with p-value 9.12756e-192
Add           1 with p-value 2.60446e-138
Add           20 with p-value 7.16903e-106
Add           21 with p-value 4.54759e-78
Add           109 with p-value 3.57763e-41
Add           37 with p-value 1.07257e-43
Add           25 with p-value 6.13284e-43
Add           108 with p-value 1.15586e-33
Add           24 with p-value 1.83366e-37
Add           44 with p-value 3.86482e-33
Add           13 with p-value 1.09407e-33
Add           49 with p-value 7.89242e-49
Add           52 with p-value 6.63119e-48
Add           54 with p-value 2.74602e-31
Add           22 with p-value 1.3631e-24
Add           51 with p-value 1.48653e-30
Add           5 with p-value 2.75956e-24
Add           160 with p-value 3.60137e-18
Add           67 with p-value 6.41839e-18
Add           38 with p-value 6.28621e-18
Add           2 with p-value 2.61185e-17
Add           169 with p-value 3.26449e-19
Add           14 with p-value 2.41789e-16
Add           60 with p-value 1.04481e-18
Add           23 with p-value 3.00275e-16
Add           10 with p-value 2.48523e-18
Add           26 with p-value 1.96944e-17
Add           53 with p-value 1.70844e-15
Add           48 with p-value 1.11435e-12
Add           63 with p-value 8.12529e-11
Add           35 with p-value 4.51403e-10
Add           62 with p-value 2.76772e-10
Add           47 with p-value 8.25343e-10
Add           40 with p-value 3.04838e-08
Add           113 with p-value 3.78935e-08
Add           28 with p-value 3.77189e-09
Add           18 with p-value 3.01502e-07
```

```

Add          16 with p-value 3.87671e-11
Add          154 with p-value 8.72264e-07
Add          36 with p-value 9.99989e-07
Add          61 with p-value 1.04671e-17
Drop         108 with p-value 0.559133
Add          137 with p-value 8.56522e-07
Add          31 with p-value 1.14269e-06
Add          179 with p-value 2.46459e-06
Add          115 with p-value 6.85753e-06
Add          189 with p-value 9.99811e-06
Add          0 with p-value 5.59258e-05
Add          32 with p-value 5.17994e-05
Add          153 with p-value 0.000100744
Add          167 with p-value 0.000141514
Add          34 with p-value 0.000164786
Add          68 with p-value 0.000293547
Add          27 with p-value 0.000120531
Add          197 with p-value 0.000302113
Add          70 with p-value 0.000429308
Add          58 with p-value 0.000538511
Add          145 with p-value 0.000726326
Add          6 with p-value 0.000863123
Add          136 with p-value 0.00108396
Add          181 with p-value 0.000915502
Add          129 with p-value 0.00131917
Add          125 with p-value 0.00161494
Add          33 with p-value 0.0015726
Add          71 with p-value 0.00221635
Add          74 with p-value 0.00158535
Add          76 with p-value 0.00276229
Add          73 with p-value 0.00151986
Add          15 with p-value 0.00322002
Add          64 with p-value 0.001714
Add          183 with p-value 0.0034915
Add          46 with p-value 0.00392104
Add          75 with p-value 0.00460015
Add          72 with p-value 0.00229158
Add          66 with p-value 0.0
Add          42 with p-value 0.00475514
Add          121 with p-value 0.00569612
Add          159 with p-value 0.00406112
Add          106 with p-value 0.00791317
Add          3 with p-value 0.00792802
Add          69 with p-value 0.00941067
resulting features: [11, 19, 112, 1, 20, 21, 109, 37, 25, 24, 44, 13, 49, 52, 54, 22, 5
1, 5, 160, 67, 38, 2, 169, 14, 60, 23, 10, 26, 53, 48, 63, 35, 62, 47, 40, 113, 28, 18,
16, 154, 36, 61, 137, 31, 179, 115, 189, 0, 32, 153, 167, 34, 68, 27, 197, 70, 58, 145,
6, 136, 181, 129, 125, 33, 71, 74, 76, 73, 15, 64, 183, 46, 75, 72, 66, 42, 121, 159, 10
6, 3, 69]

```

In [139...]

```

# run spot check on each model inline
for model in baseline_models:
    this_model = baseline_models[model]
    label = model
    spot_check = score_model(this_model, X_train_tab_tfidf, y_train, label, models)

```

```

Extra Trees w/text w/forward-backward  scores
CV 5 R2 Train Score: 79.41
CV 5 MAE Train Score: 0.1335

```

```
CV 5 RMSE Train Score: 0.1969
```

```
Gradient Boosted w/text w/forward-backward scores  
CV 5 R2 Train Score: 79.45  
CV 5 MAE Train Score: 0.1314  
CV 5 RMSE Train Score: 0.1966
```

```
Nu SVR w/text w/forward-backward scores  
CV 5 R2 Train Score: 79.09  
CV 5 MAE Train Score: 0.1324  
CV 5 RMSE Train Score: 0.1984
```

```
XGB Regressor w/text w/forward-backward scores  
CV 5 R2 Train Score: 80.52  
CV 5 MAE Train Score: 0.1318  
CV 5 RMSE Train Score: 0.1915
```

```
Random Forest Regressor w/text w/forward-backward scores  
CV 5 R2 Train Score: 78.88  
CV 5 MAE Train Score: 0.137  
CV 5 RMSE Train Score: 0.1994
```

```
Linear Regression scores  
CV 5 R2 Train Score: 77.82  
CV 5 MAE Train Score: 0.1434  
CV 5 RMSE Train Score: 0.2044
```

```
In [140...]
```

```
# make data frame from our models dictionary  
target = pd.DataFrame(models).reset_index(drop=True)  
  
# sort data frame by mae and reset index  
target.sort_values('mae', ascending=True)
```

```
Out[140...]
```

		model	r2	mae	rmse
31	Gradient Boosted w/text w/forward-backward	7.945000e+01	1.314000e-01	1.966000e-01	
33	XGB Regressor w/text w/forward-backward	8.052000e+01	1.318000e-01	1.915000e-01	
27	XGB Regressor w/text	8.029000e+01	1.322000e-01	1.926000e-01	
20	Nu SVR w/permutation	7.880000e+01	1.322000e-01	1.998000e-01	
32	Nu SVR w/text w/forward-backward	7.909000e+01	1.324000e-01	1.984000e-01	
25	Gradient Boosted w/text	7.900000e+01	1.328000e-01	1.988000e-01	
30	Extra Trees w/text w/forward-backward	7.941000e+01	1.335000e-01	1.969000e-01	
15	Nu SVR w/forward-backward	7.871000e+01	1.338000e-01	2.002000e-01	
24	Extra Trees w/text	7.892000e+01	1.344000e-01	1.992000e-01	
13	Extra Trees w/forward-backward	7.910000e+01	1.345000e-01	1.983000e-01	
1	Extra Trees	7.879000e+01	1.346000e-01	1.997000e-01	

		model	r2	mae	rmse
8		Nu SVR	7.856000e+01	1.346000e-01	2.009000e-01
26		Nu SVR w/text	7.854000e+01	1.352000e-01	2.010000e-01
18		Extra Trees w/permuation	7.857000e+01	1.355000e-01	2.008000e-01
28		Random Forest Regressor w/text	7.888000e+01	1.363000e-01	1.993000e-01
12		Random Forest Regressor	7.887000e+01	1.365000e-01	1.994000e-01
34		Random Forest Regressor w/text w/forward-backward	7.888000e+01	1.370000e-01	1.994000e-01
10		SVR	7.853000e+01	1.373000e-01	2.011000e-01
22		Random Forest Regressor w/permuation	7.862000e+01	1.377000e-01	2.006000e-01
17		Random Forest Regressor w/forward-backward	7.862000e+01	1.380000e-01	2.005000e-01
16		XGB Regressor w/forward-backward	7.858000e+01	1.388000e-01	2.007000e-01
11		XGB Regressor	7.850000e+01	1.391000e-01	2.012000e-01
21		XGB Regressor w/permuation	7.843000e+01	1.392000e-01	2.015000e-01
29		Linear Regression w/text	7.776000e+01	1.433000e-01	2.046000e-01
35		Linear Regression	7.782000e+01	1.434000e-01	2.044000e-01
5		LinearSVR	7.641000e+01	1.440000e-01	2.108000e-01
9		Ridge	7.717000e+01	1.456000e-01	2.073000e-01
0		LR	7.714000e+01	1.457000e-01	2.075000e-01
7		Bayesian Ridge	7.715000e+01	1.458000e-01	2.074000e-01
2		Gradient Boosted	7.738000e+01	1.480000e-01	2.064000e-01
19		Gradient Boosted w/permuation	7.732000e+01	1.482000e-01	2.066000e-01
14		Gradient Boosted w/forward-backward	7.715000e+01	1.494000e-01	2.074000e-01
23		Extra Trees PCA	7.499000e+01	1.520000e-01	2.170000e-01
3		KNN	7.013000e+01	1.699000e-01	2.372000e-01
6		MLPRegressor	6.210000e+01	1.742000e-01	2.633000e-01
4		Lars	-1.401635e+27	2.496253e+11	7.451065e+11

Overall, adding the text as TF_IDF vectors is marginal for the model. However when we use the tabular-only features, we will use it.

Tuned Baseline Predictions

Make two different feature sets. One without the TF-IDF (to send to the Neural Network later), and one with the TF-IDF.

In [144]...

```
# make our feature sets refined with the forward-backward features, for tabular only
X_train_tabular = pd.DataFrame(processed_train)[result]
X_val_tabular = pd.DataFrame(processed_val)[result]
X_test_tabular = pd.DataFrame(processed_test)[result]
```

```
ERROR! Session/line number was not unique in database. History logging moved to new session 3455
```

```
In [148...]
```

```
# make our feature sets refined with the forward-backward features and the TF-IDF Vector
X_train_tab_tfidf = pd.DataFrame(X_train_all)[nlp_fb_result]
X_val_tab_tfidf = pd.DataFrame(X_val_all)[nlp_fb_result]
X_test_tab_tfidf = pd.DataFrame(X_test_all)[nlp_fb_result]
```

```
In [145...]
```

```
# exponentiate the y_values
y_exp_train = np.exp(y_train)
y_exp_val = np.exp(y_val)
y_exp_test = np.exp(y_test)
```

```
In [149...]
```

```
#instantiate our tuned models

extra_trees = ExtraTreesRegressor(random_state = randomstate,
                                   n_estimators=250,
                                   criterion='squared_error',
                                   max_depth=25,
                                   max_features='auto'
                                   )

random_forest = RandomForestRegressor(
    n_estimators=500,
    random_state=randomstate,
    criterion='squared_error',
    max_depth=25,
    min_samples_leaf=1,
    max_features='auto',
    bootstrap=True,
    )

xgbr = xgb.XGBRegressor(
    n_estimators=250,
    seed=randomstate,
    missing=0,
    eval_metric='mae',
    verbosity=1,
    max_depth = 10,
    eta = .05,
    min_child_weight = 7,
    gamma = 0,
    subsample=1,
    colsample_bytree=.4
    )

nu_svr = NuSVR(gamma='auto', kernel='rbf')

gradient_boost = GradientBoostingRegressor(
    n_estimators=500,
    random_state=randomstate,
    max_depth = 5,
    learning_rate=.15,
    max_features='auto',
    min_impurity_decrease=0,
    loss='lad',
```

```
        subsample=.7,  
    )  
  
knn_8 = KNeighborsRegressor(n_neighbors = 8)  
  
knn_4 = KNeighborsRegressor(n_neighbors = 4)  
  
knn_15 = KNeighborsRegressor(n_neighbors = 15)  
  
lr = LinearRegression()
```

In [150...]

```
tuned_models = {  
    "Extra Trees" : extra_trees,  
    "Random Forest" : random_forest,  
    "XGBR" : xgbr,  
    "NuSVR": nu_svr,  
    "Gradient Boost": gradient_boost,  
    "KNN_8" : knn_8,  
    "KNN_4": knn_4,  
    "KNN_15": knn_15,  
    "Linear Regression": lr  
}
```

In [151...]

```
baseline_val_predictions, baseline_test_predictions = final_predictions(X_train_tabular)
```

```
Fitting Extra Trees  
Predicting with Extra Trees  
Fitting Random Forest  
Predicting with Random Forest  
Fitting XGBR  
Predicting with XGBR  
Fitting NuSVR  
Predicting with NuSVR  
Fitting Gradient Boost  
Predicting with Gradient Boost  
Fitting KNN_8  
Predicting with KNN_8  
Fitting KNN_4  
Predicting with KNN_4  
Fitting KNN_15  
Predicting with KNN_15  
Fitting Linear Regression  
Predicting with Linear Regression
```

In []:

```
pd.DataFrame(baseline_val_predictions).to_pickle("baseline_val_predictions.pkl")  
pd.DataFrame(baseline_test_predictions).to_pickle("baseline_test_predictions.pkl")
```

This is our baseline to beat - a test prediction on tabular features

In [152...]

```
# score our tuned Gradient Boosted model on the test set for a score baseline  
  
gradient_boost.fit(X_train_tabular, y_train)  
preds = gradient_boost.predict(X_test_tabular)  
  
pred_exp = np.exp(preds)
```

```

print("NuSVR")
print("MAE: ",int(mean_absolute_error(pred_exp, y_exp_test)))
print("RMSE:",int(np.sqrt(mean_squared_error(pred_exp, y_exp_test))))
print("R2:", r2_score(pred_exp, y_exp_test)*100)

```

NuSVR
MAE: 61711
RMSE: 106885
R2: 62.4306139880411

Neural Networks

Now we will work with an entirely different type of model - the Neural Network. In this section we'll focus on modeling in several different ways:

- Predicting on the tabular features
- Mapping text embeddings to our listing descriptions, and predicting on the text features
- Predicting on the images using both our own network and a pre-trained image network
- Creating a multi-input neural network with all of the above three inputs
- Extracting features from the neural networks for image and text data, for use in a standard model as in part 4

All Neural Network tuning and training is located in the APPENDIX

Tabular Features Only

Tabular features are the data that we used in section 5. We'll be attempting to fit and predict on this data with a neural network. Since we have no idea what kind of network to build, we'll be trying several different layer combinations in our MLP to find the best combo (tuning in appendix). We use the tabular data without TF-IDF for this.

In [181...]

```

# Load our best saved tabular model
best_tabular_model = keras.models.load_model('models/best_tabular_model.hdf5', compile=

```

ERROR! Session/line number was not unique in database. History logging moved to new session 3462

In [182...]

```

# making predictions on our validation set
tabular_val_preds = best_tabular_model.predict(X_val_tabular)
tabular_test_preds = best_tabular_model.predict(X_test_tabular)

```

In [271...]

```

# validation scores

print("NN Tabular Only")
print("MAE: ",int(mean_absolute_error(np.exp(tabular_val_preds), y_exp_val)))
print("RMSE:",int(np.sqrt(mean_squared_error(np.exp(tabular_val_preds), y_exp_val))))
print("R2:", r2_score(np.exp(tabular_val_preds), y_exp_val)*100)

```

NN Tabular Only
MAE: 61913
RMSE: 101463
R2: 76.5029749222227

In [200...]

```
del best_tabular_model
```

Pretrained Word Embeddings

We will use the pretrained word embeddings in a neural network

from <https://towardsdatascience.com/pre-trained-word-embedding-for-text-classification-end2end-approach-5fbf5cd8aead>

In [175...]

```
# amount of vocabulary to use, will pick the top 10000 words seen in the corpus
features = 10000

# max text sequence Length, must match tokens in transfer file, we are using glove 300d
max_words = 300
```

In [176...]

```
# instantiate our word tokenizer
tokenizer = Tokenizer(num_words=features)

# Create vocabulary with training texts
tokenizer.fit_on_texts(nlp_train['sentences']) # nltk method which creates a vocab index

# pad the train text to 300, or cut off if over
tokenized_train = tokenizer.texts_to_sequences(nlp_train['sentences'])# transforms each
tokenized_train = sequence.pad_sequences(tokenized_train, maxlen=max_words, truncating='post')

# pad the val text to 300, or cut off if over
tokenized_val = tokenizer.texts_to_sequences(nlp_val['sentences'])# transforms each tex
tokenized_val = sequence.pad_sequences(tokenized_val, maxlen=max_words, truncating='post')

# pad the test text to 300, or cut off if over
tokenized_test = tokenizer.texts_to_sequences(nlp_test['sentences'])# transforms each t
tokenized_test = sequence.pad_sequences(tokenized_test, maxlen=max_words, truncating='post')
```

In [177...]

```
# identify the embedding filename; we are using the Glove 42B 300d embeddings
glove_file = "glove.42B.300d.txt"

# create the embeddings index dictionary
embeddings_index = {} # create a lookup dictionary to store words and their vectors
f = open(glove_file, errors='ignore')# open our embedding file
for line in f: # for each line in the file
    values = line.split(' ') #split the Line on spaces between the word and its vectors
    word = values[0] # the word is the first entry
    if word in tokenizer.word_index.keys(): # we check if the word is in our tokenizer
        coefs = np.asarray(values[1:], dtype='float32') # if so, get the word's vectors
        embeddings_index[word] = coefs # add the word and its vectors to the embeddings
f.close()

print('Found %s word vectors.' % len(embeddings_index)) # report how many words in our
```

Found 8697 word vectors.

In [178...]

```
num_tokens = (len(tokenizer.word_index) + 1) # for num tokens we always do the length of
hits = 0
misses = 0
```

```

embedding_matrix = np.zeros((num_tokens, max_words)) # setting up an array for our tokens
for word, i in tokenizer.word_index.items(): # for each word in the tokenizer word index
    embedding_vector = embeddings_index.get(word) #get the vector from the embeddings index
    if embedding_vector is not None: # if the vector isn't None,
        # words not found in embedding index will be all-zeros.
        embedding_matrix[i] = embedding_vector # store the embedding vector in the matrix
        hits += 1
    else:
        misses += 1

print("Converted %d words (%d misses)" % (hits, misses))

```

Converted 8697 words (6499 misses)

In [179...]

```

del f
gc.collect()

```

Out[179...]

18938

In [183...]

```

# Load the best nlp model
best_nlp_model = keras.models.load_model('models/best_nlp_model.hdf5', compile=False)

```

In [184...]

```

# make validation and test predictions on the text only
nlp_val_preds = best_nlp_model.predict(tokenized_val)
nlp_test_preds = best_nlp_model.predict(tokenized_test)

```

In [272...]

```

# validation scores for NLP only

print("NN NLP Embeddings Only")
print("MAE: ", int(mean_absolute_error(np.exp(nlp_val_preds), y_exp_val)))
print("RMSE: ", int(np.sqrt(mean_squared_error(np.exp(nlp_val_preds), y_exp_val))))
print("R2: ", r2_score(np.exp(nlp_val_preds), y_exp_val)*100)

```

NN NLP Embeddings Only

MAE: 123883

RMSE: 184536

R2: -65.58530118956645

NLP Feature Extraction

In our next section, we will use the GloVe transfer learning to do feature extraction on the words so that we can feed this to our standard models.

In [185...]

```

# Set up an intermediate layer model which uses our best_nlp_model but outputs the Dense layer
# of going all the way to the end linear layer

intermediate_layer_model = Model(inputs=best_nlp_model.input, outputs=best_nlp_model.layers[-1])
intermediate_layer_model.summary()

```

Model: "model_107"

Layer (type)	Output Shape	Param #
=====		

input_38 (InputLayer)	(None, None)	0
embedding (Embedding)	(None, None, 300)	4559100
bidirectional (Bidirectional (None, None, 300))		541200
bidirectional_1 (Bidirection (None, 300))		541200
dense_268 (Dense)	(None, 128)	38528
<hr/>		
Total params:	5,680,028	
Trainable params:	1,120,928	
Non-trainable params:	4,559,100	

In [186...]

```
# predict with the new model to get extracted features of size (n, 128)

nlp_embedded_features_train = intermediate_layer_model.predict(tokenized_train)
nlp_embedded_features_val = intermediate_layer_model.predict(tokenized_val)
nlp_embedded_features_test = intermediate_layer_model.predict(tokenized_test)
```

In [187...]

```
del best_nlp_model
gc.collect()
```

Images

With Data Augmentation

Our first set of images will be processed using the Keras ImageDataGenerator for Image Augmentation. The ImageDataGenerator processes on the fly in batches, and on each epoch, it will apply random transformations to the image files. This makes the image slightly different for each training cycle, so that the model learns only the important elements of the image.

In [188...]

```
# using our df_images file, apply the correct file paths
# Add price to the df_images

df_images['location'] = df_images['homeImage'].apply(lambda x: 'homeImages/' + str(x))
df_images['price'] = np.log(df['price'])
df_images.drop('homeImage', axis=1, inplace=True)
```

In [189...]

```
# split df_images in the same manner as our other dataframes

images_train, images_rest = train_test_split(df_images, test_size=0.2, random_state=random_state)
images_val, images_test = train_test_split(images_rest, test_size=0.5, random_state=random_state)

images_train.reset_index(inplace=True, drop=True)
images_val.reset_index(inplace=True, drop=True)
images_test.reset_index(inplace=True, drop=True)

del images_rest
gc.collect()
```

Out[189...]

22489

In [190...]

```
#Setting up the image generators

# Train generator contains data augmentation. In addition to standard normalization by
# It also may apply: random rotation, horiz shift, vert shift, brightness change, shear
image_train_generator = ImageDataGenerator(
    rescale=1.0 / 255,
    rotation_range=5,
    width_shift_range=0.1,
    height_shift_range=0.1,
    brightness_range=(0.75, 1),
    shear_range=0.1,
    zoom_range=[0.75, 1],
    horizontal_flip=True,
)

# test/val have only the pixel data normalization
image_test_generator = ImageDataGenerator(rescale=1.0 / 255)

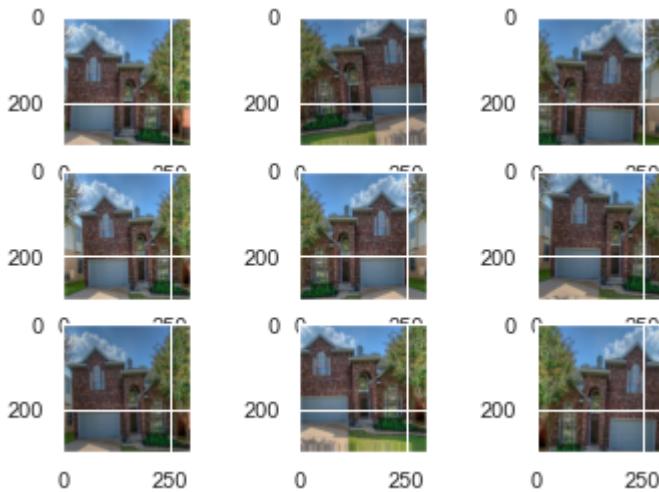
# visualize an image augmentation sample
visualize_augmentations(image_train_generator, images_train.iloc[1])

# specify where the train generator pulls batches
image_train_generator = image_train_generator.flow_from_dataframe(
    dataframe=images_train,
    x_col="location", # this is where your image data is stored
    y_col="price", # this is your target feature
    class_mode="raw", # use "raw" for regressions
    target_size=(299, 299),
    batch_size=32, # increase or decrease to fit your GPU,
)

# specify where the val generator pulls batches (we use the test generator because it d
image_val_generator = image_test_generator.flow_from_dataframe(
    dataframe=images_val,
    x_col="location",
    y_col="price",
    class_mode="raw",
    target_size=(299, 299),
    batch_size=32,
)

# specify where the test generator pulls batches
image_test_generator = image_test_generator.flow_from_dataframe(
    dataframe=images_test,
    x_col="location",
    y_col="price",
    class_mode="raw",
    target_size=(299, 299),
    batch_size=32,
)
```

Found 1 validated image filenames.



Found 10471 validated image filenames.

Found 1309 validated image filenames.

Found 1309 validated image filenames.

InceptionV3 base

With the InceptionV3 base, we use the pre-trained Google InceptionV3 model as the basis of our neural network. We remove the top classification layers and add our own linear predictive layer. We train the model with the Inception layers frozen to convergence, and then we unfreeze the Inception model and train with an extremely low learning rate to pick up any additional details.

Training/Tuning in index.

In [191...]

```
# work past image errors
from PIL import ImageFile
ImageFile.LOAD_TRUNCATED_IMAGES = True
```

In [192...]

```
# Load the best image model
best_inc_aug_model = keras.models.load_model('models/best_inception_model.hdf5', compil
```

In [193...]

```
# val and test preds from Inception NN
inc_aug_val_preds = best_inc_aug_model.predict(image_val_generator)
inc_aug_test_preds = best_inc_aug_model.predict(image_test_generator)
```

In [270...]

```
# validation scores for Images InceptionV3 only

print("NN InceptionV3 Images Only")
print("MAE: ", int(mean_absolute_error(np.exp(inc_aug_test_preds), y_exp_val)))
print("RMSE: ", int(np.sqrt(mean_squared_error(np.exp(inc_aug_test_preds), y_exp_val))))
print("R2: ", r2_score(np.exp(inc_aug_test_preds), y_exp_val)*100)
```

NN InceptionV3 Images Only
MAE: 183155
RMSE: 256818
R2: -284.4300319261521

Simple CNN base

We also try writing our own convolutional neural network, with standard convolution and pooling layers.

```
In [194...]  
# Load our best cnn model  
basic_cnn_aug_model = keras.models.load_model('models/best_basic_cnn_augments_model.hdf5')
```

```
In [195...]  
# val and test preds from cnn  
cnn_aug_val_preds = basic_cnn_aug_model.predict(image_val_generator)  
cnn_aug_test_preds = basic_cnn_aug_model.predict(image_test_generator)
```

```
In [358...]  
# validation scores for Images CNN only  
  
print("NN CNN Images Only")  
print("MAE: ", int(mean_absolute_error(np.exp(cnn_aug_test_preds), y_exp_val)))  
print("RMSE: ", int(np.sqrt(mean_squared_error(np.exp(cnn_aug_test_preds), y_exp_val))))  
print("R2: ", r2_score(np.exp(cnn_aug_test_preds), y_exp_val)*100)
```

```
NN CNN Images Only  
MAE: 150851  
RMSE: 226634  
R2: 0.0
```

Cleanup

```
In [ ]:  
del image_val_generator  
del image_test_generator  
del image_train_generator  
del best_inc_aug_model  
del images_train  
del images_rest  
del images_val  
del images_test  
  
gc.collect()
```

Without Augmentation

We'll now process images without batch data augmentation, for use both in our multi-input neural network and as extracted features in our standard models. We'll still be using the InceptionV3 model for both of these elements.

```
In [196...]  
outputimages = [] # List to store loaded images  
  
def read_image(location): # Load each image as a 299,299 resized  
    path = str(location)  
    image = cv2.imread(path)  
    image = cv2.resize(image, (299, 299)) # this is where you specify the size  
    image = preprocess_input(image) # preprocess input for InceptionV3  
    return image  
  
df_images['location'].apply(lambda x: outputimages.append(read_image(x)))  
  
# make sure our output is arrays  
output = np.array(outputimages)
```

ERROR! Session/line number was not unique in database. History logging moved to new session 3463

```
In [197...]  
# split train, val and test just as before  
images_train, images_rest = train_test_split(output, test_size=0.2, random_state=random)  
images_val, images_test = train_test_split(images_rest, test_size=0.5, random_state=ran
```

Image Feature Extraction

We extract our features from the InceptionV3 model by loading the model without the top classifier, and then rather than performing any training, we simply use the model directly to predict on our train, val and test sets. The output is an array of image features size (8, 8, 2048)

```
In [198...]  
# define the image extractor  
extractor_model = InceptionV3(include_top=False, input_shape=(299, 299, 3), weights='im  
  
# predict to extract features  
image_features_train = extractor_model.predict(images_train)  
image_features_val = extractor_model.predict(images_val)  
image_features_test = extractor_model.predict(images_test)
```

```
In [199...]  
del extractor_model  
del outputimages  
  
gc.collect()
```

```
Out[199...]  
38221
```

Multi-Input NN

Our final neural network is a multi-input which combines neural networks that process all of the tabular, text, and images at the same time. We still use our transfer learning in this model, by using the GloVe embeddings on our text features, and the InceptionV3 network on our images. After each branch processes its data type, the branches are concatenated and sent to the linear predictive layer. Training/Tuning in appendix as per usual.

```
In [209...]  
# Load the multi model network  
multi_model = keras.models.load_model('models/best_multi_model.hdf5', compile=False)
```

```
In [210...]  
# val and test predictions on multi model network  
multi_preds_val = multi_model.predict([X_val_tabular, tokenized_val, images_val])  
multi_preds_test = multi_model.predict([X_test_tabular, tokenized_test, images_test])
```

```
In [273...]  
# validation scores for Multi Model NN  
  
print("NN Multi Model Only")  
print("MAE: ", int(mean_absolute_error(np.exp(multi_preds_val), y_exp_val)))  
print("RMSE: ", int(np.sqrt(mean_squared_error(np.exp(multi_preds_val), y_exp_val))))  
print("R2: ", r2_score(np.exp(multi_preds_val), y_exp_val)*100)
```

```
NN Multi Model Only  
MAE: 65719
```

```
RMSE: 108475  
R2: 71.78058424792115
```

In [202...]

```
del multi_model  
gc.collect()
```

```
ERROR! Session/line number was not unique in database. History logging moved to new session 3465
```

Out[202...]

Ensembling

Now comes the fun part - ensembling together all of our disparate predictions into a meaningful whole. The art of ensembling is to take a suite of weak learners who work together to fill each other's deficiencies and provide a cohesive view of the data. Rather than guess which features are useful to the model, we will be running an ensembling function that automatically pulls together the strongest ensemble.

Before we can do that, we need to get a few more predictions from our standard models, using our feature extractions for both text and images.

Feature Extracted Preds

Prepare Tabular

In [203...]

```
# ensure that our tabular data is in array format and ready to stack  
  
reshaped_tab_train = np.array(X_train_tabular)  
reshaped_tab_val = np.array(X_val_tabular)  
reshaped_tab_test = np.array(X_test_tabular)  
reshaped_tab_train.shape
```

Out[203...]

```
(10471, 61)
```

Prepare Images

In [204...]

```
# flatten our images from 8*8*2048 to flat  
  
reshaped_image_train = image_features_train.reshape(image_features_train.shape[0], 8*8*  
reshaped_image_val = image_features_val.reshape(image_features_val.shape[0], 8*8*2048)  
reshaped_image_test = image_features_test.reshape(image_features_test.shape[0], 8*8*204  
reshaped_image_train.shape
```

Out[204...]

```
(10471, 131072)
```

Our image set is HUGE!

We will perform dimensionality reduction on the images while still retaining reasonable variance.

In [205...]

```
# Reducing the images into principal components that explain 95% of the variance
```

```

pca_95th = PCA(n_components=.95, random_state=randomstate)
pca_image_train = pca_95th.fit_transform(reshaped_image_train)
pca_image_val = pca_95th.transform(reshaped_image_val)
pca_image_test = pca_95th.transform(reshaped_image_test)

print(pca_image_train.shape[1],"components, starting from all features")

```

6015 components, starting from all features

This is much more manageable!

Prepare NLP Features

In [206...]

```

# ensure that our nlp embeddings are in array format and ready to stack

nlp_embedded_features_train
nlp_embedded_features_val
nlp_embedded_features_test

```

Out[206...]

```

array([[0.          , 0.05220859, 0.          , ... , 0.20172505, 0.17652756,
       0.          , ],
       [0.          , 0.02178882, 0.          , ... , 0.18483347, 0.15324326,
       0.          , ],
       [0.          , 0.03386433, 0.          , ... , 0.21349782, 0.14135349,
       0.          , ],
       ... ,
       [0.          , 0.0313061 , 0.          , ... , 0.2396021 , 0.23498642,
       0.          , ],
       [0.          , 0.03528384, 0.          , ... , 0.23816596, 0.24964969,
       0.          , ],
       [0.          , 0.          , 0.          , ... , 0.18590446, 0.16701978,
       0.          , ]], dtype=float32)

```

Tabular + Image Data Predictions

Using our dimensionality-reduced image extracted features, we run our suite of tuned models, fitting on train and then getting validation and test predictions.

In [211...]

```

# predictions on tabular + incept-images (via basic models)

tab_images_train = np.hstack((reshaped_tab_train, pca_image_train))
tab_images_val = np.hstack((reshaped_tab_val, pca_image_val))
tab_images_test = np.hstack((reshaped_tab_test, pca_image_test))
tab_images_train.shape

```

Out[211...]

(10471, 6076)

In [212...]

```

tab_images_val_predictions, tab_images_test_predictions = final_predictions(tab_images_

```

```

Fitting Extra Trees
Predicting with Extra Trees
Fitting Random Forest
Predicting with Random Forest
Fitting XGBR
Predicting with XGBR
Fitting NuSVR
Predicting with NuSVR
Fitting Gradient Boost

```

```
Predicting with Gradient Boost
Fitting KNN_8
Predicting with KNN_8
Fitting KNN_4
Predicting with KNN_4
Fitting KNN_15
Predicting with KNN_15
Fitting Linear Regression
Predicting with Linear Regression
```

Tabular + Image + NLP Data Predictions

We use our dimensionality reduced image features, our extracted text embeddings, and our tabular data. We run our suite of tuned models, fitting on train and then getting validation and test predictions.

In [213...]

```
# predictions on tabular + inception-images + nlp (via basic models)

tab_images_nlp_train = np.hstack((reshaped_tab_train, pca_image_train, nlp_embedded_fea
tab_images_nlp_val = np.hstack((reshaped_tab_val, pca_image_val, nlp_embedded_features_
tab_images_nlp_test = np.hstack((reshaped_tab_test, pca_image_test, nlp_embedded_featur
tab_images_nlp_train.shape
```

Out[213...]

```
(10471, 6204)
```

In [214...]

```
tab_images_nlp_val_predictions, tab_images_nlp_test_predictions = final_predictions(tab
```

```
Fitting Extra Trees
Predicting with Extra Trees
Fitting Random Forest
Predicting with Random Forest
Fitting XGBR
Predicting with XGBR
Fitting NuSVR
Predicting with NuSVR
Fitting Gradient Boost
Predicting with Gradient Boost
Fitting KNN_8
Predicting with KNN_8
Fitting KNN_4
Predicting with KNN_4
Fitting KNN_15
Predicting with KNN_15
Fitting Linear Regression
Predicting with Linear Regression
```

Tabular + NLP Data Predictions

We use the extracted text embeddings and tabular data. We run our suite of tuned models, fitting on train and then getting validation and test predictions.

In [215...]

```
# predictions on tabular + nlp (via basic models)

tab_nlp_train = np.hstack((reshaped_tab_train, nlp_embedded_features_train))
tab_nlp_val = np.hstack((reshaped_tab_val, nlp_embedded_features_val))
tab_nlp_test = np.hstack((reshaped_tab_test, nlp_embedded_features_test))
tab_nlp_train.shape
```

```
Out[215... (10471, 189)
```

```
In [216... tab_nlp_val_predictions, tab_nlp_test_predictions = final_predictions(tab_nlp_train, y_
```

```
Fitting Extra Trees
Predicting with Extra Trees
Fitting Random Forest
Predicting with Random Forest
Fitting XGBR
Predicting with XGBR
Fitting NuSVR
Predicting with NuSVR
Fitting Gradient Boost
Predicting with Gradient Boost
Fitting KNN_8
Predicting with KNN_8
Fitting KNN_4
Predicting with KNN_4
Fitting KNN_15
Predicting with KNN_15
Fitting Linear Regression
Predicting with Linear Regression
```

Model Stacking Selector

Validation sets for model stack:

- tabular_val_preds, tabular_test_preds: predictions on tabular only (via nn)
- nlp_val_preds, nlp_test_preds: predictions on nlp only (via nn)
- inc_aug_val_preds, inc_aug_test_preds: predictions on inception-images only (via transfer learning with image data augmentation)
- cnn_aug_val_preds, cnn_aug_test_preds: predictions on images only (via custom nn with image data augmentation)
- multi_preds_val, multi_preds_test: predictions on tabular + inception-images + nlp (via multi-input nn)
- baseline_val_predictions, baseline_test_predictions:
 - Contains predictions with normal models on tabular data only:
- tab_images_val_predictions, tab_images_test_predictions:
 - Contains predictions on tabular + inception-images (via basic models)
- tab_nlp_val_predictions, tab_nlp_test_predictions:
 - Contains predictions on tabular + nlp (via basic models)
- tab_images_nlp_val_predictions, tab_images_nlp_test_predictions:
 - Contains predictions on tabular + inception-images + nlp (via basic models)

We're now going to use my stacking selector function to figure out the optimal models to ensemble for this problem. Before I explain further, we set up our dictionary which contains labeled validation predictions.

In [249...]

```
models_dict = {
    "NN Tabular Only Preds" : tabular_val_preds,
    "NN NLP Only Preds": nlp_val_preds,
    "NN TL Image Only Preds": inc_aug_val_preds,
    "NN CNN Image Only Preds": cnn_aug_val_preds,
    "NN Multi Input Preds": multi_preds_val,
    "Extra Trees Tabular": baseline_val_predictions['Extra Trees'],
    "Extra Trees Tab and Image": tab_images_val_predictions['Extra Trees'],
    "Extra Trees Tab and NLP": tab_nlp_val_predictions['Extra Trees'],
    "Extra Trees Tab, NLP, Image": tab_images_nlp_val_predictions['Extra Trees'],
    "Random Forest Tabular": baseline_val_predictions['Random Forest'],
    "Random Forest Tab and Image": tab_images_val_predictions['Random Forest'],
    "Random Forest Tab and NLP": tab_nlp_val_predictions['Random Forest'],
    "Random Forest Tab, NLP, Image": tab_images_nlp_val_predictions['Random Forest'],
    "XGBR Tabular": baseline_val_predictions['XGBR'],
    "XGBR Tab and Image": tab_images_val_predictions['XGBR'],
    "XGBR Tab and NLP": tab_nlp_val_predictions['XGBR'],
    "XGBR Tab, NLP, Image": tab_images_nlp_val_predictions['XGBR'],
    "Gradient Boost Tabular": baseline_val_predictions['Gradient Boost'],
    "Gradient Boost Tab and Image": tab_images_val_predictions['Gradient Boost'],
    "Gradient Boost Tab and NLP": tab_nlp_val_predictions['Gradient Boost'],
    "Gradient Boost Tab, NLP, Image": tab_images_nlp_val_predictions['Gradient Boost'],
    "KNN_4 Tabular": baseline_val_predictions['KNN_4'],
    "KNN_4 Tab and Image": tab_images_val_predictions['KNN_4'],
    "KNN_4 Tab and NLP": tab_nlp_val_predictions['KNN_4'],
    "KNN_4 Tab, NLP, Image": tab_images_nlp_val_predictions['KNN_4'],
    "KNN_8 Tabular": baseline_val_predictions['KNN_8'],
    "KNN_8 Tab and Image": tab_images_val_predictions['KNN_8'],
    "KNN_8 Tab and NLP": tab_nlp_val_predictions['KNN_8'],
    "KNN_8 Tab, NLP, Image": tab_images_nlp_val_predictions['KNN_8'],
    "KNN_15 Tabular": baseline_val_predictions['KNN_15'],
    "KNN_15 Tab and Image": tab_images_val_predictions['KNN_15'],
    "KNN_15 Tab and NLP": tab_nlp_val_predictions['KNN_15'],
    "KNN_15 Tab, NLP, Image": tab_images_nlp_val_predictions['KNN_15'],
    "NuSVR Tabular": baseline_val_predictions['NuSVR'],
    "NuSVR Tab and Image": tab_images_val_predictions['NuSVR'],
    "NuSVR Tab and NLP": tab_nlp_val_predictions['NuSVR'],
    "NuSVR Tab, NLP, Image": tab_images_nlp_val_predictions['NuSVR'],
}
```

To build our optimal model stack, we fit a model to our features, then make predictions. We then fit a model to our predictions and use THIS model to predict our final outputs.



When we run the model selector function, we will send it our `y_validation` actuals and the dictionary from above with all of the `y_validation` predictions. The function then runs forward selection, using the validation predictions as potential features.

We try each one of our tuned models as the meta model for the stack. For the model that is being tried as the meta model, we first find the highest scoring single prediction set for that model. Then for each other potential prediction set, we iteratively append the potential's predictions as a new

feature and re-score the meta model using that additional feature. If our meta model score improves with the addition of any feature, the single best scoring predictions are permanently appended to the feature set and the improved score becomes the baseline. The function then loops, once more trying the addition of each potential that isn't already in the stack, until no potential additions improve the score. The function then reports the optimal included predictors for this meta model, and the best score achieved.

We're working only with our validation set and using CV in our model selector. Once we have determined our best stack, then and only then will we apply to our test set.

In [250...]

```
# Set up a scoring dictionary to hold the model stack selector results
scores = {}
scores['Model'] = []
scores['MAE'] = []
scores['Included'] = []

# Run the model stack selector for each model in our tuned_models

for model in tuned_models:

    label = model
    meta_model = tuned_models[model]

    resulting_models, best_mae = model_selector_val(y_val, meta_model, models_dict, lab

    scores['Model'].append(model)
    scores['MAE'].append(best_mae)
    scores['Included'].append(resulting_models)
```

Running model selector for Extra Trees

NEW ROUND - Setting up score charts

Included models: []

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'Extra Trees Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN _8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

KNN_4 Tab, NLP, Image score: -0.414662
NN TL Image Only Preds score: -0.44658
Extra Trees Tab, NLP, Image score: -0.200901
Random Forest Tab, NLP, Image score: -0.211752
NN NLP Only Preds score: -0.339406
KNN_4 Tab and NLP score: -0.246032
KNN_8 Tab and NLP score: -0.2346
Random Forest Tab and NLP score: -0.207242
NuSVR Tabular score: -0.178854

NuSVR Tab, NLP, Image score: -0.411828
KNN_4 Tabular score: -0.239673
KNN_8 Tab and Image score: -0.41415
Gradient Boost Tab and Image score: -0.194859
Random Forest Tabular score: -0.195373
Extra Trees Tabular score: -0.174937
XGBR Tab, NLP, Image score: -0.20327
KNN_15 Tab and Image score: -0.428791
KNN_8 Tab, NLP, Image score: -0.415325
KNN_15 Tab and NLP score: -0.229391
NuSVR Tab and Image score: -0.406534
Extra Trees Tab and Image score: -0.203942
KNN_15 Tabular score: -0.22045
KNN_8 Tabular score: -0.236639
Gradient Boost Tab and NLP score: -0.198382
KNN_4 Tab and Image score: -0.415602
NN CNN Image Only Preds score: -0.340951
Extra Trees Tab and NLP score: -0.188105
NN Tabular Only Preds score: -0.187141
Gradient Boost Tabular score: -0.182988
NN Multi Input Preds score: -0.200315
XGBR Tab and Image score: -0.202179
KNN_15 Tab, NLP, Image score: -0.428791
NuSVR Tab and NLP score: -0.185391
Random Forest Tab and Image score: -0.21105
XGBR Tab and NLP score: -0.198797
XGBR Tabular score: -0.182494
Gradient Boost Tab, NLP, Image score: -0.203215
Best mae: -0.174937

Add Extra Trees Tabular with mae -0.174937

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab a nd NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Bo ost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Starting mae: -0.174937

KNN_4 Tab, NLP, Image score: -0.1571
NN TL Image Only Preds score: -0.1577
Extra Trees Tab, NLP, Image score: -0.159
Random Forest Tab, NLP, Image score: -0.1568
NN NLP Only Preds score: -0.1631
KNN_4 Tab and NLP score: -0.1562
KNN_8 Tab and NLP score: -0.1612
Random Forest Tab and NLP score: -0.1561
NuSVR Tabular score: -0.152

NuSVR Tab, NLP, Image score: -0.1637
KNN_4 Tabular score: -0.1573
KNN_8 Tab and Image score: -0.1568
Gradient Boost Tab and Image score: -0.1537
Random Forest Tabular score: -0.155
XGBR Tab, NLP, Image score: -0.1573
KNN_15 Tab and Image score: -0.1607
KNN_8 Tab, NLP, Image score: -0.1565
KNN_15 Tab and NLP score: -0.1553
NuSVR Tab and Image score: -0.1633
Extra Trees Tab and Image score: -0.158
KNN_15 Tabular score: -0.1562
KNN_8 Tabular score: -0.16
Gradient Boost Tab and NLP score: -0.1545
KNN_4 Tab and Image score: -0.1568
NN CNN Image Only Preds score: -0.1747
Extra Trees Tab and NLP score: -0.1577
NN Tabular Only Preds score: -0.1515
Gradient Boost Tabular score: -0.1524
NN Multi Input Preds score: -0.1502
XGBR Tab and Image score: -0.1592
KNN_15 Tab, NLP, Image score: -0.1607
NuSVR Tab and NLP score: -0.1545
Random Forest Tab and Image score: -0.1536
XGBR Tab and NLP score: -0.1544
XGBR Tabular score: -0.1533
Gradient Boost Tab, NLP, Image score: -0.1532
Best mae: -0.1502

Add NN Multi Input Preds with mae -0.1502

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Starting mae: -0.150221

KNN_4 Tab, NLP, Image score: -0.1415
NN TL Image Only Preds score: -0.1432
Extra Trees Tab, NLP, Image score: -0.1395
Random Forest Tab, NLP, Image score: -0.1403
NN NLP Only Preds score: -0.1477
KNN_4 Tab and NLP score: -0.1415
KNN_8 Tab and NLP score: -0.1432
Random Forest Tab and NLP score: -0.1424
NuSVR Tabular score: -0.142
NuSVR Tab, NLP, Image score: -0.1467

```
KNN_4 Tabular score: -0.1416
KNN_8 Tab and Image score: -0.1427
Gradient Boost Tab and Image score: -0.1419
Random Forest Tabular score: -0.1441
XGBR Tab, NLP, Image score: -0.142
KNN_15 Tab and Image score: -0.1438
KNN_8 Tab, NLP, Image score: -0.1428
KNN_15 Tab and NLP score: -0.1433
NuSVR Tab and Image score: -0.1466
Extra Trees Tab and Image score: -0.1439
KNN_15 Tabular score: -0.1429
KNN_8 Tabular score: -0.1437
Gradient Boost Tab and NLP score: -0.1402
KNN_4 Tab and Image score: -0.1415
NN CNN Image Only Preds score: -0.1502
Extra Trees Tab and NLP score: -0.1431
NN Tabular Only Preds score: -0.1414
Gradient Boost Tabular score: -0.1419
XGBR Tab and Image score: -0.1434
KNN_15 Tab, NLP, Image score: -0.1438
NuSVR Tab and NLP score: -0.139
Random Forest Tab and Image score: -0.1405
XGBR Tab and NLP score: -0.142
XGBR Tabular score: -0.1447
Gradient Boost Tab, NLP, Image score: -0.141
Best mae: -0.139
```

Add NuSVR Tab and NLP with mae -0.139

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NuSVR Tab and NLP (1309, 3)
Starting mae: -0.138976
```

```
KNN_4 Tab, NLP, Image score: -0.1366
NN TL Image Only Preds score: -0.1365
Extra Trees Tab, NLP, Image score: -0.135
Random Forest Tab, NLP, Image score: -0.1344
NN NLP Only Preds score: -0.1385
KNN_4 Tab and NLP score: -0.1356
KNN_8 Tab and NLP score: -0.1368
Random Forest Tab and NLP score: -0.1355
NuSVR Tabular score: -0.1362
NuSVR Tab, NLP, Image score: -0.1389
KNN_4 Tabular score: -0.1351
```

```
KNN_8 Tab and Image score: -0.1358
Gradient Boost Tab and Image score: -0.1376
Random Forest Tabular score: -0.1376
XGBR Tab, NLP, Image score: -0.1359
KNN_15 Tab and Image score: -0.1375
KNN_8 Tab, NLP, Image score: -0.1358
KNN_15 Tab and NLP score: -0.1362
NuSVR Tab and Image score: -0.1388
Extra Trees Tab and Image score: -0.1362
KNN_15 Tabular score: -0.1365
KNN_8 Tabular score: -0.1374
Gradient Boost Tab and NLP score: -0.1362
KNN_4 Tab and Image score: -0.1366
NN CNN Image Only Preds score: -0.1383
Extra Trees Tab and NLP score: -0.1372
NN Tabular Only Preds score: -0.1363
Gradient Boost Tabular score: -0.1342
XGBR Tab and Image score: -0.1359
KNN_15 Tab, NLP, Image score: -0.1375
Random Forest Tab and Image score: -0.1347
XGBR Tab and NLP score: -0.1368
XGBR Tabular score: -0.1381
Gradient Boost Tab, NLP, Image score: -0.1361
Best mae: -0.1342
```

Add Gradient Boost Tabular with mae -0.1342

NEW ROUND - Setting up score charts

```
Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP', 'Gradient Boost Tabular']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NuSVR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Starting mae: -0.134247
```

```
KNN_4 Tab, NLP, Image score: -0.1326
NN TL Image Only Preds score: -0.1319
Extra Trees Tab, NLP, Image score: -0.1318
Random Forest Tab, NLP, Image score: -0.1314
NN NLP Only Preds score: -0.1339
KNN_4 Tab and NLP score: -0.1322
KNN_8 Tab and NLP score: -0.1315
Random Forest Tab and NLP score: -0.1315
NuSVR Tabular score: -0.133
NuSVR Tab, NLP, Image score: -0.1343
KNN_4 Tabular score: -0.1317
```

```
KNN_8 Tab and Image score: -0.1324
Gradient Boost Tab and Image score: -0.1333
Random Forest Tabular score: -0.1337
XGBR Tab, NLP, Image score: -0.1313
KNN_15 Tab and Image score: -0.133
KNN_8 Tab, NLP, Image score: -0.1324
KNN_15 Tab and NLP score: -0.1331
NuSVR Tab and Image score: -0.1344
Extra Trees Tab and Image score: -0.1332
KNN_15 Tabular score: -0.1326
KNN_8 Tabular score: -0.132
Gradient Boost Tab and NLP score: -0.1312
KNN_4 Tab and Image score: -0.1327
NN CNN Image Only Preds score: -0.1337
Extra Trees Tab and NLP score: -0.1321
NN Tabular Only Preds score: -0.1322
XGBR Tab and Image score: -0.131
KNN_15 Tab, NLP, Image score: -0.133
Random Forest Tab and Image score: -0.1318
XGBR Tab and NLP score: -0.1306
XGBR Tabular score: -0.1329
Gradient Boost Tab, NLP, Image score: -0.1317
Best mae: -0.1306
```

Add XGBR Tab and NLP with mae -0.1306

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NuSVR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Starting mae: -0.130555
```

```
KNN_4 Tab, NLP, Image score: -0.1305
NN TL Image Only Preds score: -0.1299
Extra Trees Tab, NLP, Image score: -0.13
Random Forest Tab, NLP, Image score: -0.1307
NN NLP Only Preds score: -0.1309
KNN_4 Tab and NLP score: -0.1294
KNN_8 Tab and NLP score: -0.1301
Random Forest Tab and NLP score: -0.1304
NuSVR Tabular score: -0.1301
NuSVR Tab, NLP, Image score: -0.1311
KNN_4 Tabular score: -0.1292
```

```
KNN_8 Tab and Image score: -0.1292
Gradient Boost Tab and Image score: -0.1314
Random Forest Tabular score: -0.1315
XGBR Tab, NLP, Image score: -0.1307
KNN_15 Tab and Image score: -0.1286
KNN_8 Tab, NLP, Image score: -0.129
KNN_15 Tab and NLP score: -0.1299
NuSVR Tab and Image score: -0.1312
Extra Trees Tab and Image score: -0.1303
KNN_15 Tabular score: -0.1301
KNN_8 Tabular score: -0.1302
Gradient Boost Tab and NLP score: -0.1303
KNN_4 Tab and Image score: -0.1305
NN CNN Image Only Preds score: -0.1302
Extra Trees Tab and NLP score: -0.1309
NN Tabular Only Preds score: -0.1289
XGBR Tab and Image score: -0.1289
KNN_15 Tab, NLP, Image score: -0.1286
Random Forest Tab and Image score: -0.1293
XGBR Tabular score: -0.1304
Gradient Boost Tab, NLP, Image score: -0.1314
Best mae: -0.1286
```

Add KNN_15 Tab and Image with mae -0.1286

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and NLP', 'KNN_15 Tab and Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NuSVR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding KNN_15 Tab and Image (1309, 6)
Starting mae: -0.128624
```

```
KNN_4 Tab, NLP, Image score: -0.1295
NN TL Image Only Preds score: -0.1282
Extra Trees Tab, NLP, Image score: -0.1289
Random Forest Tab, NLP, Image score: -0.1294
NN NLP Only Preds score: -0.13
KNN_4 Tab and NLP score: -0.1279
KNN_8 Tab and NLP score: -0.1283
Random Forest Tab and NLP score: -0.1296
NuSVR Tabular score: -0.1283
NuSVR Tab, NLP, Image score: -0.1296
KNN_4 Tabular score: -0.1281
KNN_8 Tab and Image score: -0.1286
```

```
Gradient Boost Tab and Image score: -0.1301
Random Forest Tabular score: -0.1295
XGBR Tab, NLP, Image score: -0.1293
KNN_8 Tab, NLP, Image score: -0.1286
KNN_15 Tab and NLP score: -0.1284
NuSVR Tab and Image score: -0.1298
Extra Trees Tab and Image score: -0.129
KNN_15 Tabular score: -0.1285
KNN_8 Tabular score: -0.1285
Gradient Boost Tab and NLP score: -0.1291
KNN_4 Tab and Image score: -0.1296
NN CNN Image Only Preds score: -0.1285
Extra Trees Tab and NLP score: -0.1297
NN Tabular Only Preds score: -0.1282
XGBR Tab and Image score: -0.1274
KNN_15 Tab, NLP, Image score: -0.1291
Random Forest Tab and Image score: -0.1277
XGBR Tabular score: -0.1293
Gradient Boost Tab, NLP, Image score: -0.1297
Best mae: -0.1274
```

Add XGBR Tab and Image with mae -0.1274

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and NLP', 'KNN_15 Tab and Image', 'XGBR Tab and Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NuSVR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding KNN_15 Tab and Image (1309, 6)
Adding XGBR Tab and Image (1309, 7)
Starting mae: -0.127382
```

```
KNN_4 Tab, NLP, Image score: -0.128
NN TL Image Only Preds score: -0.1275
Extra Trees Tab, NLP, Image score: -0.128
Random Forest Tab, NLP, Image score: -0.1285
NN NLP Only Preds score: -0.129
KNN_4 Tab and NLP score: -0.1274
KNN_8 Tab and NLP score: -0.1278
Random Forest Tab and NLP score: -0.1284
NuSVR Tabular score: -0.1277
NuSVR Tab, NLP, Image score: -0.1288
KNN_4 Tabular score: -0.1275
KNN_8 Tab and Image score: -0.1281
```

```
Gradient Boost Tab and Image score: -0.1289
Random Forest Tabular score: -0.1289
XGBR Tab, NLP, Image score: -0.1281
KNN_8 Tab, NLP, Image score: -0.1281
KNN_15 Tab and NLP score: -0.1274
NuSVR Tab and Image score: -0.1287
Extra Trees Tab and Image score: -0.1281
KNN_15 Tabular score: -0.1272
KNN_8 Tabular score: -0.1282
Gradient Boost Tab and NLP score: -0.1284
KNN_4 Tab and Image score: -0.128
NN CNN Image Only Preds score: -0.1278
Extra Trees Tab and NLP score: -0.1287
NN Tabular Only Preds score: -0.1277
KNN_15 Tab, NLP, Image score: -0.1277
Random Forest Tab and Image score: -0.1278
XGBR Tabular score: -0.1291
Gradient Boost Tab, NLP, Image score: -0.1293
Best mae: -0.1272
```

Add KNN_15 Tabular with mae -0.1272

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and NLP', 'KNN_15 Tab and Image', 'XGBR Tab and Image', 'KNN_15 Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NuSVR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding KNN_15 Tab and Image (1309, 6)
Adding XGBR Tab and Image (1309, 7)
Adding KNN_15 Tabular (1309, 8)
Starting mae: -0.127155
```

```
KNN_4 Tab, NLP, Image score: -0.1272
NN TL Image Only Preds score: -0.1265
Extra Trees Tab, NLP, Image score: -0.1279
Random Forest Tab, NLP, Image score: -0.1279
NN NLP Only Preds score: -0.1283
KNN_4 Tab and NLP score: -0.1272
KNN_8 Tab and NLP score: -0.1275
Random Forest Tab and NLP score: -0.1278
NuSVR Tabular score: -0.1269
NuSVR Tab, NLP, Image score: -0.1282
KNN_4 Tabular score: -0.1267
KNN_8 Tab and Image score: -0.1271
```

```
Gradient Boost Tab and Image score: -0.128
Random Forest Tabular score: -0.1284
XGBR Tab, NLP, Image score: -0.1276
KNN_8 Tab, NLP, Image score: -0.127
KNN_15 Tab and NLP score: -0.1277
NuSVR Tab and Image score: -0.1278
Extra Trees Tab and Image score: -0.1281
KNN_8 Tabular score: -0.1276
Gradient Boost Tab and NLP score: -0.1278
KNN_4 Tab and Image score: -0.1272
NN CNN Image Only Preds score: -0.1273
Extra Trees Tab and NLP score: -0.1283
NN Tabular Only Preds score: -0.1271
KNN_15 Tab, NLP, Image score: -0.1274
Random Forest Tab and Image score: -0.1275
XGBR Tabular score: -0.128
Gradient Boost Tab, NLP, Image score: -0.1276
Best mae: -0.1265
```

Add NN TL Image Only Preds with mae -0.1265

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and NLP', 'KNN_15 Tab and Image', 'XGBR Tab and Image', 'KNN_15 Tabular', 'NN TL Image Only Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NuSVR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding KNN_15 Tab and Image (1309, 6)
Adding XGBR Tab and Image (1309, 7)
Adding KNN_15 Tabular (1309, 8)
Adding NN TL Image Only Preds (1309, 9)
Starting mae: -0.126498
```

```
KNN_4 Tab, NLP, Image score: -0.1267
Extra Trees Tab, NLP, Image score: -0.1271
Random Forest Tab, NLP, Image score: -0.1269
NN NLP Only Preds score: -0.1274
KNN_4 Tab and NLP score: -0.1264
KNN_8 Tab and NLP score: -0.127
Random Forest Tab and NLP score: -0.1272
NuSVR Tabular score: -0.1261
NuSVR Tab, NLP, Image score: -0.1272
KNN_4 Tabular score: -0.1262
KNN_8 Tab and Image score: -0.1264
Gradient Boost Tab and Image score: -0.1265
```

```
Random Forest Tabular score: -0.1272
XGBR Tab, NLP, Image score: -0.1273
KNN_8 Tab, NLP, Image score: -0.1264
KNN_15 Tab and NLP score: -0.127
NuSVR Tab and Image score: -0.1275
Extra Trees Tab and Image score: -0.1275
KNN_8 Tabular score: -0.1268
Gradient Boost Tab and NLP score: -0.1272
KNN_4 Tab and Image score: -0.1268
NN CNN Image Only Preds score: -0.1267
Extra Trees Tab and NLP score: -0.1278
NN Tabular Only Preds score: -0.1267
KNN_15 Tab, NLP, Image score: -0.1265
Random Forest Tab and Image score: -0.1271
XGBR Tabular score: -0.1272
Gradient Boost Tab, NLP, Image score: -0.1274
Best mae: -0.1261
```

Add NuSVR Tabular with mae -0.1261

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and NLP', 'KNN_15 Tab and Image', 'XGBR Tab and Image', 'KNN_15 Tabular', 'NN TL Image Only Preds', 'NuSVR Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NuSVR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding KNN_15 Tab and Image (1309, 6)
Adding XGBR Tab and Image (1309, 7)
Adding KNN_15 Tabular (1309, 8)
Adding NN TL Image Only Preds (1309, 9)
Adding NuSVR Tabular (1309, 10)
Starting mae: -0.126144
```

```
KNN_4 Tab, NLP, Image score: -0.1262
Extra Trees Tab, NLP, Image score: -0.1259
Random Forest Tab, NLP, Image score: -0.127
NN NLP Only Preds score: -0.1269
KNN_4 Tab and NLP score: -0.126
KNN_8 Tab and NLP score: -0.1265
Random Forest Tab and NLP score: -0.1265
NuSVR Tab, NLP, Image score: -0.1271
KNN_4 Tabular score: -0.1265
KNN_8 Tab and Image score: -0.127
Gradient Boost Tab and Image score: -0.1269
Random Forest Tabular score: -0.1271
XGBR Tab, NLP, Image score: -0.1268
```

```
KNN_8 Tab, NLP, Image score: -0.1269
KNN_15 Tab and NLP score: -0.127
NuSVR Tab and Image score: -0.1273
Extra Trees Tab and Image score: -0.1269
KNN_8 Tabular score: -0.1268
Gradient Boost Tab and NLP score: -0.1266
KNN_4 Tab and Image score: -0.1262
NN CNN Image Only Preds score: -0.1262
Extra Trees Tab and NLP score: -0.1273
NN Tabular Only Preds score: -0.1266
KNN_15 Tab, NLP, Image score: -0.1267
Random Forest Tab and Image score: -0.127
XGBR Tabular score: -0.1269
Gradient Boost Tab, NLP, Image score: -0.1265
Best mae: -0.1259
```

Add Extra Trees Tab, NLP, Image with mae -0.1259

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and NLP', 'KNN_15 Tab and Image', 'XGBR Tab and Image', 'KNN_15 Tabular', 'NN TL Image Only Preds', 'NuSVR Tabular', 'Extra Trees Tab, NLP, Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NuSVR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding KNN_15 Tab and Image (1309, 6)
Adding XGBR Tab and Image (1309, 7)
Adding KNN_15 Tabular (1309, 8)
Adding NN TL Image Only Preds (1309, 9)
Adding NuSVR Tabular (1309, 10)
Adding Extra Trees Tab, NLP, Image (1309, 11)
Starting mae: -0.125921
```

```
KNN_4 Tab, NLP, Image score: -0.1262
Random Forest Tab, NLP, Image score: -0.1267
NN NLP Only Preds score: -0.1267
KNN_4 Tab and NLP score: -0.1256
KNN_8 Tab and NLP score: -0.1265
Random Forest Tab and NLP score: -0.1265
NuSVR Tab, NLP, Image score: -0.1265
KNN_4 Tabular score: -0.126
KNN_8 Tab and Image score: -0.1265
Gradient Boost Tab and Image score: -0.126
Random Forest Tabular score: -0.1269
XGBR Tab, NLP, Image score: -0.1268
KNN_8 Tab, NLP, Image score: -0.1263
```

```
KNN_15 Tab and NLP score: -0.1267
NuSVR Tab and Image score: -0.1265
Extra Trees Tab and Image score: -0.1267
KNN_8 Tabular score: -0.1266
Gradient Boost Tab and NLP score: -0.1265
KNN_4 Tab and Image score: -0.1262
NN CNN Image Only Preds score: -0.1264
Extra Trees Tab and NLP score: -0.1271
NN Tabular Only Preds score: -0.1263
KNN_15 Tab, NLP, Image score: -0.1265
Random Forest Tab and Image score: -0.1264
XGBR Tabular score: -0.1264
Gradient Boost Tab, NLP, Image score: -0.1269
Best mae: -0.1256
```

Add KNN_4 Tab and NLP with mae -0.1256

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and NLP', 'KNN_15 Tab and Image', 'XGBR Tab and Image', 'KNN_15 Tabular', 'NN TL Image Only Preds', 'NuSVR Tabular', 'Extra Trees Tab, NLP, Image', 'KNN_4 Tab and NLP']

Exluded models: ['KNN_4 Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NuSVR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding KNN_15 Tab and Image (1309, 6)
Adding XGBR Tab and Image (1309, 7)
Adding KNN_15 Tabular (1309, 8)
Adding NN TL Image Only Preds (1309, 9)
Adding NuSVR Tabular (1309, 10)
Adding Extra Trees Tab, NLP, Image (1309, 11)
Adding KNN_4 Tab and NLP (1309, 12)
Starting mae: -0.12558
```

```
KNN_4 Tab, NLP, Image score: -0.1263
Random Forest Tab, NLP, Image score: -0.1269
NN NLP Only Preds score: -0.1267
KNN_8 Tab and NLP score: -0.1261
Random Forest Tab and NLP score: -0.1261
NuSVR Tab, NLP, Image score: -0.126
KNN_4 Tabular score: -0.1259
KNN_8 Tab and Image score: -0.1262
Gradient Boost Tab and Image score: -0.1256
Random Forest Tabular score: -0.1268
XGBR Tab, NLP, Image score: -0.1259
KNN_8 Tab, NLP, Image score: -0.1262
KNN_15 Tab and NLP score: -0.1258
```

```
NuSVR Tab and Image score: -0.1259
Extra Trees Tab and Image score: -0.1263
KNN_8 Tabular score: -0.1261
Gradient Boost Tab and NLP score: -0.1266
KNN_4 Tab and Image score: -0.1262
NN CNN Image Only Preds score: -0.1259
Extra Trees Tab and NLP score: -0.1271
NN Tabular Only Preds score: -0.1263
KNN_15 Tab, NLP, Image score: -0.1261
Random Forest Tab and Image score: -0.1258
XGBR Tabular score: -0.1264
Gradient Boost Tab, NLP, Image score: -0.126
Best mae: -0.1256
```

```
Extra Trees model optimized
resulting models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NuSVR Tab and NLP',
'Gradient Boost Tabular', 'XGBR Tab and NLP', 'KNN_15 Tab and Image', 'XGBR Tab and Image',
'KNN_15 Tabular', 'NN TL Image Only Preds', 'NuSVR Tabular', 'Extra Trees Tab, NLP,
Image', 'KNN_4 Tab and NLP']
MAE: -0.12558
```

Running model selector for Random Forest

NEW ROUND - Setting up score charts

Included models: []

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL
P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K
NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag
e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore
st Tabular', 'Extra Trees Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN
_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and I
mage', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and I
mage', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'G
radient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP,
Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Ta
bular', 'Gradient Boost Tab, NLP, Image']

```
KNN_4 Tab, NLP, Image score: -0.384022
NN TL Image Only Preds score: -0.416463
Extra Trees Tab, NLP, Image score: -0.187778
Random Forest Tab, NLP, Image score: -0.201548
NN NLP Only Preds score: -0.325
KNN_4 Tab and NLP score: -0.227377
KNN_8 Tab and NLP score: -0.219763
Random Forest Tab and NLP score: -0.190024
NuSVR Tabular score: -0.16884
NuSVR Tab, NLP, Image score: -0.388097
KNN_4 Tabular score: -0.223103
KNN_8 Tab and Image score: -0.387637
Gradient Boost Tab and Image score: -0.182023
Random Forest Tabular score: -0.181519
Extra Trees Tabular score: -0.1661
XGBR Tab, NLP, Image score: -0.190518
KNN_15 Tab and Image score: -0.397069
KNN_8 Tab, NLP, Image score: -0.387803
KNN_15 Tab and NLP score: -0.216288
NuSVR Tab and Image score: -0.380892
Extra Trees Tab and Image score: -0.189459
```

```
KNN_15 Tabular score: -0.207969
KNN_8 Tabular score: -0.221939
Gradient Boost Tab and NLP score: -0.182861
KNN_4 Tab and Image score: -0.384394
NN CNN Image Only Preds score: -0.340987
Extra Trees Tab and NLP score: -0.173713
NN Tabular Only Preds score: -0.173631
Gradient Boost Tabular score: -0.170519
NN Multi Input Preds score: -0.189167
XGBR Tab and Image score: -0.187525
KNN_15 Tab, NLP, Image score: -0.397069
NuSVR Tab and NLP score: -0.17358
Random Forest Tab and Image score: -0.199279
XGBR Tab and NLP score: -0.184626
XGBR Tabular score: -0.170572
Gradient Boost Tab, NLP, Image score: -0.18903
Best mae: -0.1661
```

Add Extra Trees Tabular with mae -0.1661

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular']

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab a nd NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Bo ost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)

Starting mae: -0.1661

```
KNN_4 Tab, NLP, Image score: -0.1521
NN TL Image Only Preds score: -0.153
Extra Trees Tab, NLP, Image score: -0.1512
Random Forest Tab, NLP, Image score: -0.1504
NN NLP Only Preds score: -0.1566
KNN_4 Tab and NLP score: -0.1519
KNN_8 Tab and NLP score: -0.1521
Random Forest Tab and NLP score: -0.1498
NuSVR Tabular score: -0.1448
NuSVR Tab, NLP, Image score: -0.1534
KNN_4 Tabular score: -0.1523
KNN_8 Tab and Image score: -0.1509
Gradient Boost Tab and Image score: -0.1481
Random Forest Tabular score: -0.1542
XGBR Tab, NLP, Image score: -0.1491
KNN_15 Tab and Image score: -0.1533
KNN_8 Tab, NLP, Image score: -0.1508
KNN_15 Tab and NLP score: -0.1507
NuSVR Tab and Image score: -0.1531
Extra Trees Tab and Image score: -0.1521
KNN_15 Tabular score: -0.1501
```

```
KNN_8 Tabular score: -0.1531
Gradient Boost Tab and NLP score: -0.1494
KNN_4 Tab and Image score: -0.1519
NN CNN Image Only Preds score: -0.1661
Extra Trees Tab and NLP score: -0.1503
NN Tabular Only Preds score: -0.1458
Gradient Boost Tabular score: -0.1461
NN Multi Input Preds score: -0.1462
XGBR Tab and Image score: -0.1505
KNN_15 Tab, NLP, Image score: -0.1533
NuSVR Tab and NLP score: -0.1486
Random Forest Tab and Image score: -0.15
XGBR Tab and NLP score: -0.1491
XGBR Tabular score: -0.1489
Gradient Boost Tab, NLP, Image score: -0.1487
Best mae: -0.1448
```

Add NuSVR Tabular with mae -0.1448

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGB R Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NL P', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Starting mae: -0.144768

```
KNN_4 Tab, NLP, Image score: -0.1398
NN TL Image Only Preds score: -0.1413
Extra Trees Tab, NLP, Image score: -0.1409
Random Forest Tab, NLP, Image score: -0.1396
NN NLP Only Preds score: -0.1413
KNN_4 Tab and NLP score: -0.1399
KNN_8 Tab and NLP score: -0.1418
Random Forest Tab and NLP score: -0.1405
NuSVR Tab, NLP, Image score: -0.1442
KNN_4 Tabular score: -0.1396
KNN_8 Tab and Image score: -0.1415
Gradient Boost Tab and Image score: -0.141
Random Forest Tabular score: -0.1408
XGBR Tab, NLP, Image score: -0.1368
KNN_15 Tab and Image score: -0.142
KNN_8 Tab, NLP, Image score: -0.1414
KNN_15 Tab and NLP score: -0.1414
NuSVR Tab and Image score: -0.1445
Extra Trees Tab and Image score: -0.1417
KNN_15 Tabular score: -0.1412
KNN_8 Tabular score: -0.1426
```

Gradient Boost Tab and NLP score: -0.1404
KNN_4 Tab and Image score: -0.1398
NN CNN Image Only Preds score: -0.1448
Extra Trees Tab and NLP score: -0.1411
NN Tabular Only Preds score: -0.1405
Gradient Boost Tabular score: -0.1391
NN Multi Input Preds score: -0.139
XGBR Tab and Image score: -0.1392
KNN_15 Tab, NLP, Image score: -0.142
NuSVR Tab and NLP score: -0.1412
Random Forest Tab and Image score: -0.1404
XGBR Tab and NLP score: -0.1408
XGBR Tabular score: -0.1414
Gradient Boost Tab, NLP, Image score: -0.1411
Best mae: -0.1368

Add XGBR Tab, NLP, Image with mae -0.1368

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN _15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'X GBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Starting mae: -0.136766

KNN_4 Tab, NLP, Image score: -0.1361
NN TL Image Only Preds score: -0.1357
Extra Trees Tab, NLP, Image score: -0.1354
Random Forest Tab, NLP, Image score: -0.1355
NN NLP Only Preds score: -0.1372
KNN_4 Tab and NLP score: -0.1357
KNN_8 Tab and NLP score: -0.1365
Random Forest Tab and NLP score: -0.1369
NuSVR Tab, NLP, Image score: -0.138
KNN_4 Tabular score: -0.1355
KNN_8 Tab and Image score: -0.1351
Gradient Boost Tab and Image score: -0.1358
Random Forest Tabular score: -0.1362
KNN_15 Tab and Image score: -0.1354
KNN_8 Tab, NLP, Image score: -0.135
KNN_15 Tab and NLP score: -0.1369
NuSVR Tab and Image score: -0.1382
Extra Trees Tab and Image score: -0.1354
KNN_15 Tabular score: -0.1372
KNN_8 Tabular score: -0.1366
Gradient Boost Tab and NLP score: -0.1361
KNN_4 Tab and Image score: -0.1361

```
NN CNN Image Only Preds score: -0.1369
Extra Trees Tab and NLP score: -0.1368
NN Tabular Only Preds score: -0.1363
Gradient Boost Tabular score: -0.1341
NN Multi Input Preds score: -0.1348
XGBR Tab and Image score: -0.1352
KNN_15 Tab, NLP, Image score: -0.1354
NuSVR Tab and NLP score: -0.1363
Random Forest Tab and Image score: -0.1347
XGBR Tab and NLP score: -0.1372
XGBR Tabular score: -0.1367
Gradient Boost Tab, NLP, Image score: -0.1369
Best mae: -0.1341
```

Add Gradient Boost Tabular with mae -0.1341

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN _15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Starting mae: -0.134075
```

```
KNN_4 Tab, NLP, Image score: -0.1335
NN TL Image Only Preds score: -0.1326
Extra Trees Tab, NLP, Image score: -0.1329
Random Forest Tab, NLP, Image score: -0.1337
NN NLP Only Preds score: -0.1339
KNN_4 Tab and NLP score: -0.1324
KNN_8 Tab and NLP score: -0.1333
Random Forest Tab and NLP score: -0.1348
NuSVR Tab, NLP, Image score: -0.135
KNN_4 Tabular score: -0.132
KNN_8 Tab and Image score: -0.132
Gradient Boost Tab and Image score: -0.134
Random Forest Tabular score: -0.1347
KNN_15 Tab and Image score: -0.1325
KNN_8 Tab, NLP, Image score: -0.132
KNN_15 Tab and NLP score: -0.1335
NuSVR Tab and Image score: -0.135
Extra Trees Tab and Image score: -0.1333
KNN_15 Tabular score: -0.1337
KNN_8 Tabular score: -0.1327
Gradient Boost Tab and NLP score: -0.1326
KNN_4 Tab and Image score: -0.1335
```

```
NN CNN Image Only Preds score: -0.1339
Extra Trees Tab and NLP score: -0.1334
NN Tabular Only Preds score: -0.1328
NN Multi Input Preds score: -0.1316
XGBR Tab and Image score: -0.1321
KNN_15 Tab, NLP, Image score: -0.1325
NuSVR Tab and NLP score: -0.1321
Random Forest Tab and Image score: -0.1328
XGBR Tab and NLP score: -0.1334
XGBR Tabular score: -0.1328
Gradient Boost Tab, NLP, Image score: -0.1338
Best mae: -0.1316
```

Add NN Multi Input Preds with mae -0.1316

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabula r', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN _15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Imag e', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Starting mae: -0.131586
```

```
KNN_4 Tab, NLP, Image score: -0.1318
NN TL Image Only Preds score: -0.1309
Extra Trees Tab, NLP, Image score: -0.1308
Random Forest Tab, NLP, Image score: -0.1311
NN NLP Only Preds score: -0.1319
KNN_4 Tab and NLP score: -0.1303
KNN_8 Tab and NLP score: -0.1312
Random Forest Tab and NLP score: -0.132
NuSVR Tab, NLP, Image score: -0.1321
KNN_4 Tabular score: -0.1306
KNN_8 Tab and Image score: -0.1296
Gradient Boost Tab and Image score: -0.1317
Random Forest Tabular score: -0.1321
KNN_15 Tab and Image score: -0.13
KNN_8 Tab, NLP, Image score: -0.1297
KNN_15 Tab and NLP score: -0.1309
NuSVR Tab and Image score: -0.1321
Extra Trees Tab and Image score: -0.1313
KNN_15 Tabular score: -0.1311
KNN_8 Tabular score: -0.131
Gradient Boost Tab and NLP score: -0.1305
KNN_4 Tab and Image score: -0.1319
```

```
NN CNN Image Only Preds score: -0.1314
Extra Trees Tab and NLP score: -0.1305
NN Tabular Only Preds score: -0.1301
XGBR Tab and Image score: -0.1304
KNN_15 Tab, NLP, Image score: -0.13
NuSVR Tab and NLP score: -0.1303
Random Forest Tab and Image score: -0.1308
XGBR Tab and NLP score: -0.1318
XGBR Tabular score: -0.1304
Gradient Boost Tab, NLP, Image score: -0.1314
Best mae: -0.1296
```

Add KNN_8 Tab and Image with mae -0.1296

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Starting mae: -0.129642
```

```
KNN_4 Tab, NLP, Image score: -0.1301
NN TL Image Only Preds score: -0.1296
Extra Trees Tab, NLP, Image score: -0.1294
Random Forest Tab, NLP, Image score: -0.1297
NN NLP Only Preds score: -0.13
KNN_4 Tab and NLP score: -0.1294
KNN_8 Tab and NLP score: -0.1297
Random Forest Tab and NLP score: -0.1308
NuSVR Tab, NLP, Image score: -0.1304
KNN_4 Tabular score: -0.1294
Gradient Boost Tab and Image score: -0.1299
Random Forest Tabular score: -0.1307
KNN_15 Tab and Image score: -0.1295
KNN_8 Tab, NLP, Image score: -0.1296
KNN_15 Tab and NLP score: -0.1298
NuSVR Tab and Image score: -0.1305
Extra Trees Tab and Image score: -0.1298
KNN_15 Tabular score: -0.1297
KNN_8 Tabular score: -0.1296
Gradient Boost Tab and NLP score: -0.1289
KNN_4 Tab and Image score: -0.1302
NN CNN Image Only Preds score: -0.1296
Extra Trees Tab and NLP score: -0.1294
```

```
NN Tabular Only Preds score: -0.1288
XGBR Tab and Image score: -0.1289
KNN_15 Tab, NLP, Image score: -0.1295
NuSVR Tab and NLP score: -0.1292
Random Forest Tab and Image score: -0.1297
XGBR Tab and NLP score: -0.1302
XGBR Tabular score: -0.1289
Gradient Boost Tab, NLP, Image score: -0.1303
Best mae: -0.1288
```

Add NN Tabular Only Preds with mae -0.1288

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KN N_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN _15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Starting mae: -0.128788
```

```
KNN_4 Tab, NLP, Image score: -0.1293
NN TL Image Only Preds score: -0.129
Extra Trees Tab, NLP, Image score: -0.1285
Random Forest Tab, NLP, Image score: -0.1286
NN NLP Only Preds score: -0.1291
KNN_4 Tab and NLP score: -0.1291
KNN_8 Tab and NLP score: -0.1288
Random Forest Tab and NLP score: -0.1298
NuSVR Tab, NLP, Image score: -0.1296
KNN_4 Tabular score: -0.1289
Gradient Boost Tab and Image score: -0.1288
Random Forest Tabular score: -0.1295
KNN_15 Tab and Image score: -0.1286
KNN_8 Tab, NLP, Image score: -0.129
KNN_15 Tab and NLP score: -0.1289
NuSVR Tab and Image score: -0.1295
Extra Trees Tab and Image score: -0.1289
KNN_15 Tabular score: -0.1289
KNN_8 Tabular score: -0.1283
Gradient Boost Tab and NLP score: -0.128
KNN_4 Tab and Image score: -0.1293
NN CNN Image Only Preds score: -0.1289
Extra Trees Tab and NLP score: -0.1284
```

```
XGBR Tab and Image score: -0.1284
KNN_15 Tab, NLP, Image score: -0.1286
NuSVR Tab and NLP score: -0.1296
Random Forest Tab and Image score: -0.1283
XGBR Tab and NLP score: -0.1301
XGBR Tabular score: -0.1276
Gradient Boost Tab, NLP, Image score: -0.1297
Best mae: -0.1276
```

Add XGBR Tabular with mae -0.1276

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabula r', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KN N_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN _15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Starting mae: -0.127582
```

```
KNN_4 Tab, NLP, Image score: -0.1278
NN TL Image Only Preds score: -0.1277
Extra Trees Tab, NLP, Image score: -0.1274
Random Forest Tab, NLP, Image score: -0.1275
NN NLP Only Preds score: -0.1279
KNN_4 Tab and NLP score: -0.1277
KNN_8 Tab and NLP score: -0.1272
Random Forest Tab and NLP score: -0.1284
NuSVR Tab, NLP, Image score: -0.1283
KNN_4 Tabular score: -0.1277
Gradient Boost Tab and Image score: -0.1277
Random Forest Tabular score: -0.1284
KNN_15 Tab and Image score: -0.1276
KNN_8 Tab, NLP, Image score: -0.1276
KNN_15 Tab and NLP score: -0.1276
NuSVR Tab and Image score: -0.1283
Extra Trees Tab and Image score: -0.1272
KNN_15 Tabular score: -0.1276
KNN_8 Tabular score: -0.1271
Gradient Boost Tab and NLP score: -0.1265
KNN_4 Tab and Image score: -0.1278
NN CNN Image Only Preds score: -0.1277
Extra Trees Tab and NLP score: -0.1275
```

```
XGBR Tab and Image score: -0.1271
KNN_15 Tab, NLP, Image score: -0.1276
NuSVR Tab and NLP score: -0.1286
Random Forest Tab and Image score: -0.1272
XGBR Tab and NLP score: -0.1286
Gradient Boost Tab, NLP, Image score: -0.1283
Best mae: -0.1265
```

```
Add Gradient Boost Tab and NLP with mae -0.1265
```

NEW ROUND - Setting up score charts

```
Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNIN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Adding Gradient Boost Tab and NLP (1309, 9)
Starting mae: -0.126533
```

```
KNN_4 Tab, NLP, Image score: -0.1272
NN TL Image Only Preds score: -0.1266
Extra Trees Tab, NLP, Image score: -0.1267
Random Forest Tab, NLP, Image score: -0.1266
NN NLP Only Preds score: -0.1271
KNN_4 Tab and NLP score: -0.1268
KNN_8 Tab and NLP score: -0.1263
Random Forest Tab and NLP score: -0.1273
NuSVR Tab, NLP, Image score: -0.1274
KNN_4 Tabular score: -0.1269
Gradient Boost Tab and Image score: -0.1266
Random Forest Tabular score: -0.1275
KNN_15 Tab and Image score: -0.1268
KNN_8 Tab, NLP, Image score: -0.1265
KNN_15 Tab and NLP score: -0.1267
NuSVR Tab and Image score: -0.1272
Extra Trees Tab and Image score: -0.1266
KNN_15 Tabular score: -0.1268
KNN_8 Tabular score: -0.1263
KNN_4 Tab and Image score: -0.1272
NN CNN Image Only Preds score: -0.1268
Extra Trees Tab and NLP score: -0.1268
XGBR Tab and Image score: -0.1266
```

KNN_15 Tab, NLP, Image score: -0.1268
NuSVR Tab and NLP score: -0.1276
Random Forest Tab and Image score: -0.1263
XGBR Tab and NLP score: -0.128
Gradient Boost Tab, NLP, Image score: -0.1278
Best mae: -0.1263

Add KNN_8 Tab and NLP with mae -0.1263

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP', 'KNN_8 Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Adding Gradient Boost Tab and NLP (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Starting mae: -0.126303

KNN_4 Tab, NLP, Image score: -0.1265
NN TL Image Only Preds score: -0.1262
Extra Trees Tab, NLP, Image score: -0.1262
Random Forest Tab, NLP, Image score: -0.1262
NN NLP Only Preds score: -0.1267
KNN_4 Tab and NLP score: -0.1265
Random Forest Tab and NLP score: -0.1272
NuSVR Tab, NLP, Image score: -0.1268
KNN_4 Tabular score: -0.1265
Gradient Boost Tab and Image score: -0.1259
Random Forest Tabular score: -0.127
KNN_15 Tab and Image score: -0.1262
KNN_8 Tab, NLP, Image score: -0.1264
KNN_15 Tab and NLP score: -0.126
NuSVR Tab and Image score: -0.1267
Extra Trees Tab and Image score: -0.1258
KNN_15 Tabular score: -0.1263
KNN_8 Tabular score: -0.1263
KNN_4 Tab and Image score: -0.1266
NN CNN Image Only Preds score: -0.1265
Extra Trees Tab and NLP score: -0.1266
XGBR Tab and Image score: -0.1258
KNN_15 Tab, NLP, Image score: -0.1262
NuSVR Tab and NLP score: -0.1273

```
Random Forest Tab and Image score: -0.1261
XGBR Tab and NLP score: -0.1276
Gradient Boost Tab, NLP, Image score: -0.1273
Best mae: -0.1258
```

```
Add Extra Trees Tab and Image with mae -0.1258
```

```
NEW ROUND - Setting up score charts
```

```
Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP', 'KNN_8 Tab and NLP', 'Extra Trees Tab and Image']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Adding Gradient Boost Tab and NLP (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Adding Extra Trees Tab and Image (1309, 11)
Starting mae: -0.125834
```

```
KNN_4 Tab, NLP, Image score: -0.1263
NN TL Image Only Preds score: -0.126
Extra Trees Tab, NLP, Image score: -0.1257
Random Forest Tab, NLP, Image score: -0.1259
NN NLP Only Preds score: -0.1263
KNN_4 Tab and NLP score: -0.1261
Random Forest Tab and NLP score: -0.1264
NuSVR Tab, NLP, Image score: -0.1264
KNN_4 Tabular score: -0.1258
Gradient Boost Tab and Image score: -0.1257
Random Forest Tabular score: -0.1262
KNN_15 Tab and Image score: -0.1258
KNN_8 Tab, NLP, Image score: -0.1258
KNN_15 Tab and NLP score: -0.1257
NuSVR Tab and Image score: -0.1265
KNN_15 Tabular score: -0.126
KNN_8 Tabular score: -0.1259
KNN_4 Tab and Image score: -0.1263
NN CNN Image Only Preds score: -0.126
Extra Trees Tab and NLP score: -0.1258
XGBR Tab and Image score: -0.1254
KNN_15 Tab, NLP, Image score: -0.1258
NuSVR Tab and NLP score: -0.1268
Random Forest Tab and Image score: -0.1259
```

```
XGBR Tab and NLP score: -0.1267
Gradient Boost Tab, NLP, Image score: -0.1269
Best mae: -0.1254
```

```
Add XGBR Tab and Image with mae -0.1254
```

NEW ROUND - Setting up score charts

```
Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP', 'KNN_8 Tab and NLP', 'Extra Trees Tab and Image', 'XGBR Tab and Image']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Adding Gradient Boost Tab and NLP (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Adding Extra Trees Tab and Image (1309, 11)
Adding XGBR Tab and Image (1309, 12)
Starting mae: -0.125362
```

```
KNN_4 Tab, NLP, Image score: -0.1258
NN TL Image Only Preds score: -0.1256
Extra Trees Tab, NLP, Image score: -0.1257
Random Forest Tab, NLP, Image score: -0.1259
NN NLP Only Preds score: -0.126
KNN_4 Tab and NLP score: -0.1257
Random Forest Tab and NLP score: -0.1265
NuSVR Tab, NLP, Image score: -0.1261
KNN_4 Tabular score: -0.1255
Gradient Boost Tab and Image score: -0.1254
Random Forest Tabular score: -0.1261
KNN_15 Tab and Image score: -0.1256
KNN_8 Tab, NLP, Image score: -0.1256
KNN_15 Tab and NLP score: -0.1255
NuSVR Tab and Image score: -0.126
KNN_15 Tabular score: -0.1258
KNN_8 Tabular score: -0.1256
KNN_4 Tab and Image score: -0.1259
NN CNN Image Only Preds score: -0.1256
Extra Trees Tab and NLP score: -0.1258
KNN_15 Tab, NLP, Image score: -0.1256
NuSVR Tab and NLP score: -0.1266
Random Forest Tab and Image score: -0.1253
XGBR Tab and NLP score: -0.1264
```

Gradient Boost Tab, NLP, Image score: -0.1267
Best mae: -0.1253

Add Random Forest Tab and Image with mae -0.1253

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP', 'KNN_8 Tab and NLP', 'Extra Trees Tab and Image', 'XGBR Tab and Image', 'Random Forest Tab and Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Adding Gradient Boost Tab and NLP (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Adding Extra Trees Tab and Image (1309, 11)
Adding XGBR Tab and Image (1309, 12)
Adding Random Forest Tab and Image (1309, 13)
Starting mae: -0.125307

KNN_4 Tab, NLP, Image score: -0.1257
NN TL Image Only Preds score: -0.1255
Extra Trees Tab, NLP, Image score: -0.1251
Random Forest Tab, NLP, Image score: -0.1254
NN NLP Only Preds score: -0.126
KNN_4 Tab and NLP score: -0.1255
Random Forest Tab and NLP score: -0.1259
NuSVR Tab, NLP, Image score: -0.1259
KNN_4 Tabular score: -0.1255
Gradient Boost Tab and Image score: -0.1252
Random Forest Tabular score: -0.1259
KNN_15 Tab and Image score: -0.1255
KNN_8 Tab, NLP, Image score: -0.1253
KNN_15 Tab and NLP score: -0.1253
NuSVR Tab and Image score: -0.1259
KNN_15 Tabular score: -0.1255
KNN_8 Tabular score: -0.1254
KNN_4 Tab and Image score: -0.1257
NN CNN Image Only Preds score: -0.1254
Extra Trees Tab and NLP score: -0.1253
KNN_15 Tab, NLP, Image score: -0.1255
NuSVR Tab and NLP score: -0.1267
XGBR Tab and NLP score: -0.1259
Gradient Boost Tab, NLP, Image score: -0.1263
Best mae: -0.1251

Add Extra Trees Tab, NLP, Image with mae -0.1251

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP', 'KNN_8 Tab and NLP', 'Extra Trees Tab and Image', 'XGBR Tab and Image', 'Random Forest Tab and Image', 'Extra Trees Tab, NLP, Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Adding Gradient Boost Tab and NLP (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Adding Extra Trees Tab and Image (1309, 11)
Adding XGBR Tab and Image (1309, 12)
Adding Random Forest Tab and Image (1309, 13)
Adding Extra Trees Tab, NLP, Image (1309, 14)
Starting mae: -0.125126

KNN_4 Tab, NLP, Image score: -0.1255
NN TL Image Only Preds score: -0.1251
Random Forest Tab, NLP, Image score: -0.1253
NN NLP Only Preds score: -0.1252
KNN_4 Tab and NLP score: -0.1253
Random Forest Tab and NLP score: -0.1258
NuSVR Tab, NLP, Image score: -0.1256
KNN_4 Tabular score: -0.1254
Gradient Boost Tab and Image score: -0.1251
Random Forest Tabular score: -0.1256
KNN_15 Tab and Image score: -0.1252
KNN_8 Tab, NLP, Image score: -0.125
KNN_15 Tab and NLP score: -0.1252
NuSVR Tab and Image score: -0.1256
KNN_15 Tabular score: -0.1255
KNN_8 Tabular score: -0.1253
KNN_4 Tab and Image score: -0.1254
NN CNN Image Only Preds score: -0.1253
Extra Trees Tab and NLP score: -0.1254
KNN_15 Tab, NLP, Image score: -0.1252
NuSVR Tab and NLP score: -0.1263
XGBR Tab and NLP score: -0.1258
Gradient Boost Tab, NLP, Image score: -0.1259
Best mae: -0.125

Add KNN_8 Tab, NLP, Image with mae -0.125

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP', 'KNN_8 Tab and NLP', 'Extra Trees Tab and Image', 'XGBR Tab and Image', 'Random Forest Tab and Image', 'Extra Trees Tab, NLP, Image', 'KNN_8 Tab, NLP, Image']

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Adding Gradient Boost Tab and NLP (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Adding Extra Trees Tab and Image (1309, 11)
Adding XGBR Tab and Image (1309, 12)
Adding Random Forest Tab and Image (1309, 13)
Adding Extra Trees Tab, NLP, Image (1309, 14)
Adding KNN_8 Tab, NLP, Image (1309, 15)
Starting mae: -0.125047

KNN_4 Tab, NLP, Image score: -0.1253
NN TL Image Only Preds score: -0.125
Random Forest Tab, NLP, Image score: -0.1252
NN NLP Only Preds score: -0.1257
KNN_4 Tab and NLP score: -0.1253
Random Forest Tab and NLP score: -0.1259
NuSVR Tab, NLP, Image score: -0.1257
KNN_4 Tabular score: -0.1251
Gradient Boost Tab and Image score: -0.1252
Random Forest Tabular score: -0.1256
KNN_15 Tab and Image score: -0.1253
KNN_15 Tab and NLP score: -0.1252
NuSVR Tab and Image score: -0.1256
KNN_15 Tabular score: -0.1255
KNN_8 Tabular score: -0.1252
KNN_4 Tab and Image score: -0.1253
NN CNN Image Only Preds score: -0.1252
Extra Trees Tab and NLP score: -0.1251
KNN_15 Tab, NLP, Image score: -0.1253
NuSVR Tab and NLP score: -0.1263
XGBR Tab and NLP score: -0.1257
Gradient Boost Tab, NLP, Image score: -0.1261
Best mae: -0.125

Add NN TL Image Only Preds with mae -0.125

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP', 'KNN_8 Tab and NLP', 'Extra Trees Tab and Image', 'XGBR Tab and Image', 'Random Forest Tab and Image', 'Extra Trees Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'NN TL Image Only Preds']

Exluded models: ['KNN_4 Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Adding Gradient Boost Tab and NLP (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Adding Extra Trees Tab and Image (1309, 11)
Adding XGBR Tab and Image (1309, 12)
Adding Random Forest Tab and Image (1309, 13)
Adding Extra Trees Tab, NLP, Image (1309, 14)
Adding KNN_8 Tab, NLP, Image (1309, 15)
Adding NN TL Image Only Preds (1309, 16)
Starting mae: -0.125023

KNN_4 Tab, NLP, Image score: -0.1257
Random Forest Tab, NLP, Image score: -0.1251
NN NLP Only Preds score: -0.1255
KNN_4 Tab and NLP score: -0.1254
Random Forest Tab and NLP score: -0.1258
NuSVR Tab, NLP, Image score: -0.1256
KNN_4 Tabular score: -0.1254
Gradient Boost Tab and Image score: -0.125
Random Forest Tabular score: -0.1254
KNN_15 Tab and Image score: -0.125
KNN_15 Tab and NLP score: -0.1254
NuSVR Tab and Image score: -0.1256
KNN_15 Tabular score: -0.1256
KNN_8 Tabular score: -0.1253
KNN_4 Tab and Image score: -0.1257
NN CNN Image Only Preds score: -0.125
Extra Trees Tab and NLP score: -0.1255
KNN_15 Tab, NLP, Image score: -0.125
NuSVR Tab and NLP score: -0.1264
XGBR Tab and NLP score: -0.126
Gradient Boost Tab, NLP, Image score: -0.1261
Best mae: -0.125

Add Gradient Boost Tab and Image with mae -0.125

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP', 'KNN_8 Tab and NLP', 'Extra Trees Tab and Image', 'XGBR Tab and Image', 'Random Forest Tab and Image', 'Extra Trees Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'NN TL Image Only Preds', 'Gradient Boost Tab and Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Adding Gradient Boost Tab and NLP (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Adding Extra Trees Tab and Image (1309, 11)
Adding XGBR Tab and Image (1309, 12)
Adding Random Forest Tab and Image (1309, 13)
Adding Extra Trees Tab, NLP, Image (1309, 14)
Adding KNN_8 Tab, NLP, Image (1309, 15)
Adding NN TL Image Only Preds (1309, 16)
Adding Gradient Boost Tab and Image (1309, 17)
Starting mae: -0.125022

KNN_4 Tab, NLP, Image score: -0.1254
Random Forest Tab, NLP, Image score: -0.1255
NN NLP Only Preds score: -0.1254
KNN_4 Tab and NLP score: -0.1252
Random Forest Tab and NLP score: -0.1257
NuSVR Tab, NLP, Image score: -0.1256
KNN_4 Tabular score: -0.1251
Random Forest Tabular score: -0.1257
KNN_15 Tab and Image score: -0.1249
KNN_15 Tab and NLP score: -0.1253
NuSVR Tab and Image score: -0.1255
KNN_15 Tabular score: -0.1253
KNN_8 Tabular score: -0.1252
KNN_4 Tab and Image score: -0.1254
NN CNN Image Only Preds score: -0.1252
Extra Trees Tab and NLP score: -0.1253
KNN_15 Tab, NLP, Image score: -0.1249
NuSVR Tab and NLP score: -0.1262
XGBR Tab and NLP score: -0.1256
Gradient Boost Tab, NLP, Image score: -0.1258
Best mae: -0.1249

Add KNN_15 Tab and Image with mae -0.1249

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP', 'KNN_8 Tab and NLP', 'Extra Trees Tab and Image', 'XGBR Tab and Image', 'Random Forest Tab and Image', 'Extra Trees Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'NN TL Image Only Preds', 'Gradient Boost Tab and Image', 'KNN_15 Tab and Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'Random Forest Tabular', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab, NLP, Image (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding KNN_8 Tab and Image (1309, 6)
Adding NN Tabular Only Preds (1309, 7)
Adding XGBR Tabular (1309, 8)
Adding Gradient Boost Tab and NLP (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Adding Extra Trees Tab and Image (1309, 11)
Adding XGBR Tab and Image (1309, 12)
Adding Random Forest Tab and Image (1309, 13)
Adding Extra Trees Tab, NLP, Image (1309, 14)
Adding KNN_8 Tab, NLP, Image (1309, 15)
Adding NN TL Image Only Preds (1309, 16)
Adding Gradient Boost Tab and Image (1309, 17)
Adding KNN_15 Tab and Image (1309, 18)
Starting mae: -0.124913
```

```
KNN_4 Tab, NLP, Image score: -0.1252
Random Forest Tab, NLP, Image score: -0.1252
NN NLP Only Preds score: -0.1254
KNN_4 Tab and NLP score: -0.1253
Random Forest Tab and NLP score: -0.1256
NuSVR Tab, NLP, Image score: -0.1257
KNN_4 Tabular score: -0.1252
Random Forest Tabular score: -0.1253
KNN_15 Tab and NLP score: -0.125
NuSVR Tab and Image score: -0.1257
KNN_15 Tabular score: -0.125
KNN_8 Tabular score: -0.125
KNN_4 Tab and Image score: -0.1252
NN CNN Image Only Preds score: -0.1251
Extra Trees Tab and NLP score: -0.1251
KNN_15 Tab, NLP, Image score: -0.1251
NuSVR Tab and NLP score: -0.126
XGBR Tab and NLP score: -0.1255
Gradient Boost Tab, NLP, Image score: -0.1259
Best mae: -0.125
```

Random Forest model optimized

resulting models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab, NLP, Image', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'KNN_8 Tab and Image', 'NN Tabular Only Preds', 'XGBR Tabular', 'Gradient Boost Tab and NLP', 'KNN_8 Tab and NLP', 'Extra Trees Tab and Image', 'XGBR Tab and Image', 'Random Forest Tab and Image', 'Extra Trees Tab, NLP,

```
Image', 'KNN_8 Tab, NLP, Image', 'NN TL Image Only Preds', 'Gradient Boost Tab and Image', 'KNN_15 Tab and Image']
MAE: -0.124913
```

Running model selector for XGBR

NEW ROUND - Setting up score charts

Included models: []

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'Extra Trees Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

KNN_4 Tab, NLP, Image score: -0.338785
NN TL Image Only Preds score: -0.365073
Extra Trees Tab, NLP, Image score: -0.158142
Random Forest Tab, NLP, Image score: -0.171213
NN NLP Only Preds score: -0.288466
KNN_4 Tab and NLP score: -0.188254
KNN_8 Tab and NLP score: -0.186382
Random Forest Tab and NLP score: -0.157951
NuSVR Tabular score: -0.142985
NuSVR Tab, NLP, Image score: -0.344137
KNN_4 Tabular score: -0.188374
KNN_8 Tab and Image score: -0.338936
Gradient Boost Tab and Image score: -0.156686
Random Forest Tabular score: -0.151136
Extra Trees Tabular score: -0.141794
XGBR Tab, NLP, Image score: -0.16289
KNN_15 Tab and Image score: -0.343242
KNN_8 Tab, NLP, Image score: -0.338792
KNN_15 Tab and NLP score: -0.183174
NuSVR Tab and Image score: -0.338777
Extra Trees Tab and Image score: -0.152767
KNN_15 Tabular score: -0.179357
KNN_8 Tabular score: -0.187088
Gradient Boost Tab and NLP score: -0.15272
KNN_4 Tab and Image score: -0.338253
NN CNN Image Only Preds score: -0.340948
Extra Trees Tab and NLP score: -0.150851
NN Tabular Only Preds score: -0.145538
Gradient Boost Tabular score: -0.14481
NN Multi Input Preds score: -0.160765
XGBR Tab and Image score: -0.159035
KNN_15 Tab, NLP, Image score: -0.343242
NuSVR Tab and NLP score: -0.147483
Random Forest Tab and Image score: -0.167257
XGBR Tab and NLP score: -0.155498
XGBR Tabular score: -0.149493
Gradient Boost Tab, NLP, Image score: -0.159098
Best mae: -0.141794

```
Add Extra Trees Tabular with mae -0.141794
```

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab a nd NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Bo ost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)

Starting mae: -0.141794

KNN_4 Tab, NLP, Image score: -0.1577
NN TL Image Only Preds score: -0.152
Extra Trees Tab, NLP, Image score: -0.1559
Random Forest Tab, NLP, Image score: -0.16
NN NLP Only Preds score: -0.157
KNN_4 Tab and NLP score: -0.1643
KNN_8 Tab and NLP score: -0.1652
Random Forest Tab and NLP score: -0.153
NuSVR Tabular score: -0.143
NuSVR Tab, NLP, Image score: -0.1587
KNN_4 Tabular score: -0.1664
KNN_8 Tab and Image score: -0.1531
Gradient Boost Tab and Image score: -0.1509
Random Forest Tabular score: -0.1486
XGBR Tab, NLP, Image score: -0.1531
KNN_15 Tab and Image score: -0.1525
KNN_8 Tab, NLP, Image score: -0.1533
KNN_15 Tab and NLP score: -0.1637
NuSVR Tab and Image score: -0.1565
Extra Trees Tab and Image score: -0.1538
KNN_15 Tabular score: -0.1621
KNN_8 Tabular score: -0.1676
Gradient Boost Tab and NLP score: -0.1466
KNN_4 Tab and Image score: -0.1579
NN CNN Image Only Preds score: -0.1448
Extra Trees Tab and NLP score: -0.1504
NN Tabular Only Preds score: -0.1441
Gradient Boost Tabular score: -0.1456
NN Multi Input Preds score: -0.1538
XGBR Tab and Image score: -0.1538
KNN_15 Tab, NLP, Image score: -0.1525
NuSVR Tab and NLP score: -0.1452
Random Forest Tab and Image score: -0.1607
XGBR Tab and NLP score: -0.1496
XGBR Tabular score: -0.1488
Gradient Boost Tab, NLP, Image score: -0.1513
Best mae: -0.143

```
XGBR model optimized
resulting models: ['Extra Trees Tabular']
MAE: -0.141794
```

```
Running model selector for NuSVR
```

```
NEW ROUND - Setting up score charts
```

```
Included models: []
```

```
Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'Extra Trees Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN _8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and I mage', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and I mage', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'G radient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR T abular', 'Gradient Boost Tab, NLP, Image']
```

```
KNN_4 Tab, NLP, Image score: -0.321814
NN TL Image Only Preds score: -0.340683
Extra Trees Tab, NLP, Image score: -0.149041
Random Forest Tab, NLP, Image score: -0.163112
NN NLP Only Preds score: -0.27602
KNN_4 Tab and NLP score: -0.175845
KNN_8 Tab and NLP score: -0.169893
Random Forest Tab and NLP score: -0.148825
NuSVR Tabular score: -0.133994
NuSVR Tab, NLP, Image score: -0.331912
KNN_4 Tabular score: -0.176312
KNN_8 Tab and Image score: -0.319688
Gradient Boost Tab and Image score: -0.146228
Random Forest Tabular score: -0.140697
Extra Trees Tabular score: -0.132604
XGBR Tab, NLP, Image score: -0.151357
KNN_15 Tab and Image score: -0.317332
KNN_8 Tab, NLP, Image score: -0.319611
KNN_15 Tab and NLP score: -0.169242
NuSVR Tab and Image score: -0.332483
Extra Trees Tab and Image score: -0.143976
KNN_15 Tabular score: -0.169534
KNN_8 Tabular score: -0.170786
Gradient Boost Tab and NLP score: -0.143085
KNN_4 Tab and Image score: -0.321856
NN CNN Image Only Preds score: -0.340346
Extra Trees Tab and NLP score: -0.139475
NN Tabular Only Preds score: -0.136453
Gradient Boost Tabular score: -0.135383
NN Multi Input Preds score: -0.144164
XGBR Tab and Image score: -0.147999
KNN_15 Tab, NLP, Image score: -0.317332
NuSVR Tab and NLP score: -0.137703
Random Forest Tab and Image score: -0.157128
XGBR Tab and NLP score: -0.14327
XGBR Tabular score: -0.137012
Gradient Boost Tab, NLP, Image score: -0.149472
Best mae: -0.132604
```

```
Add Extra Trees Tabular with mae -0.132604
```

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab a nd NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Bo ost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)

Starting mae: -0.132604

KNN_4 Tab, NLP, Image score: -0.1327
NN TL Image Only Preds score: -0.1337
Extra Trees Tab, NLP, Image score: -0.1323
Random Forest Tab, NLP, Image score: -0.1327
NN NLP Only Preds score: -0.1329
KNN_4 Tab and NLP score: -0.1331
KNN_8 Tab and NLP score: -0.1325
Random Forest Tab and NLP score: -0.1322
NuSVR Tabular score: -0.129
NuSVR Tab, NLP, Image score: -0.1327
KNN_4 Tabular score: -0.1329
KNN_8 Tab and Image score: -0.1321
Gradient Boost Tab and Image score: -0.1317
Random Forest Tabular score: -0.1331
XGBR Tab, NLP, Image score: -0.1313
KNN_15 Tab and Image score: -0.1319
KNN_8 Tab, NLP, Image score: -0.1321
KNN_15 Tab and NLP score: -0.1331
NuSVR Tab and Image score: -0.1327
Extra Trees Tab and Image score: -0.1328
KNN_15 Tabular score: -0.1331
KNN_8 Tabular score: -0.1326
Gradient Boost Tab and NLP score: -0.1289
KNN_4 Tab and Image score: -0.1327
NN CNN Image Only Preds score: -0.1328
Extra Trees Tab and NLP score: -0.1318
NN Tabular Only Preds score: -0.1282
Gradient Boost Tabular score: -0.1292
NN Multi Input Preds score: -0.1281
XGBR Tab and Image score: -0.1325
KNN_15 Tab, NLP, Image score: -0.1319
NuSVR Tab and NLP score: -0.1301
Random Forest Tab and Image score: -0.1331
XGBR Tab and NLP score: -0.1296
XGBR Tabular score: -0.1311
Gradient Boost Tab, NLP, Image score: -0.1302
Best mae: -0.1281

Add NN Multi Input Preds with mae -0.1281

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)

Adding NN Multi Input Preds (1309, 2)

Starting mae: -0.128101

KNN_4 Tab, NLP, Image score: -0.1283
NN TL Image Only Preds score: -0.128
Extra Trees Tab, NLP, Image score: -0.1278
Random Forest Tab, NLP, Image score: -0.1282
NN NLP Only Preds score: -0.1279
KNN_4 Tab and NLP score: -0.1283
KNN_8 Tab and NLP score: -0.1281
Random Forest Tab and NLP score: -0.1281
NuSVR Tabular score: -0.1272
NuSVR Tab, NLP, Image score: -0.128
KNN_4 Tabular score: -0.1283
KNN_8 Tab and Image score: -0.1279
Gradient Boost Tab and Image score: -0.1279
Random Forest Tabular score: -0.1285
XGBR Tab, NLP, Image score: -0.1273
KNN_15 Tab and Image score: -0.1274
KNN_8 Tab, NLP, Image score: -0.1279
KNN_15 Tab and NLP score: -0.1281
NuSVR Tab and Image score: -0.128
Extra Trees Tab and Image score: -0.1282
KNN_15 Tabular score: -0.1281
KNN_8 Tabular score: -0.128
Gradient Boost Tab and NLP score: -0.1264
KNN_4 Tab and Image score: -0.1283
NN CNN Image Only Preds score: -0.1279
Extra Trees Tab and NLP score: -0.1276
NN Tabular Only Preds score: -0.1249
Gradient Boost Tabular score: -0.1266
XGBR Tab and Image score: -0.1283
KNN_15 Tab, NLP, Image score: -0.1274
NuSVR Tab and NLP score: -0.1274
Random Forest Tab and Image score: -0.1286
XGBR Tab and NLP score: -0.1272
XGBR Tabular score: -0.1276
Gradient Boost Tab, NLP, Image score: -0.127
Best mae: -0.1249

Add NN Tabular Only Preds with mae -0.1249

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds']

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Starting mae: -0.124932

KNN_4 Tab, NLP, Image score: -0.1253
NN TL Image Only Preds score: -0.1251
Extra Trees Tab, NLP, Image score: -0.1249
Random Forest Tab, NLP, Image score: -0.1252
NN NLP Only Preds score: -0.1249
KNN_4 Tab and NLP score: -0.1253
KNN_8 Tab and NLP score: -0.1251
Random Forest Tab and NLP score: -0.1247
NuSVR Tabular score: -0.1252
NuSVR Tab, NLP, Image score: -0.1251
KNN_4 Tabular score: -0.1254
KNN_8 Tab and Image score: -0.1253
Gradient Boost Tab and Image score: -0.125
Random Forest Tabular score: -0.1253
XGBR Tab, NLP, Image score: -0.1245
KNN_15 Tab and Image score: -0.1249
KNN_8 Tab, NLP, Image score: -0.1253
KNN_15 Tab and NLP score: -0.1253
NuSVR Tab and Image score: -0.1251
Extra Trees Tab and Image score: -0.1253
KNN_15 Tabular score: -0.1252
KNN_8 Tabular score: -0.1251
Gradient Boost Tab and NLP score: -0.1237
KNN_4 Tab and Image score: -0.1253
NN CNN Image Only Preds score: -0.1251
Extra Trees Tab and NLP score: -0.1243
Gradient Boost Tabular score: -0.1245
XGBR Tab and Image score: -0.1254
KNN_15 Tab, NLP, Image score: -0.1249
NuSVR Tab and NLP score: -0.1253
Random Forest Tab and Image score: -0.1253
XGBR Tab and NLP score: -0.1239
XGBR Tabular score: -0.1248
Gradient Boost Tab, NLP, Image score: -0.1241
Best mae: -0.1237

Add Gradient Boost Tab and NLP with mae -0.1237

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'Gradient Boost Tab and NLP']

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Nu SVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gr adient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding Gradient Boost Tab and NLP (1309, 4)
Starting mae: -0.123669

KNN_4 Tab, NLP, Image score: -0.124
NN TL Image Only Preds score: -0.1235
Extra Trees Tab, NLP, Image score: -0.1237
Random Forest Tab, NLP, Image score: -0.1237
NN NLP Only Preds score: -0.1242
KNN_4 Tab and NLP score: -0.1237
KNN_8 Tab and NLP score: -0.1236
Random Forest Tab and NLP score: -0.1237
NuSVR Tabular score: -0.1241
NuSVR Tab, NLP, Image score: -0.1237
KNN_4 Tabular score: -0.1237
KNN_8 Tab and Image score: -0.1238
Gradient Boost Tab and Image score: -0.1237
Random Forest Tabular score: -0.1237
XGBR Tab, NLP, Image score: -0.1239
KNN_15 Tab and Image score: -0.1235
KNN_8 Tab, NLP, Image score: -0.1238
KNN_15 Tab and NLP score: -0.1234
NuSVR Tab and Image score: -0.1237
Extra Trees Tab and Image score: -0.1236
KNN_15 Tabular score: -0.1234
KNN_8 Tabular score: -0.1237
KNN_4 Tab and Image score: -0.124
NN CNN Image Only Preds score: -0.1236
Extra Trees Tab and NLP score: -0.1238
Gradient Boost Tabular score: -0.1236
XGBR Tab and Image score: -0.1238
KNN_15 Tab, NLP, Image score: -0.1235
NuSVR Tab and NLP score: -0.1243
Random Forest Tab and Image score: -0.1236
XGBR Tab and NLP score: -0.1238
XGBR Tabular score: -0.1237
Gradient Boost Tab, NLP, Image score: -0.1238
Best mae: -0.1234

Add KNN_15 Tab and NLP with mae -0.1234

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'Gradient Boost Tab and NLP', 'KNN_15 Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KN N_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding Gradient Boost Tab and NLP (1309, 4)
Adding KNN_15 Tab and NLP (1309, 5)
Starting mae: -0.123431

KNN_4 Tab, NLP, Image score: -0.124
NN TL Image Only Preds score: -0.1234
Extra Trees Tab, NLP, Image score: -0.1236
Random Forest Tab, NLP, Image score: -0.1237
NN NLP Only Preds score: -0.1239
KNN_4 Tab and NLP score: -0.1233
KNN_8 Tab and NLP score: -0.1232
Random Forest Tab and NLP score: -0.1237
NuSVR Tabular score: -0.1238
NuSVR Tab, NLP, Image score: -0.1234
KNN_4 Tabular score: -0.1233
KNN_8 Tab and Image score: -0.1236
Gradient Boost Tab and Image score: -0.1236
Random Forest Tabular score: -0.1235
XGBR Tab, NLP, Image score: -0.1235
KNN_15 Tab and Image score: -0.1232
KNN_8 Tab, NLP, Image score: -0.1236
NuSVR Tab and Image score: -0.1234
Extra Trees Tab and Image score: -0.1235
KNN_15 Tabular score: -0.1235
KNN_8 Tabular score: -0.1233
KNN_4 Tab and Image score: -0.124
NN CNN Image Only Preds score: -0.1235
Extra Trees Tab and NLP score: -0.1234
Gradient Boost Tabular score: -0.1234
XGBR Tab and Image score: -0.1237
KNN_15 Tab, NLP, Image score: -0.1232
NuSVR Tab and NLP score: -0.1238
Random Forest Tab and Image score: -0.1236
XGBR Tab and NLP score: -0.1234
XGBR Tabular score: -0.1236
Gradient Boost Tab, NLP, Image score: -0.1233
Best mae: -0.1232

Add KNN_8 Tab and NLP with mae -0.1232

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'Gradient Boost Tab and NLP', 'KNN_15 Tab and NLP', 'KNN_8 Tab and NLP']

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'R andom Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'K NN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'NuSVR Tab and Image', 'Ex tra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab a nd Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding Gradient Boost Tab and NLP (1309, 4)
Adding KNN_15 Tab and NLP (1309, 5)
Adding KNN_8 Tab and NLP (1309, 6)
Starting mae: -0.123236

KNN_4 Tab, NLP, Image score: -0.1237
NN TL Image Only Preds score: -0.1234
Extra Trees Tab, NLP, Image score: -0.1232
Random Forest Tab, NLP, Image score: -0.1236
NN NLP Only Preds score: -0.1237
KNN_4 Tab and NLP score: -0.1232
Random Forest Tab and NLP score: -0.1237
NuSVR Tabular score: -0.1236
NuSVR Tab, NLP, Image score: -0.1233
KNN_4 Tabular score: -0.1233
KNN_8 Tab and Image score: -0.1234
Gradient Boost Tab and Image score: -0.1235
Random Forest Tabular score: -0.1234
XGBR Tab, NLP, Image score: -0.1233
KNN_15 Tab and Image score: -0.1232
KNN_8 Tab, NLP, Image score: -0.1235
NuSVR Tab and Image score: -0.1233
Extra Trees Tab and Image score: -0.1232
KNN_15 Tabular score: -0.1232
KNN_8 Tabular score: -0.1232
KNN_4 Tab and Image score: -0.1237
NN CNN Image Only Preds score: -0.1233
Extra Trees Tab and NLP score: -0.1233
Gradient Boost Tabular score: -0.1233
XGBR Tab and Image score: -0.1236
KNN_15 Tab, NLP, Image score: -0.1232
NuSVR Tab and NLP score: -0.1235
Random Forest Tab and Image score: -0.1235
XGBR Tab and NLP score: -0.1233
XGBR Tabular score: -0.1233
Gradient Boost Tab, NLP, Image score: -0.1231
Best mae: -0.1231

Add Gradient Boost Tab, NLP, Image with mae -0.1231

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'Gradient Boost Tab and NLP', 'KNN_15 Tab and NLP', 'KNN_8 Tab and NLP', 'Gradient B

```
oost Tab, NLP, Image']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL  
P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'R  
andom Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'K  
NN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab,  
NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'NuSVR Tab and Image', 'Ex  
tra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'KNN_4 Tab and Image', 'NN  
CNN Image Only Preds', 'Extra Trees Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab a  
nd Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image',  
'XGBR Tab and NLP', 'XGBR Tabular']
```

```
Adding Extra Trees Tabular (1309, 1)  
Adding NN Multi Input Preds (1309, 2)  
Adding NN Tabular Only Preds (1309, 3)  
Adding Gradient Boost Tab and NLP (1309, 4)  
Adding KNN_15 Tab and NLP (1309, 5)  
Adding KNN_8 Tab and NLP (1309, 6)  
Adding Gradient Boost Tab, NLP, Image (1309, 7)  
Starting mae: -0.123086
```

```
KNN_4 Tab, NLP, Image score: -0.1237  
NN TL Image Only Preds score: -0.1234  
Extra Trees Tab, NLP, Image score: -0.1233  
Random Forest Tab, NLP, Image score: -0.1234  
NN NLP Only Preds score: -0.1237  
KNN_4 Tab and NLP score: -0.1234  
Random Forest Tab and NLP score: -0.1234  
NuSVR Tabular score: -0.1237  
NuSVR Tab, NLP, Image score: -0.1231  
KNN_4 Tabular score: -0.1233  
KNN_8 Tab and Image score: -0.1232  
Gradient Boost Tab and Image score: -0.1234  
Random Forest Tabular score: -0.1233  
XGBR Tab, NLP, Image score: -0.1233  
KNN_15 Tab and Image score: -0.1231  
KNN_8 Tab, NLP, Image score: -0.1232  
NuSVR Tab and Image score: -0.1231  
Extra Trees Tab and Image score: -0.1232  
KNN_15 Tabular score: -0.1231  
KNN_8 Tabular score: -0.1232  
KNN_4 Tab and Image score: -0.1236  
NN CNN Image Only Preds score: -0.1231  
Extra Trees Tab and NLP score: -0.1233  
Gradient Boost Tabular score: -0.1235  
XGBR Tab and Image score: -0.1234  
KNN_15 Tab, NLP, Image score: -0.1231  
NuSVR Tab and NLP score: -0.1235  
Random Forest Tab and Image score: -0.1234  
XGBR Tab and NLP score: -0.1233  
XGBR Tabular score: -0.1235  
Best mae: -0.1231
```

```
NuSVR model optimized  
resulting models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Pred  
s', 'Gradient Boost Tab and NLP', 'KNN_15 Tab and NLP', 'KNN_8 Tab and NLP', 'Gradient B  
oost Tab, NLP, Image']  
MAE: -0.123086
```

```
Running model selector for Gradient Boost
```

NEW ROUND - Setting up score charts

Included models: []

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'Extra Trees Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN _8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and I mage', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and I mage', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'G radient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR T abular', 'Gradient Boost Tab, NLP, Image']

KNN_4 Tab, NLP, Image score: -0.35603
NN TL Image Only Preds score: -0.395918
Extra Trees Tab, NLP, Image score: -0.172734
Random Forest Tab, NLP, Image score: -0.184747
NN NLP Only Preds score: -0.314234
KNN_4 Tab and NLP score: -0.209784
KNN_8 Tab and NLP score: -0.201248
Random Forest Tab and NLP score: -0.173269
NuSVR Tabular score: -0.153594
NuSVR Tab, NLP, Image score: -0.365127
KNN_4 Tabular score: -0.20669
KNN_8 Tab and Image score: -0.362498
Gradient Boost Tab and Image score: -0.167971
Random Forest Tabular score: -0.167036
Extra Trees Tabular score: -0.151905
XGBR Tab, NLP, Image score: -0.176208
KNN_15 Tab and Image score: -0.367225
KNN_8 Tab, NLP, Image score: -0.363704
KNN_15 Tab and NLP score: -0.195809
NuSVR Tab and Image score: -0.358807
Extra Trees Tab and Image score: -0.171816
KNN_15 Tabular score: -0.190944
KNN_8 Tabular score: -0.203674
Gradient Boost Tab and NLP score: -0.167635
KNN_4 Tab and Image score: -0.357972
NN CNN Image Only Preds score: -0.340222
Extra Trees Tab and NLP score: -0.161745
NN Tabular Only Preds score: -0.158769
Gradient Boost Tabular score: -0.15488
NN Multi Input Preds score: -0.172358
XGBR Tab and Image score: -0.173568
KNN_15 Tab, NLP, Image score: -0.367225
NuSVR Tab and NLP score: -0.161719
Random Forest Tab and Image score: -0.182215
XGBR Tab and NLP score: -0.169713
XGBR Tabular score: -0.158854
Gradient Boost Tab, NLP, Image score: -0.173722
Best mae: -0.151905

Add Extra Trees Tabular with mae -0.151905

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular']

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab a nd NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Bo ost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)

Starting mae: -0.151905

KNN_4 Tab, NLP, Image score: -0.1488
NN TL Image Only Preds score: -0.1511
Extra Trees Tab, NLP, Image score: -0.1512
Random Forest Tab, NLP, Image score: -0.1511
NN NLP Only Preds score: -0.1526
KNN_4 Tab and NLP score: -0.1515
KNN_8 Tab and NLP score: -0.152
Random Forest Tab and NLP score: -0.1537
NuSVR Tabular score: -0.1464
NuSVR Tab, NLP, Image score: -0.1508
KNN_4 Tabular score: -0.1499
KNN_8 Tab and Image score: -0.1497
Gradient Boost Tab and Image score: -0.149
Random Forest Tabular score: -0.1525
XGBR Tab, NLP, Image score: -0.1487
KNN_15 Tab and Image score: -0.1481
KNN_8 Tab, NLP, Image score: -0.1506
KNN_15 Tab and NLP score: -0.1501
NuSVR Tab and Image score: -0.1501
Extra Trees Tab and Image score: -0.1511
KNN_15 Tabular score: -0.146
KNN_8 Tabular score: -0.153
Gradient Boost Tab and NLP score: -0.1451
KNN_4 Tab and Image score: -0.1492
NN CNN Image Only Preds score: -0.1519
Extra Trees Tab and NLP score: -0.1533
NN Tabular Only Preds score: -0.1462
Gradient Boost Tabular score: -0.144
NN Multi Input Preds score: -0.1484
XGBR Tab and Image score: -0.1501
KNN_15 Tab, NLP, Image score: -0.1481
NuSVR Tab and NLP score: -0.1462
Random Forest Tab and Image score: -0.1503
XGBR Tab and NLP score: -0.1501
XGBR Tabular score: -0.1449
Gradient Boost Tab, NLP, Image score: -0.1476
Best mae: -0.144

Add Gradient Boost Tabular with mae -0.144

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'Gradient Boost Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'NN Multi Input Pred s', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding Gradient Boost Tabular (1309, 2)
Starting mae: -0.144003

KNN_4 Tab, NLP, Image score: -0.1422
NN TL Image Only Preds score: -0.144
Extra Trees Tab, NLP, Image score: -0.1452
Random Forest Tab, NLP, Image score: -0.1439
NN NLP Only Preds score: -0.1444
KNN_4 Tab and NLP score: -0.1424
KNN_8 Tab and NLP score: -0.1449
Random Forest Tab and NLP score: -0.1484
NuSVR Tabular score: -0.1419
NuSVR Tab, NLP, Image score: -0.1446
KNN_4 Tabular score: -0.1447
KNN_8 Tab and Image score: -0.1415
Gradient Boost Tab and Image score: -0.1418
Random Forest Tabular score: -0.1435
XGBR Tab, NLP, Image score: -0.1419
KNN_15 Tab and Image score: -0.1416
KNN_8 Tab, NLP, Image score: -0.1418
KNN_15 Tab and NLP score: -0.1442
NuSVR Tab and Image score: -0.143
Extra Trees Tab and Image score: -0.1451
KNN_15 Tabular score: -0.1438
KNN_8 Tabular score: -0.1433
Gradient Boost Tab and NLP score: -0.1417
KNN_4 Tab and Image score: -0.1418
NN CNN Image Only Preds score: -0.1431
Extra Trees Tab and NLP score: -0.1452
NN Tabular Only Preds score: -0.1397
NN Multi Input Preds score: -0.1429
XGBR Tab and Image score: -0.1412
KNN_15 Tab, NLP, Image score: -0.1416
NuSVR Tab and NLP score: -0.1399
Random Forest Tab and Image score: -0.1439
XGBR Tab and NLP score: -0.1422
XGBR Tabular score: -0.1415
Gradient Boost Tab, NLP, Image score: -0.1412
Best mae: -0.1397

Add NN Tabular Only Preds with mae -0.1397

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'Gradient Boost Tabular', 'NN Tabular Only Pred s']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding Gradient Boost Tabular (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Starting mae: -0.139687

KNN_4 Tab, NLP, Image score: -0.1401
NN TL Image Only Preds score: -0.1389
Extra Trees Tab, NLP, Image score: -0.1397
Random Forest Tab, NLP, Image score: -0.1417
NN NLP Only Preds score: -0.142
KNN_4 Tab and NLP score: -0.1407
KNN_8 Tab and NLP score: -0.1396
Random Forest Tab and NLP score: -0.1421
NuSVR Tabular score: -0.1393
NuSVR Tab, NLP, Image score: -0.1391
KNN_4 Tabular score: -0.141
KNN_8 Tab and Image score: -0.1391
Gradient Boost Tab and Image score: -0.1395
Random Forest Tabular score: -0.1433
XGBR Tab, NLP, Image score: -0.139
KNN_15 Tab and Image score: -0.139
KNN_8 Tab, NLP, Image score: -0.1408
KNN_15 Tab and NLP score: -0.1386
NuSVR Tab and Image score: -0.1383
Extra Trees Tab and Image score: -0.1382
KNN_15 Tabular score: -0.139
KNN_8 Tabular score: -0.1411
Gradient Boost Tab and NLP score: -0.1402
KNN_4 Tab and Image score: -0.1411
NN CNN Image Only Preds score: -0.1396
Extra Trees Tab and NLP score: -0.1389
NN Multi Input Preds score: -0.1377
XGBR Tab and Image score: -0.1375
KNN_15 Tab, NLP, Image score: -0.139
NuSVR Tab and NLP score: -0.136
Random Forest Tab and Image score: -0.1397
XGBR Tab and NLP score: -0.141
XGBR Tabular score: -0.1373
Gradient Boost Tab, NLP, Image score: -0.1396
Best mae: -0.136

Add NuSVR Tab and NLP with mae -0.136

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'Gradient Boost Tabular', 'NN Tabular Only Preds', 'NuSVR Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL

```
P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding Gradient Boost Tabular (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding NuSVR Tab and NLP (1309, 4)
Starting mae: -0.135993
```

```
KNN_4 Tab, NLP, Image score: -0.1374
NN TL Image Only Preds score: -0.1387
Extra Trees Tab, NLP, Image score: -0.1395
Random Forest Tab, NLP, Image score: -0.1407
NN NLP Only Preds score: -0.1411
KNN_4 Tab and NLP score: -0.1386
KNN_8 Tab and NLP score: -0.1387
Random Forest Tab and NLP score: -0.1375
NuSVR Tabular score: -0.139
NuSVR Tab, NLP, Image score: -0.1386
KNN_4 Tabular score: -0.1399
KNN_8 Tab and Image score: -0.1384
Gradient Boost Tab and Image score: -0.1368
Random Forest Tabular score: -0.1402
XGBR Tab, NLP, Image score: -0.1367
KNN_15 Tab and Image score: -0.1358
KNN_8 Tab, NLP, Image score: -0.1374
KNN_15 Tab and NLP score: -0.1365
NuSVR Tab and Image score: -0.1382
Extra Trees Tab and Image score: -0.1386
KNN_15 Tabular score: -0.1376
KNN_8 Tabular score: -0.1363
Gradient Boost Tab and NLP score: -0.1385
KNN_4 Tab and Image score: -0.1369
NN CNN Image Only Preds score: -0.1382
Extra Trees Tab and NLP score: -0.1388
NN Multi Input Preds score: -0.1367
XGBR Tab and Image score: -0.1371
KNN_15 Tab, NLP, Image score: -0.1358
Random Forest Tab and Image score: -0.1378
XGBR Tab and NLP score: -0.1402
XGBR Tabular score: -0.1349
Gradient Boost Tab, NLP, Image score: -0.1371
Best mae: -0.1349
```

```
Add XGBR Tabular with mae -0.1349
```

```
NEW ROUND - Setting up score charts
```

```
Included models: ['Extra Trees Tabular', 'Gradient Boost Tabular', 'NN Tabular Only Preds', 'NuSVR Tab and NLP', 'XGBR Tabular']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and NLP', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding Gradient Boost Tabular (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding NuSVR Tab and NLP (1309, 4)
Adding XGBR Tabular (1309, 5)
Starting mae: -0.134857
```

```
KNN_4 Tab, NLP, Image score: -0.1373
NN TL Image Only Preds score: -0.1358
Extra Trees Tab, NLP, Image score: -0.1378
Random Forest Tab, NLP, Image score: -0.1393
NN NLP Only Preds score: -0.1403
KNN_4 Tab and NLP score: -0.1372
KNN_8 Tab and NLP score: -0.137
Random Forest Tab and NLP score: -0.1397
NuSVR Tabular score: -0.1383
NuSVR Tab, NLP, Image score: -0.1406
KNN_4 Tabular score: -0.1367
KNN_8 Tab and Image score: -0.1365
Gradient Boost Tab and Image score: -0.1349
Random Forest Tabular score: -0.1392
XGBR Tab, NLP, Image score: -0.1373
KNN_15 Tab and Image score: -0.1374
KNN_8 Tab, NLP, Image score: -0.1363
KNN_15 Tab and NLP score: -0.1353
NuSVR Tab and Image score: -0.139
Extra Trees Tab and Image score: -0.1368
KNN_15 Tabular score: -0.1395
KNN_8 Tabular score: -0.1387
Gradient Boost Tab and NLP score: -0.138
KNN_4 Tab and Image score: -0.1349
NN CNN Image Only Preds score: -0.137
Extra Trees Tab and NLP score: -0.1377
NN Multi Input Preds score: -0.1346
XGBR Tab and Image score: -0.1367
KNN_15 Tab, NLP, Image score: -0.1374
Random Forest Tab and Image score: -0.1368
XGBR Tab and NLP score: -0.1365
Gradient Boost Tab, NLP, Image score: -0.1397
Best mae: -0.1346
```

```
Add NN Multi Input Preds with mae -0.1346
```

NEW ROUND - Setting up score charts

```
Included models: ['Extra Trees Tabular', 'Gradient Boost Tabular', 'NN Tabular Only Preds', 'NuSVR Tab and NLP', 'XGBR Tabular', 'NN Multi Input Preds']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image']
```

```
e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding Gradient Boost Tabular (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding NuSVR Tab and NLP (1309, 4)
Adding XGBR Tabular (1309, 5)
Adding NN Multi Input Preds (1309, 6)
Starting mae: -0.134627
```

```
KNN_4 Tab, NLP, Image score: -0.134
NN TL Image Only Preds score: -0.1323
Extra Trees Tab, NLP, Image score: -0.1373
Random Forest Tab, NLP, Image score: -0.1356
NN NLP Only Preds score: -0.1382
KNN_4 Tab and NLP score: -0.1367
KNN_8 Tab and NLP score: -0.1353
Random Forest Tab and NLP score: -0.1398
NuSVR Tabular score: -0.1353
NuSVR Tab, NLP, Image score: -0.1355
KNN_4 Tabular score: -0.1385
KNN_8 Tab and Image score: -0.1355
Gradient Boost Tab and Image score: -0.1344
Random Forest Tabular score: -0.1378
XGBR Tab, NLP, Image score: -0.1344
KNN_15 Tab and Image score: -0.1334
KNN_8 Tab, NLP, Image score: -0.1356
KNN_15 Tab and NLP score: -0.1347
NuSVR Tab and Image score: -0.1344
Extra Trees Tab and Image score: -0.1349
KNN_15 Tabular score: -0.1358
KNN_8 Tabular score: -0.1359
Gradient Boost Tab and NLP score: -0.1362
KNN_4 Tab and Image score: -0.1356
NN CNN Image Only Preds score: -0.1349
Extra Trees Tab and NLP score: -0.1367
XGBR Tab and Image score: -0.1352
KNN_15 Tab, NLP, Image score: -0.1334
Random Forest Tab and Image score: -0.1384
XGBR Tab and NLP score: -0.1356
Gradient Boost Tab, NLP, Image score: -0.1354
Best mae: -0.1323
```

```
Add NN TL Image Only Preds with mae -0.1323
```

NEW ROUND - Setting up score charts

```
Included models: ['Extra Trees Tabular', 'Gradient Boost Tabular', 'NN Tabular Only Preds', 'NuSVR Tab and NLP', 'XGBR Tabular', 'NN Multi Input Preds', 'NN TL Image Only Preds']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP,
```

```
Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding Gradient Boost Tabular (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding NuSVR Tab and NLP (1309, 4)
Adding XGBR Tabular (1309, 5)
Adding NN Multi Input Preds (1309, 6)
Adding NN TL Image Only Preds (1309, 7)
Starting mae: -0.132331
```

```
KNN_4 Tab, NLP, Image score: -0.1338
Extra Trees Tab, NLP, Image score: -0.1354
Random Forest Tab, NLP, Image score: -0.1365
NN NLP Only Preds score: -0.1344
KNN_4 Tab and NLP score: -0.1349
KNN_8 Tab and NLP score: -0.1369
Random Forest Tab and NLP score: -0.1373
NuSVR Tabular score: -0.1332
NuSVR Tab, NLP, Image score: -0.1351
KNN_4 Tabular score: -0.1356
KNN_8 Tab and Image score: -0.1352
Gradient Boost Tab and Image score: -0.1359
Random Forest Tabular score: -0.134
XGBR Tab, NLP, Image score: -0.1341
KNN_15 Tab and Image score: -0.1318
KNN_8 Tab, NLP, Image score: -0.1367
KNN_15 Tab and NLP score: -0.1342
NuSVR Tab and Image score: -0.1341
Extra Trees Tab and Image score: -0.1354
KNN_15 Tabular score: -0.1364
KNN_8 Tabular score: -0.1351
Gradient Boost Tab and NLP score: -0.1349
KNN_4 Tab and Image score: -0.1343
NN CNN Image Only Preds score: -0.1328
Extra Trees Tab and NLP score: -0.1343
XGBR Tab and Image score: -0.1342
KNN_15 Tab, NLP, Image score: -0.1318
Random Forest Tab and Image score: -0.135
XGBR Tab and NLP score: -0.1331
Gradient Boost Tab, NLP, Image score: -0.1377
Best mae: -0.1318
```

```
Add KNN_15 Tab and Image with mae -0.1318
```

```
NEW ROUND - Setting up score charts
```

```
Included models: ['Extra Trees Tabular', 'Gradient Boost Tabular', 'NN Tabular Only Preds', 'NuSVR Tab and NLP', 'XGBR Tabular', 'NN Multi Input Preds', 'NN TL Image Only Preds', 'KNN_15 Tab and Image']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Tre
```

```
es Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding Gradient Boost Tabular (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding NuSVR Tab and NLP (1309, 4)
Adding XGBR Tabular (1309, 5)
Adding NN Multi Input Preds (1309, 6)
Adding NN TL Image Only Preds (1309, 7)
Adding KNN_15 Tab and Image (1309, 8)
Starting mae: -0.131797
```

```
KNN_4 Tab, NLP, Image score: -0.1318
Extra Trees Tab, NLP, Image score: -0.1347
Random Forest Tab, NLP, Image score: -0.1361
NN NLP Only Preds score: -0.1345
KNN_4 Tab and NLP score: -0.1345
KNN_8 Tab and NLP score: -0.1338
Random Forest Tab and NLP score: -0.1336
NuSVR Tabular score: -0.1348
NuSVR Tab, NLP, Image score: -0.1347
KNN_4 Tabular score: -0.1348
KNN_8 Tab and Image score: -0.1321
Gradient Boost Tab and Image score: -0.1338
Random Forest Tabular score: -0.1348
XGBR Tab, NLP, Image score: -0.1343
KNN_8 Tab, NLP, Image score: -0.1311
KNN_15 Tab and NLP score: -0.1303
NuSVR Tab and Image score: -0.1335
Extra Trees Tab and Image score: -0.1347
KNN_15 Tabular score: -0.131
KNN_8 Tabular score: -0.1312
Gradient Boost Tab and NLP score: -0.1323
KNN_4 Tab and Image score: -0.1338
NN CNN Image Only Preds score: -0.1336
Extra Trees Tab and NLP score: -0.1334
XGBR Tab and Image score: -0.1346
KNN_15 Tab, NLP, Image score: -0.1348
Random Forest Tab and Image score: -0.1349
XGBR Tab and NLP score: -0.134
Gradient Boost Tab, NLP, Image score: -0.1342
Best mae: -0.1303
```

```
Add KNN_15 Tab and NLP with mae -0.1303
```

```
NEW ROUND - Setting up score charts
```

```
Included models: ['Extra Trees Tabular', 'Gradient Boost Tabular', 'NN Tabular Only Preds', 'NuSVR Tab and NLP', 'XGBR Tabular', 'NN Multi Input Preds', 'NN TL Image Only Preds', 'KNN_15 Tab and Image', 'KNN_15 Tab and NLP']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN
```

```
CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NL  
P, Image', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'Gradient Boost Tab, NLP,  
Image']
```

```
Adding Extra Trees Tabular (1309, 1)  
Adding Gradient Boost Tabular (1309, 2)  
Adding NN Tabular Only Preds (1309, 3)  
Adding NuSVR Tab and NLP (1309, 4)  
Adding XGBR Tabular (1309, 5)  
Adding NN Multi Input Preds (1309, 6)  
Adding NN TL Image Only Preds (1309, 7)  
Adding KNN_15 Tab and Image (1309, 8)  
Adding KNN_15 Tab and NLP (1309, 9)  
Starting mae: -0.130272
```

```
KNN_4 Tab, NLP, Image score: -0.1316  
Extra Trees Tab, NLP, Image score: -0.1349  
Random Forest Tab, NLP, Image score: -0.1313  
NN NLP Only Preds score: -0.1352  
KNN_4 Tab and NLP score: -0.1329  
KNN_8 Tab and NLP score: -0.1349  
Random Forest Tab and NLP score: -0.1357  
NuSVR Tabular score: -0.1347  
NuSVR Tab, NLP, Image score: -0.1355  
KNN_4 Tabular score: -0.1334  
KNN_8 Tab and Image score: -0.1343  
Gradient Boost Tab and Image score: -0.1334  
Random Forest Tabular score: -0.1332  
XGBR Tab, NLP, Image score: -0.134  
KNN_8 Tab, NLP, Image score: -0.1334  
NuSVR Tab and Image score: -0.1357  
Extra Trees Tab and Image score: -0.1337  
KNN_15 Tabular score: -0.132  
KNN_8 Tabular score: -0.1322  
Gradient Boost Tab and NLP score: -0.1318  
KNN_4 Tab and Image score: -0.1324  
NN CNN Image Only Preds score: -0.1344  
Extra Trees Tab and NLP score: -0.1307  
XGBR Tab and Image score: -0.1341  
KNN_15 Tab, NLP, Image score: -0.1342  
Random Forest Tab and Image score: -0.1319  
XGBR Tab and NLP score: -0.1306  
Gradient Boost Tab, NLP, Image score: -0.1331  
Best mae: -0.1306
```

```
Gradient Boost model optimized  
resulting models: ['Extra Trees Tabular', 'Gradient Boost Tabular', 'NN Tabular Only Pre  
ds', 'NuSVR Tab and NLP', 'XGBR Tabular', 'NN Multi Input Preds', 'NN TL Image Only Pred  
s', 'KNN_15 Tab and Image', 'KNN_15 Tab and NLP']  
MAE: -0.130272
```

```
Running model selector for KNN_8
```

```
NEW ROUND - Setting up score charts
```

```
Included models: []
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL  
P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K  
NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag
```

e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'Extra Trees Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

KNN_4 Tab, NLP, Image score: -0.345956
NN TL Image Only Preds score: -0.363009
Extra Trees Tab, NLP, Image score: -0.161474
Random Forest Tab, NLP, Image score: -0.173414
NN NLP Only Preds score: -0.29215
KNN_4 Tab and NLP score: -0.193554
KNN_8 Tab and NLP score: -0.18922
Random Forest Tab and NLP score: -0.159497
NuSVR Tabular score: -0.144558
NuSVR Tab, NLP, Image score: -0.346663
KNN_4 Tabular score: -0.193714
KNN_8 Tab and Image score: -0.337051
Gradient Boost Tab and Image score: -0.160771
Random Forest Tabular score: -0.154329
Extra Trees Tabular score: -0.145362
XGBR Tab, NLP, Image score: -0.165778
KNN_15 Tab and Image score: -0.34363
KNN_8 Tab, NLP, Image score: -0.336812
KNN_15 Tab and NLP score: -0.184973
NuSVR Tab and Image score: -0.343006
Extra Trees Tab and Image score: -0.155788
KNN_15 Tabular score: -0.18364
KNN_8 Tabular score: -0.188028
Gradient Boost Tab and NLP score: -0.153561
KNN_4 Tab and Image score: -0.34571
NN CNN Image Only Preds score: -0.384522
Extra Trees Tab and NLP score: -0.152138
NN Tabular Only Preds score: -0.148623
Gradient Boost Tabular score: -0.151361
NN Multi Input Preds score: -0.161512
XGBR Tab and Image score: -0.160913
KNN_15 Tab, NLP, Image score: -0.34363
NuSVR Tab and NLP score: -0.151763
Random Forest Tab and Image score: -0.168476
XGBR Tab and NLP score: -0.157166
XGBR Tabular score: -0.152151
Gradient Boost Tab, NLP, Image score: -0.160508
Best mae: -0.144558

Add NuSVR Tabular with mae -0.144558

NEW ROUND - Setting up score charts

Included models: ['NuSVR Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'Extra Trees Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tab, NLP, Image']

```
bular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

Adding NuSVR Tabular (1309, 1)

Starting mae: -0.144558

```
KNN_4 Tab, NLP, Image score: -0.146
NN TL Image Only Preds score: -0.1476
Extra Trees Tab, NLP, Image score: -0.1429
Random Forest Tab, NLP, Image score: -0.1421
NN NLP Only Preds score: -0.1459
KNN_4 Tab and NLP score: -0.1455
KNN_8 Tab and NLP score: -0.1472
Random Forest Tab and NLP score: -0.1432
NuSVR Tab, NLP, Image score: -0.1476
KNN_4 Tabular score: -0.1449
KNN_8 Tab and Image score: -0.1481
Gradient Boost Tab and Image score: -0.1432
Random Forest Tabular score: -0.1418
Extra Trees Tabular score: -0.1363
XGBR Tab, NLP, Image score: -0.1397
KNN_15 Tab and Image score: -0.1462
KNN_8 Tab, NLP, Image score: -0.1481
KNN_15 Tab and NLP score: -0.1474
NuSVR Tab and Image score: -0.1477
Extra Trees Tab and Image score: -0.1443
KNN_15 Tabular score: -0.1493
KNN_8 Tabular score: -0.1467
Gradient Boost Tab and NLP score: -0.1402
KNN_4 Tab and Image score: -0.146
NN CNN Image Only Preds score: -0.1446
Extra Trees Tab and NLP score: -0.1403
NN Tabular Only Preds score: -0.1429
Gradient Boost Tabular score: -0.1424
NN Multi Input Preds score: -0.1419
XGBR Tab and Image score: -0.143
KNN_15 Tab, NLP, Image score: -0.1462
NuSVR Tab and NLP score: -0.143
Random Forest Tab and Image score: -0.1437
XGBR Tab and NLP score: -0.1389
XGBR Tabular score: -0.1444
Gradient Boost Tab, NLP, Image score: -0.1418
Best mae: -0.1363
```

Add Extra Trees Tabular with mae -0.1363

NEW ROUND - Setting up score charts

Included models: ['NuSVR Tabular', 'Extra Trees Tabular']

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Ext
```

```
ra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Inpu  
t Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random F  
orest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Imag  
e']
```

```
Adding NuSVR Tabular (1309, 1)  
Adding Extra Trees Tabular (1309, 2)  
Starting mae: -0.136265
```

```
KNN_4 Tab, NLP, Image score: -0.1403  
NN TL Image Only Preds score: -0.14  
Extra Trees Tab, NLP, Image score: -0.1345  
Random Forest Tab, NLP, Image score: -0.1359  
NN NLP Only Preds score: -0.1376  
KNN_4 Tab and NLP score: -0.1383  
KNN_8 Tab and NLP score: -0.1385  
Random Forest Tab and NLP score: -0.1349  
NuSVR Tab, NLP, Image score: -0.1359  
KNN_4 Tabular score: -0.1378  
KNN_8 Tab and Image score: -0.1383  
Gradient Boost Tab and Image score: -0.1392  
Random Forest Tabular score: -0.1389  
XGBR Tab, NLP, Image score: -0.1352  
KNN_15 Tab and Image score: -0.1406  
KNN_8 Tab, NLP, Image score: -0.1384  
KNN_15 Tab and NLP score: -0.138  
NuSVR Tab and Image score: -0.1364  
Extra Trees Tab and Image score: -0.1358  
KNN_15 Tabular score: -0.1383  
KNN_8 Tabular score: -0.1382  
Gradient Boost Tab and NLP score: -0.1361  
KNN_4 Tab and Image score: -0.1402  
NN CNN Image Only Preds score: -0.1363  
Extra Trees Tab and NLP score: -0.1364  
NN Tabular Only Preds score: -0.1364  
Gradient Boost Tabular score: -0.1363  
NN Multi Input Preds score: -0.136  
XGBR Tab and Image score: -0.1365  
KNN_15 Tab, NLP, Image score: -0.1406  
NuSVR Tab and NLP score: -0.139  
Random Forest Tab and Image score: -0.1351  
XGBR Tab and NLP score: -0.1344  
XGBR Tabular score: -0.1366  
Gradient Boost Tab, NLP, Image score: -0.1355  
Best mae: -0.1344
```

```
Add XGBR Tab and NLP with mae -0.1344
```

```
NEW ROUND - Setting up score charts
```

```
Included models: ['NuSVR Tabular', 'Extra Trees Tabular', 'XGBR Tab and NLP']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL  
P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K  
NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabula  
r', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGB  
R Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NL  
P', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabula  
r', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Ext  
ra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Inpu
```

```
t Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding NuSVR Tabular (1309, 1)
Adding Extra Trees Tabular (1309, 2)
Adding XGBR Tab and NLP (1309, 3)
Starting mae: -0.134441
```

```
KNN_4 Tab, NLP, Image score: -0.1379
NN TL Image Only Preds score: -0.1351
Extra Trees Tab, NLP, Image score: -0.1319
Random Forest Tab, NLP, Image score: -0.134
NN NLP Only Preds score: -0.1374
KNN_4 Tab and NLP score: -0.1353
KNN_8 Tab and NLP score: -0.1344
Random Forest Tab and NLP score: -0.135
NuSVR Tab, NLP, Image score: -0.1341
KNN_4 Tabular score: -0.1353
KNN_8 Tab and Image score: -0.1348
Gradient Boost Tab and Image score: -0.1356
Random Forest Tabular score: -0.1345
XGBR Tab, NLP, Image score: -0.1358
KNN_15 Tab and Image score: -0.1348
KNN_8 Tab, NLP, Image score: -0.1347
KNN_15 Tab and NLP score: -0.1352
NuSVR Tab and Image score: -0.1344
Extra Trees Tab and Image score: -0.1328
KNN_15 Tabular score: -0.135
KNN_8 Tabular score: -0.1339
Gradient Boost Tab and NLP score: -0.1355
KNN_4 Tab and Image score: -0.1379
NN CNN Image Only Preds score: -0.1344
Extra Trees Tab and NLP score: -0.1354
NN Tabular Only Preds score: -0.1336
Gradient Boost Tabular score: -0.1332
NN Multi Input Preds score: -0.1314
XGBR Tab and Image score: -0.1327
KNN_15 Tab, NLP, Image score: -0.1348
NuSVR Tab and NLP score: -0.1351
Random Forest Tab and Image score: -0.1325
XGBR Tabular score: -0.1353
Gradient Boost Tab, NLP, Image score: -0.1359
Best mae: -0.1314
```

```
Add NN Multi Input Preds with mae -0.1314
```

```
NEW ROUND - Setting up score charts
```

```
Included models: ['NuSVR Tabular', 'Extra Trees Tabular', 'XGBR Tab and NLP', 'NN Multi Input Preds']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image']
```

```
'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding NuSVR Tabular (1309, 1)
Adding Extra Trees Tabular (1309, 2)
Adding XGBR Tab and NLP (1309, 3)
Adding NN Multi Input Preds (1309, 4)
Starting mae: -0.131419
```

```
KNN_4 Tab, NLP, Image score: -0.1347
NN TL Image Only Preds score: -0.1337
Extra Trees Tab, NLP, Image score: -0.1319
Random Forest Tab, NLP, Image score: -0.1324
NN NLP Only Preds score: -0.1369
KNN_4 Tab and NLP score: -0.1314
KNN_8 Tab and NLP score: -0.1337
Random Forest Tab and NLP score: -0.1325
NuSVR Tab, NLP, Image score: -0.1319
KNN_4 Tabular score: -0.1315
KNN_8 Tab and Image score: -0.1312
Gradient Boost Tab and Image score: -0.1343
Random Forest Tabular score: -0.1313
XGBR Tab, NLP, Image score: -0.1329
KNN_15 Tab and Image score: -0.1318
KNN_8 Tab, NLP, Image score: -0.1313
KNN_15 Tab and NLP score: -0.1335
NuSVR Tab and Image score: -0.1316
Extra Trees Tab and Image score: -0.1327
KNN_15 Tabular score: -0.135
KNN_8 Tabular score: -0.1337
Gradient Boost Tab and NLP score: -0.1319
KNN_4 Tab and Image score: -0.1346
NN CNN Image Only Preds score: -0.1314
Extra Trees Tab and NLP score: -0.1325
NN Tabular Only Preds score: -0.132
Gradient Boost Tabular score: -0.1304
XGBR Tab and Image score: -0.1316
KNN_15 Tab, NLP, Image score: -0.1318
NuSVR Tab and NLP score: -0.1309
Random Forest Tab and Image score: -0.1313
XGBR Tabular score: -0.1311
Gradient Boost Tab, NLP, Image score: -0.1316
Best mae: -0.1304
```

```
Add Gradient Boost Tabular with mae -0.1304
```

NEW ROUND - Setting up score charts

```
Included models: ['NuSVR Tabular', 'Extra Trees Tabular', 'XGBR Tab and NLP', 'NN Multi Input Preds', 'Gradient Boost Tabular']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding NuSVR Tabular (1309, 1)
Adding Extra Trees Tabular (1309, 2)
Adding XGBR Tab and NLP (1309, 3)
Adding NN Multi Input Preds (1309, 4)
Adding Gradient Boost Tabular (1309, 5)
Starting mae: -0.130418

KNN_4 Tab, NLP, Image score: -0.1326
NN TL Image Only Preds score: -0.1338
Extra Trees Tab, NLP, Image score: -0.1303
Random Forest Tab, NLP, Image score: -0.1307
NN NLP Only Preds score: -0.1355
KNN_4 Tab and NLP score: -0.1301
KNN_8 Tab and NLP score: -0.1338
Random Forest Tab and NLP score: -0.1301
NuSVR Tab, NLP, Image score: -0.1303
KNN_4 Tabular score: -0.1299
KNN_8 Tab and Image score: -0.131
Gradient Boost Tab and Image score: -0.1325
Random Forest Tabular score: -0.1322
XGBR Tab, NLP, Image score: -0.1295
KNN_15 Tab and Image score: -0.1316
KNN_8 Tab, NLP, Image score: -0.1309
KNN_15 Tab and NLP score: -0.1323
NuSVR Tab and Image score: -0.1299
Extra Trees Tab and Image score: -0.132
KNN_15 Tabular score: -0.1329
KNN_8 Tabular score: -0.1333
Gradient Boost Tab and NLP score: -0.1309
KNN_4 Tab and Image score: -0.1323
NN CNN Image Only Preds score: -0.1304
Extra Trees Tab and NLP score: -0.1299
NN Tabular Only Preds score: -0.1315
XGBR Tab and Image score: -0.13
KNN_15 Tab, NLP, Image score: -0.1316
NuSVR Tab and NLP score: -0.1311
Random Forest Tab and Image score: -0.13
XGBR Tabular score: -0.1303
Gradient Boost Tab, NLP, Image score: -0.131
Best mae: -0.1295
```

Add XGBR Tab, NLP, Image with mae -0.1295

NEW ROUND - Setting up score charts

Included models: ['NuSVR Tabular', 'Extra Trees Tabular', 'XGBR Tab and NLP', 'NN Multi Input Preds', 'Gradient Boost Tabular', 'XGBR Tab, NLP, Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding NuSVR Tabular (1309, 1)

```
Adding Extra Trees Tabular (1309, 2)
Adding XGBR Tab and NLP (1309, 3)
Adding NN Multi Input Preds (1309, 4)
Adding Gradient Boost Tabular (1309, 5)
Adding XGBR Tab, NLP, Image (1309, 6)
Starting mae: -0.129468

KNN_4 Tab, NLP, Image score: -0.1344
NN TL Image Only Preds score: -0.1334
Extra Trees Tab, NLP, Image score: -0.1301
Random Forest Tab, NLP, Image score: -0.1303
NN NLP Only Preds score: -0.1352
KNN_4 Tab and NLP score: -0.1319
KNN_8 Tab and NLP score: -0.1332
Random Forest Tab and NLP score: -0.1298
NuSVR Tab, NLP, Image score: -0.1297
KNN_4 Tabular score: -0.1315
KNN_8 Tab and Image score: -0.1319
Gradient Boost Tab and Image score: -0.133
Random Forest Tabular score: -0.1302
KNN_15 Tab and Image score: -0.1312
KNN_8 Tab, NLP, Image score: -0.1318
KNN_15 Tab and NLP score: -0.1323
NuSVR Tab and Image score: -0.1293
Extra Trees Tab and Image score: -0.1307
KNN_15 Tabular score: -0.1334
KNN_8 Tabular score: -0.1329
Gradient Boost Tab and NLP score: -0.1314
KNN_4 Tab and Image score: -0.1343
NN CNN Image Only Preds score: -0.1295
Extra Trees Tab and NLP score: -0.1303
NN Tabular Only Preds score: -0.1301
XGBR Tab and Image score: -0.1302
KNN_15 Tab, NLP, Image score: -0.1312
NuSVR Tab and NLP score: -0.1292
Random Forest Tab and Image score: -0.1304
XGBR Tabular score: -0.1296
Gradient Boost Tab, NLP, Image score: -0.132
Best mae: -0.1292
```

Add NuSVR Tab and NLP with mae -0.1292

NEW ROUND - Setting up score charts

```
Included models: ['NuSVR Tabular', 'Extra Trees Tabular', 'XGBR Tab and NLP', 'NN Multi Input Preds', 'Gradient Boost Tabular', 'XGBR Tab, NLP, Image', 'NuSVR Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding NuSVR Tabular (1309, 1)
Adding Extra Trees Tabular (1309, 2)
Adding XGBR Tab and NLP (1309, 3)
```

```

Adding NN Multi Input Preds (1309, 4)
Adding Gradient Boost Tabular (1309, 5)
Adding XGBR Tab, NLP, Image (1309, 6)
Adding NuSVR Tab and NLP (1309, 7)
Starting mae: -0.12925

KNN_4 Tab, NLP, Image score: -0.1336
NN TL Image Only Preds score: -0.1341
Extra Trees Tab, NLP, Image score: -0.1294
Random Forest Tab, NLP, Image score: -0.1295
NN NLP Only Preds score: -0.1349
KNN_4 Tab and NLP score: -0.1317
KNN_8 Tab and NLP score: -0.132
Random Forest Tab and NLP score: -0.1294
NuSVR Tab, NLP, Image score: -0.1294
KNN_4 Tabular score: -0.1317
KNN_8 Tab and Image score: -0.1327
Gradient Boost Tab and Image score: -0.132
Random Forest Tabular score: -0.1297
KNN_15 Tab and Image score: -0.1315
KNN_8 Tab, NLP, Image score: -0.1326
KNN_15 Tab and NLP score: -0.1317
NuSVR Tab and Image score: -0.1295
Extra Trees Tab and Image score: -0.1299
KNN_15 Tabular score: -0.1321
KNN_8 Tabular score: -0.1313
Gradient Boost Tab and NLP score: -0.1293
KNN_4 Tab and Image score: -0.1335
NN CNN Image Only Preds score: -0.1292
Extra Trees Tab and NLP score: -0.1305
NN Tabular Only Preds score: -0.1299
XGBR Tab and Image score: -0.13
KNN_15 Tab, NLP, Image score: -0.1315
Random Forest Tab and Image score: -0.1305
XGBR Tabular score: -0.1299
Gradient Boost Tab, NLP, Image score: -0.1314
Best mae: -0.1292

Add NN CNN Image Only Preds with mae -0.1292

NEW ROUND - Setting up score charts

Included models: ['NuSVR Tabular', 'Extra Trees Tabular', 'XGBR Tab and NLP', 'NN Multi Input Preds', 'Gradient Boost Tabular', 'XGBR Tab, NLP, Image', 'NuSVR Tab and NLP', 'NN CNN Image Only Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding NuSVR Tabular (1309, 1)
Adding Extra Trees Tabular (1309, 2)
Adding XGBR Tab and NLP (1309, 3)
Adding NN Multi Input Preds (1309, 4)

```

```
Adding Gradient Boost Tabular (1309, 5)
Adding XGBR Tab, NLP, Image (1309, 6)
Adding NuSVR Tab and NLP (1309, 7)
Adding NN CNN Image Only Preds (1309, 8)
Starting mae: -0.12925

KNN_4 Tab, NLP, Image score: -0.1336
NN TL Image Only Preds score: -0.1341
Extra Trees Tab, NLP, Image score: -0.1294
Random Forest Tab, NLP, Image score: -0.1295
NN NLP Only Preds score: -0.1349
KNN_4 Tab and NLP score: -0.1317
KNN_8 Tab and NLP score: -0.132
Random Forest Tab and NLP score: -0.1294
NuSVR Tab, NLP, Image score: -0.1294
KNN_4 Tabular score: -0.1317
KNN_8 Tab and Image score: -0.1327
Gradient Boost Tab and Image score: -0.132
Random Forest Tabular score: -0.1297
KNN_15 Tab and Image score: -0.1315
KNN_8 Tab, NLP, Image score: -0.1326
KNN_15 Tab and NLP score: -0.1317
NuSVR Tab and Image score: -0.1295
Extra Trees Tab and Image score: -0.1299
KNN_15 Tabular score: -0.1321
KNN_8 Tabular score: -0.1313
Gradient Boost Tab and NLP score: -0.1293
KNN_4 Tab and Image score: -0.1335
Extra Trees Tab and NLP score: -0.1305
NN Tabular Only Preds score: -0.1299
XGBR Tab and Image score: -0.13
KNN_15 Tab, NLP, Image score: -0.1315
Random Forest Tab and Image score: -0.1305
XGBR Tabular score: -0.1299
Gradient Boost Tab, NLP, Image score: -0.1314
Best mae: -0.1293

KNN_8 model optimized
resulting models: ['NuSVR Tabular', 'Extra Trees Tabular', 'XGBR Tab and NLP', 'NN Multi Input Preds', 'Gradient Boost Tabular', 'XGBR Tab, NLP, Image', 'NuSVR Tab and NLP', 'NN CNN Image Only Preds']
MAE: -0.12925

Running model selector for KNN_4

NEW ROUND - Setting up score charts

Included models: []

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'Extra Trees Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN _8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and I mage', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and I mage', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'G radient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

KNN_4 Tab, NLP, Image score: -0.361716
NN TL Image Only Preds score: -0.388144
Extra Trees Tab, NLP, Image score: -0.17298
Random Forest Tab, NLP, Image score: -0.18691
NN NLP Only Preds score: -0.323011
KNN_4 Tab and NLP score: -0.20469
KNN_8 Tab and NLP score: -0.200497
Random Forest Tab and NLP score: -0.169977
NuSVR Tabular score: -0.154781
NuSVR Tab, NLP, Image score: -0.366478
KNN_4 Tabular score: -0.204827
KNN_8 Tab and Image score: -0.354574
Gradient Boost Tab and Image score: -0.172167
Random Forest Tabular score: -0.166331
Extra Trees Tabular score: -0.154141
XGBR Tab, NLP, Image score: -0.177643
KNN_15 Tab and Image score: -0.362059
KNN_8 Tab, NLP, Image score: -0.354673
KNN_15 Tab and NLP score: -0.195861
NuSVR Tab and Image score: -0.359032
Extra Trees Tab and Image score: -0.169085
KNN_15 Tabular score: -0.192831
KNN_8 Tabular score: -0.198912
Gradient Boost Tab and NLP score: -0.164476
KNN_4 Tab and Image score: -0.361973
NN CNN Image Only Preds score: -0.41992
Extra Trees Tab and NLP score: -0.164795
NN Tabular Only Preds score: -0.161597
Gradient Boost Tabular score: -0.158643
NN Multi Input Preds score: -0.173659
XGBR Tab and Image score: -0.170884
KNN_15 Tab, NLP, Image score: -0.362059
NuSVR Tab and NLP score: -0.160132
Random Forest Tab and Image score: -0.181628
XGBR Tab and NLP score: -0.168154
XGBR Tabular score: -0.161912
Gradient Boost Tab, NLP, Image score: -0.173595
Best mae: -0.154141

Add Extra Trees Tabular with mae -0.154141

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab a nd NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Bo ost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)

Starting mae: -0.154141

KNN_4 Tab, NLP, Image score: -0.1517
NN TL Image Only Preds score: -0.1588
Extra Trees Tab, NLP, Image score: -0.1526
Random Forest Tab, NLP, Image score: -0.1559
NN NLP Only Preds score: -0.1565
KNN_4 Tab and NLP score: -0.1548
KNN_8 Tab and NLP score: -0.1621
Random Forest Tab and NLP score: -0.1525
NuSVR Tabular score: -0.1479
NuSVR Tab, NLP, Image score: -0.1558
KNN_4 Tabular score: -0.1565
KNN_8 Tab and Image score: -0.1545
Gradient Boost Tab and Image score: -0.1531
Random Forest Tabular score: -0.1537
XGBR Tab, NLP, Image score: -0.1509
KNN_15 Tab and Image score: -0.16
KNN_8 Tab, NLP, Image score: -0.1544
KNN_15 Tab and NLP score: -0.1538
NuSVR Tab and Image score: -0.1559
Extra Trees Tab and Image score: -0.1534
KNN_15 Tabular score: -0.1554
KNN_8 Tabular score: -0.157
Gradient Boost Tab and NLP score: -0.1521
KNN_4 Tab and Image score: -0.152
NN CNN Image Only Preds score: -0.1541
Extra Trees Tab and NLP score: -0.15
NN Tabular Only Preds score: -0.1504
Gradient Boost Tabular score: -0.1486
NN Multi Input Preds score: -0.1473
XGBR Tab and Image score: -0.1556
KNN_15 Tab, NLP, Image score: -0.16
NuSVR Tab and NLP score: -0.1503
Random Forest Tab and Image score: -0.1538
XGBR Tab and NLP score: -0.1491
XGBR Tabular score: -0.1519
Gradient Boost Tab, NLP, Image score: -0.1518
Best mae: -0.1473

Add NN Multi Input Preds with mae -0.1473

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NLP, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Starting mae: -0.147325

KNN_4 Tab, NLP, Image score: -0.1442
NN TL Image Only Preds score: -0.1479
Extra Trees Tab, NLP, Image score: -0.1401
Random Forest Tab, NLP, Image score: -0.1434
NN NLP Only Preds score: -0.1503
KNN_4 Tab and NLP score: -0.1445
KNN_8 Tab and NLP score: -0.1476
Random Forest Tab and NLP score: -0.1462
NuSVR Tabular score: -0.1439
NuSVR Tab, NLP, Image score: -0.1487
KNN_4 Tabular score: -0.1437
KNN_8 Tab and Image score: -0.1473
Gradient Boost Tab and Image score: -0.1478
Random Forest Tabular score: -0.1467
XGBR Tab, NLP, Image score: -0.1432
KNN_15 Tab and Image score: -0.1487
KNN_8 Tab, NLP, Image score: -0.1473
KNN_15 Tab and NLP score: -0.1464
NuSVR Tab and Image score: -0.1486
Extra Trees Tab and Image score: -0.1468
KNN_15 Tabular score: -0.1472
KNN_8 Tabular score: -0.1471
Gradient Boost Tab and NLP score: -0.1434
KNN_4 Tab and Image score: -0.1437
NN CNN Image Only Preds score: -0.1473
Extra Trees Tab and NLP score: -0.1455
NN Tabular Only Preds score: -0.1449
Gradient Boost Tabular score: -0.146
XGBR Tab and Image score: -0.1464
KNN_15 Tab, NLP, Image score: -0.1487
NuSVR Tab and NLP score: -0.1417
Random Forest Tab and Image score: -0.1474
XGBR Tab and NLP score: -0.1436
XGBR Tabular score: -0.1482
Gradient Boost Tab, NLP, Image score: -0.144
Best mae: -0.1401

Add Extra Trees Tab, NLP, Image with mae -0.1401

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'Extra Trees Tab, NLP, Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding Extra Trees Tab, NLP, Image (1309, 3)
Starting mae: -0.140069

```
KNN_4 Tab, NLP, Image score: -0.1463
NN TL Image Only Preds score: -0.1463
Random Forest Tab, NLP, Image score: -0.1435
NN NLP Only Preds score: -0.1438
KNN_4 Tab and NLP score: -0.144
KNN_8 Tab and NLP score: -0.1467
Random Forest Tab and NLP score: -0.1458
NuSVR Tabular score: -0.1387
NuSVR Tab, NLP, Image score: -0.1417
KNN_4 Tabular score: -0.145
KNN_8 Tab and Image score: -0.1446
Gradient Boost Tab and Image score: -0.1483
Random Forest Tabular score: -0.1454
XGBR Tab, NLP, Image score: -0.1401
KNN_15 Tab and Image score: -0.1459
KNN_8 Tab, NLP, Image score: -0.1445
KNN_15 Tab and NLP score: -0.144
NuSVR Tab and Image score: -0.1426
Extra Trees Tab and Image score: -0.1434
KNN_15 Tabular score: -0.1458
KNN_8 Tabular score: -0.1456
Gradient Boost Tab and NLP score: -0.1455
KNN_4 Tab and Image score: -0.146
NN CNN Image Only Preds score: -0.1401
Extra Trees Tab and NLP score: -0.1431
NN Tabular Only Preds score: -0.143
Gradient Boost Tabular score: -0.142
XGBR Tab and Image score: -0.1428
KNN_15 Tab, NLP, Image score: -0.1459
NuSVR Tab and NLP score: -0.1404
Random Forest Tab and Image score: -0.1431
XGBR Tab and NLP score: -0.141
XGBR Tabular score: -0.142
Gradient Boost Tab, NLP, Image score: -0.1447
Best mae: -0.1387
```

Add NuSVR Tabular with mae -0.1387

NEW ROUND - Setting up score charts

```
Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'Extra Trees Tab, NLP, Image', 'NuSVR Tabular']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding Extra Trees Tab, NLP, Image (1309, 3)
Adding NuSVR Tabular (1309, 4)
Starting mae: -0.138651
```

```
KNN_4 Tab, NLP, Image score: -0.144
NN TL Image Only Preds score: -0.1427
Random Forest Tab, NLP, Image score: -0.1397
NN NLP Only Preds score: -0.1421
KNN_4 Tab and NLP score: -0.1417
KNN_8 Tab and NLP score: -0.1406
Random Forest Tab and NLP score: -0.1405
NuSVR Tab, NLP, Image score: -0.139
KNN_4 Tabular score: -0.1401
KNN_8 Tab and Image score: -0.1433
Gradient Boost Tab and Image score: -0.1439
Random Forest Tabular score: -0.142
XGBR Tab, NLP, Image score: -0.1399
KNN_15 Tab and Image score: -0.1426
KNN_8 Tab, NLP, Image score: -0.1431
KNN_15 Tab and NLP score: -0.1411
NuSVR Tab and Image score: -0.1392
Extra Trees Tab and Image score: -0.1407
KNN_15 Tabular score: -0.1403
KNN_8 Tabular score: -0.1411
Gradient Boost Tab and NLP score: -0.1388
KNN_4 Tab and Image score: -0.1436
NN CNN Image Only Preds score: -0.1387
Extra Trees Tab and NLP score: -0.1429
NN Tabular Only Preds score: -0.1388
Gradient Boost Tabular score: -0.1401
XGBR Tab and Image score: -0.1404
KNN_15 Tab, NLP, Image score: -0.1426
NuSVR Tab and NLP score: -0.1388
Random Forest Tab and Image score: -0.1412
XGBR Tab and NLP score: -0.1368
XGBR Tabular score: -0.1386
Gradient Boost Tab, NLP, Image score: -0.1398
Best mae: -0.1368
```

Add XGBR Tab and NLP with mae -0.1368

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'Extra Trees Tab, NLP, Image', 'NuSVR Tabular', 'XGBR Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding Extra Trees Tab, NLP, Image (1309, 3)
Adding NuSVR Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Starting mae: -0.13679

```
KNN_4 Tab, NLP, Image score: -0.1424
NN TL Image Only Preds score: -0.1412
Random Forest Tab, NLP, Image score: -0.1384
NN NLP Only Preds score: -0.1405
KNN_4 Tab and NLP score: -0.1399
KNN_8 Tab and NLP score: -0.1401
Random Forest Tab and NLP score: -0.1403
NuSVR Tab, NLP, Image score: -0.1374
KNN_4 Tabular score: -0.1393
KNN_8 Tab and Image score: -0.14
Gradient Boost Tab and Image score: -0.1402
Random Forest Tabular score: -0.1387
XGBR Tab, NLP, Image score: -0.1391
KNN_15 Tab and Image score: -0.1404
KNN_8 Tab, NLP, Image score: -0.1401
KNN_15 Tab and NLP score: -0.139
NuSVR Tab and Image score: -0.1372
Extra Trees Tab and Image score: -0.1364
KNN_15 Tabular score: -0.1391
KNN_8 Tabular score: -0.1408
Gradient Boost Tab and NLP score: -0.1385
KNN_4 Tab and Image score: -0.1421
NN CNN Image Only Preds score: -0.1368
Extra Trees Tab and NLP score: -0.1386
NN Tabular Only Preds score: -0.1373
Gradient Boost Tabular score: -0.1354
XGBR Tab and Image score: -0.1374
KNN_15 Tab, NLP, Image score: -0.1404
NuSVR Tab and NLP score: -0.1392
Random Forest Tab and Image score: -0.1364
XGBR Tabular score: -0.1361
Gradient Boost Tab, NLP, Image score: -0.1408
Best mae: -0.1354
```

Add Gradient Boost Tabular with mae -0.1354

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'Extra Trees Tab, NLP, Image', 'NuSVR Tabular', 'XGBR Tab and NLP', 'Gradient Boost Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding Extra Trees Tab, NLP, Image (1309, 3)
Adding NuSVR Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Starting mae: -0.135419
```

KNN_4 Tab, NLP, Image score: -0.1385

```
NN TL Image Only Preds score: -0.1379
Random Forest Tab, NLP, Image score: -0.1389
NN NLP Only Preds score: -0.1391
KNN_4 Tab and NLP score: -0.136
KNN_8 Tab and NLP score: -0.1372
Random Forest Tab and NLP score: -0.1353
NuSVR Tab, NLP, Image score: -0.1357
KNN_4 Tabular score: -0.1356
KNN_8 Tab and Image score: -0.1385
Gradient Boost Tab and Image score: -0.1371
Random Forest Tabular score: -0.137
XGBR Tab, NLP, Image score: -0.1376
KNN_15 Tab and Image score: -0.1362
KNN_8 Tab, NLP, Image score: -0.1385
KNN_15 Tab and NLP score: -0.1363
NuSVR Tab and Image score: -0.1359
Extra Trees Tab and Image score: -0.1369
KNN_15 Tabular score: -0.1382
KNN_8 Tabular score: -0.1389
Gradient Boost Tab and NLP score: -0.1361
KNN_4 Tab and Image score: -0.1383
NN CNN Image Only Preds score: -0.1354
Extra Trees Tab and NLP score: -0.136
NN Tabular Only Preds score: -0.1364
XGBR Tab and Image score: -0.1356
KNN_15 Tab, NLP, Image score: -0.1362
NuSVR Tab and NLP score: -0.1361
Random Forest Tab and Image score: -0.1356
XGBR Tabular score: -0.1352
Gradient Boost Tab, NLP, Image score: -0.1382
Best mae: -0.1352
```

Add XGBR Tabular with mae -0.1352

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'Extra Trees Tab, NLP, Image', 'NuSVR Tabular', 'XGBR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding Extra Trees Tab, NLP, Image (1309, 3)
Adding NuSVR Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Adding XGBR Tabular (1309, 7)
Starting mae: -0.135188
```

```
KNN_4 Tab, NLP, Image score: -0.1392
NN TL Image Only Preds score: -0.1385
```

```
Random Forest Tab, NLP, Image score: -0.137
NN NLP Only Preds score: -0.14
KNN_4 Tab and NLP score: -0.1363
KNN_8 Tab and NLP score: -0.1372
Random Forest Tab and NLP score: -0.1357
NuSVR Tab, NLP, Image score: -0.1358
KNN_4 Tabular score: -0.1367
KNN_8 Tab and Image score: -0.1391
Gradient Boost Tab and Image score: -0.1364
Random Forest Tabular score: -0.1375
XGBR Tab, NLP, Image score: -0.1336
KNN_15 Tab and Image score: -0.1369
KNN_8 Tab, NLP, Image score: -0.139
KNN_15 Tab and NLP score: -0.1371
NuSVR Tab and Image score: -0.1359
Extra Trees Tab and Image score: -0.1353
KNN_15 Tabular score: -0.1379
KNN_8 Tabular score: -0.1394
Gradient Boost Tab and NLP score: -0.1365
KNN_4 Tab and Image score: -0.1388
NN CNN Image Only Preds score: -0.1352
Extra Trees Tab and NLP score: -0.1342
NN Tabular Only Preds score: -0.135
XGBR Tab and Image score: -0.1338
KNN_15 Tab, NLP, Image score: -0.1369
NuSVR Tab and NLP score: -0.134
Random Forest Tab and Image score: -0.1356
Gradient Boost Tab, NLP, Image score: -0.1368
Best mae: -0.1336
```

Add XGBR Tab, NLP, Image with mae -0.1336

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'Extra Trees Tab, NLP, Image', 'NuSVR Tabular', 'XGBR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tabular', 'XGBR Tab, NLP, Image']

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding Extra Trees Tab, NLP, Image (1309, 3)
Adding NuSVR Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Adding XGBR Tabular (1309, 7)
Adding XGBR Tab, NLP, Image (1309, 8)
Starting mae: -0.133634
```

```
KNN_4 Tab, NLP, Image score: -0.1397
NN TL Image Only Preds score: -0.1388
```

```
Random Forest Tab, NLP, Image score: -0.1361
NN NLP Only Preds score: -0.1397
KNN_4 Tab and NLP score: -0.1378
KNN_8 Tab and NLP score: -0.1379
Random Forest Tab and NLP score: -0.1362
NuSVR Tab, NLP, Image score: -0.1343
KNN_4 Tabular score: -0.1369
KNN_8 Tab and Image score: -0.1374
Gradient Boost Tab and Image score: -0.1381
Random Forest Tabular score: -0.1347
KNN_15 Tab and Image score: -0.1352
KNN_8 Tab, NLP, Image score: -0.1372
KNN_15 Tab and NLP score: -0.138
NuSVR Tab and Image score: -0.1343
Extra Trees Tab and Image score: -0.1362
KNN_15 Tabular score: -0.139
KNN_8 Tabular score: -0.1381
Gradient Boost Tab and NLP score: -0.1351
KNN_4 Tab and Image score: -0.1396
NN CNN Image Only Preds score: -0.1336
Extra Trees Tab and NLP score: -0.1353
NN Tabular Only Preds score: -0.1357
XGBR Tab and Image score: -0.1343
KNN_15 Tab, NLP, Image score: -0.1352
NuSVR Tab and NLP score: -0.1336
Random Forest Tab and Image score: -0.1359
Gradient Boost Tab, NLP, Image score: -0.1354
Best mae: -0.1336
```

Add NN CNN Image Only Preds with mae -0.1336

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'Extra Trees Tab, NLP, Image', 'NuSVR Tabular', 'XGBR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tabular', 'XGBR Tab, NLP, Image', 'NN CNN Image Only Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding Extra Trees Tab, NLP, Image (1309, 3)
Adding NuSVR Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Adding XGBR Tabular (1309, 7)
Adding XGBR Tab, NLP, Image (1309, 8)
Adding NN CNN Image Only Preds (1309, 9)
Starting mae: -0.133634
```

KNN_4 Tab, NLP, Image score: -0.1397
NN TL Image Only Preds score: -0.1388

```
Random Forest Tab, NLP, Image score: -0.1361
NN NLP Only Preds score: -0.1397
KNN_4 Tab and NLP score: -0.1378
KNN_8 Tab and NLP score: -0.1379
Random Forest Tab and NLP score: -0.1362
NuSVR Tab, NLP, Image score: -0.1343
KNN_4 Tabular score: -0.1369
KNN_8 Tab and Image score: -0.1374
Gradient Boost Tab and Image score: -0.1381
Random Forest Tabular score: -0.1347
KNN_15 Tab and Image score: -0.1352
KNN_8 Tab, NLP, Image score: -0.1372
KNN_15 Tab and NLP score: -0.138
NuSVR Tab and Image score: -0.1343
Extra Trees Tab and Image score: -0.1362
KNN_15 Tabular score: -0.139
KNN_8 Tabular score: -0.1381
Gradient Boost Tab and NLP score: -0.1351
KNN_4 Tab and Image score: -0.1396
Extra Trees Tab and NLP score: -0.1353
NN Tabular Only Preds score: -0.1357
XGBR Tab and Image score: -0.1343
KNN_15 Tab, NLP, Image score: -0.1352
NuSVR Tab and NLP score: -0.1336
Random Forest Tab and Image score: -0.1359
Gradient Boost Tab, NLP, Image score: -0.1354
Best mae: -0.1336
```

Add NuSVR Tab and NLP with mae -0.1336

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'Extra Trees Tab, NLP, Image', 'NuSVR Tabular', 'XGBR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tabular', 'XGBR Tab, NLP, Image', 'NN CNN Image Only Preds', 'NuSVR Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'Random Forest Tab and Image', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding Extra Trees Tab, NLP, Image (1309, 3)
Adding NuSVR Tabular (1309, 4)
Adding XGBR Tab and NLP (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Adding XGBR Tabular (1309, 7)
Adding XGBR Tab, NLP, Image (1309, 8)
Adding NN CNN Image Only Preds (1309, 9)
Adding NuSVR Tab and NLP (1309, 10)
Starting mae: -0.133572
```

```
KNN_4 Tab, NLP, Image score: -0.1382
NN TL Image Only Preds score: -0.1371
Random Forest Tab, NLP, Image score: -0.1348
```

```
NN NLP Only Preds score: -0.1376
KNN_4 Tab and NLP score: -0.1345
KNN_8 Tab and NLP score: -0.1358
Random Forest Tab and NLP score: -0.134
NuSVR Tab, NLP, Image score: -0.1343
KNN_4 Tabular score: -0.1356
KNN_8 Tab and Image score: -0.1358
Gradient Boost Tab and Image score: -0.1355
Random Forest Tabular score: -0.1342
KNN_15 Tab and Image score: -0.1343
KNN_8 Tab, NLP, Image score: -0.1356
KNN_15 Tab and NLP score: -0.1382
NuSVR Tab and Image score: -0.1343
Extra Trees Tab and Image score: -0.1344
KNN_15 Tabular score: -0.1383
KNN_8 Tabular score: -0.1357
Gradient Boost Tab and NLP score: -0.1338
KNN_4 Tab and Image score: -0.138
Extra Trees Tab and NLP score: -0.1343
NN Tabular Only Preds score: -0.1337
XGBR Tab and Image score: -0.1346
KNN_15 Tab, NLP, Image score: -0.1343
Random Forest Tab and Image score: -0.1345
Gradient Boost Tab, NLP, Image score: -0.1337
Best mae: -0.1337
```

```
KNN_4 model optimized
resulting models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'Extra Trees Tab, NLP, Image', 'NuSVR Tabular', 'XGBR Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tabular', 'XGBR Tab, NLP, Image', 'NN CNN Image Only Preds', 'NuSVR Tab and NLP']
MAE: -0.133572
```

```
Running model selector for KNN_15
```

```
NEW ROUND - Setting up score charts
```

```
Included models: []
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'Extra Trees Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
KNN_4 Tab, NLP, Image score: -0.332981
NN TL Image Only Preds score: -0.354651
Extra Trees Tab, NLP, Image score: -0.155803
Random Forest Tab, NLP, Image score: -0.166745
NN NLP Only Preds score: -0.290202
KNN_4 Tab and NLP score: -0.182892
KNN_8 Tab and NLP score: -0.180798
Random Forest Tab and NLP score: -0.155149
NuSVR Tabular score: -0.142641
NuSVR Tab, NLP, Image score: -0.337425
```

```
KNN_4 Tabular score: -0.183208
KNN_8 Tab and Image score: -0.327497
Gradient Boost Tab and Image score: -0.153259
Random Forest Tabular score: -0.147801
Extra Trees Tabular score: -0.139938
XGBR Tab, NLP, Image score: -0.159783
KNN_15 Tab and Image score: -0.33272
KNN_8 Tab, NLP, Image score: -0.327311
KNN_15 Tab and NLP score: -0.176092
NuSVR Tab and Image score: -0.334524
Extra Trees Tab and Image score: -0.151654
KNN_15 Tabular score: -0.177237
KNN_8 Tabular score: -0.181202
Gradient Boost Tab and NLP score: -0.149427
KNN_4 Tab and Image score: -0.33276
NN CNN Image Only Preds score: -0.360892
Extra Trees Tab and NLP score: -0.147597
NN Tabular Only Preds score: -0.14541
Gradient Boost Tabular score: -0.143965
NN Multi Input Preds score: -0.15314
XGBR Tab and Image score: -0.154251
KNN_15 Tab, NLP, Image score: -0.33272
NuSVR Tab and NLP score: -0.146393
Random Forest Tab and Image score: -0.163398
XGBR Tab and NLP score: -0.152694
XGBR Tabular score: -0.146393
Gradient Boost Tab, NLP, Image score: -0.157392
Best mae: -0.139938
```

Add Extra Trees Tabular with mae -0.139938

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab a nd NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Bo ost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)

Starting mae: -0.139938

```
KNN_4 Tab, NLP, Image score: -0.1386
NN TL Image Only Preds score: -0.1412
Extra Trees Tab, NLP, Image score: -0.1387
Random Forest Tab, NLP, Image score: -0.1404
NN NLP Only Preds score: -0.1407
KNN_4 Tab and NLP score: -0.1413
KNN_8 Tab and NLP score: -0.1402
Random Forest Tab and NLP score: -0.1378
NuSVR Tabular score: -0.1333
NuSVR Tab, NLP, Image score: -0.1417
```

```
KNN_4 Tabular score: -0.1411
KNN_8 Tab and Image score: -0.1387
Gradient Boost Tab and Image score: -0.1389
Random Forest Tabular score: -0.1393
XGBR Tab, NLP, Image score: -0.138
KNN_15 Tab and Image score: -0.1402
KNN_8 Tab, NLP, Image score: -0.1387
KNN_15 Tab and NLP score: -0.1397
NuSVR Tab and Image score: -0.1421
Extra Trees Tab and Image score: -0.1388
KNN_15 Tabular score: -0.141
KNN_8 Tabular score: -0.1415
Gradient Boost Tab and NLP score: -0.1355
KNN_4 Tab and Image score: -0.1385
NN CNN Image Only Preds score: -0.1399
Extra Trees Tab and NLP score: -0.1385
NN Tabular Only Preds score: -0.135
Gradient Boost Tabular score: -0.1348
NN Multi Input Preds score: -0.1336
XGBR Tab and Image score: -0.138
KNN_15 Tab, NLP, Image score: -0.1402
NuSVR Tab and NLP score: -0.1352
Random Forest Tab and Image score: -0.1385
XGBR Tab and NLP score: -0.1348
XGBR Tabular score: -0.1375
Gradient Boost Tab, NLP, Image score: -0.1366
Best mae: -0.1333
```

Add NuSVR Tabular with mae -0.1333

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular']

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabula r', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGB R Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NL P', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabula r', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Inpu t Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random F orest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Imag e']

Adding Extra Trees Tabular (1309, 1)

Adding NuSVR Tabular (1309, 2)

Starting mae: -0.133318

```
KNN_4 Tab, NLP, Image score: -0.1361
NN TL Image Only Preds score: -0.1371
Extra Trees Tab, NLP, Image score: -0.1312
Random Forest Tab, NLP, Image score: -0.1313
NN NLP Only Preds score: -0.1347
KNN_4 Tab and NLP score: -0.134
KNN_8 Tab and NLP score: -0.1329
Random Forest Tab and NLP score: -0.1315
NuSVR Tab, NLP, Image score: -0.1324
KNN_4 Tabular score: -0.1342
```

```
KNN_8 Tab and Image score: -0.1339
Gradient Boost Tab and Image score: -0.1346
Random Forest Tabular score: -0.1347
XGBR Tab, NLP, Image score: -0.13
KNN_15 Tab and Image score: -0.1355
KNN_8 Tab, NLP, Image score: -0.1338
KNN_15 Tab and NLP score: -0.1344
NuSVR Tab and Image score: -0.1324
Extra Trees Tab and Image score: -0.1332
KNN_15 Tabular score: -0.134
KNN_8 Tabular score: -0.1339
Gradient Boost Tab and NLP score: -0.1314
KNN_4 Tab and Image score: -0.1359
NN CNN Image Only Preds score: -0.1333
Extra Trees Tab and NLP score: -0.133
NN Tabular Only Preds score: -0.1325
Gradient Boost Tabular score: -0.1319
NN Multi Input Preds score: -0.1319
XGBR Tab and Image score: -0.1338
KNN_15 Tab, NLP, Image score: -0.1355
NuSVR Tab and NLP score: -0.1352
Random Forest Tab and Image score: -0.1318
XGBR Tab and NLP score: -0.1297
XGBR Tabular score: -0.1332
Gradient Boost Tab, NLP, Image score: -0.132
Best mae: -0.1297
```

Add XGBR Tab and NLP with mae -0.1297

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabula r', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGB R Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NL P', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabula r', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Ext ra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabular', 'NN Multi Inpu t Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random F orest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)

Adding NuSVR Tabular (1309, 2)

Adding XGBR Tab and NLP (1309, 3)

Starting mae: -0.129743

```
KNN_4 Tab, NLP, Image score: -0.1347
NN TL Image Only Preds score: -0.1334
Extra Trees Tab, NLP, Image score: -0.1293
Random Forest Tab, NLP, Image score: -0.1295
NN NLP Only Preds score: -0.1335
KNN_4 Tab and NLP score: -0.1311
KNN_8 Tab and NLP score: -0.1322
Random Forest Tab and NLP score: -0.1312
NuSVR Tab, NLP, Image score: -0.13
KNN_4 Tabular score: -0.1311
KNN_8 Tab and Image score: -0.1329
```

```
Gradient Boost Tab and Image score: -0.1312
Random Forest Tabular score: -0.1312
XGBR Tab, NLP, Image score: -0.1312
KNN_15 Tab and Image score: -0.1321
KNN_8 Tab, NLP, Image score: -0.1329
KNN_15 Tab and NLP score: -0.1324
NuSVR Tab and Image score: -0.1298
Extra Trees Tab and Image score: -0.1293
KNN_15 Tabular score: -0.1323
KNN_8 Tabular score: -0.1315
Gradient Boost Tab and NLP score: -0.1308
KNN_4 Tab and Image score: -0.1347
NN CNN Image Only Preds score: -0.1297
Extra Trees Tab and NLP score: -0.1313
NN Tabular Only Preds score: -0.1303
Gradient Boost Tabular score: -0.1291
NN Multi Input Preds score: -0.1291
XGBR Tab and Image score: -0.1303
KNN_15 Tab, NLP, Image score: -0.1321
NuSVR Tab and NLP score: -0.131
Random Forest Tab and Image score: -0.1294
XGBR Tabular score: -0.1312
Gradient Boost Tab, NLP, Image score: -0.1313
Best mae: -0.1291
```

Add Gradient Boost Tabular with mae -0.1291

NEW ROUND - Setting up score charts

```
Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab and NLP', 'Gradient Boost Tabular']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NL P', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Starting mae: -0.129128
```

```
KNN_4 Tab, NLP, Image score: -0.1333
NN TL Image Only Preds score: -0.1318
Extra Trees Tab, NLP, Image score: -0.1292
Random Forest Tab, NLP, Image score: -0.1288
NN NLP Only Preds score: -0.1333
KNN_4 Tab and NLP score: -0.1306
KNN_8 Tab and NLP score: -0.1317
Random Forest Tab and NLP score: -0.1301
NuSVR Tab, NLP, Image score: -0.1284
KNN_4 Tabular score: -0.1308
KNN_8 Tab and Image score: -0.1309
```

Gradient Boost Tab and Image score: -0.1307
Random Forest Tabular score: -0.1307
XGBR Tab, NLP, Image score: -0.1294
KNN_15 Tab and Image score: -0.1305
KNN_8 Tab, NLP, Image score: -0.1309
KNN_15 Tab and NLP score: -0.1315
NuSVR Tab and Image score: -0.1284
Extra Trees Tab and Image score: -0.1295
KNN_15 Tabular score: -0.1315
KNN_8 Tabular score: -0.1311
Gradient Boost Tab and NLP score: -0.1307
KNN_4 Tab and Image score: -0.1333
NN CNN Image Only Preds score: -0.1291
Extra Trees Tab and NLP score: -0.1307
NN Tabular Only Preds score: -0.1298
NN Multi Input Preds score: -0.1279
XGBR Tab and Image score: -0.1299
KNN_15 Tab, NLP, Image score: -0.1305
NuSVR Tab and NLP score: -0.1301
Random Forest Tab and Image score: -0.1288
XGBR Tabular score: -0.1288
Gradient Boost Tab, NLP, Image score: -0.1301
Best mae: -0.1279

Add NN Multi Input Preds with mae -0.1279

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab and NLP', 'Gradient Boost Tabular', 'NN Multi Input Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Starting mae: -0.127913

KNN_4 Tab, NLP, Image score: -0.13
NN TL Image Only Preds score: -0.1318
Extra Trees Tab, NLP, Image score: -0.1277
Random Forest Tab, NLP, Image score: -0.1278
NN NLP Only Preds score: -0.1324
KNN_4 Tab and NLP score: -0.1295
KNN_8 Tab and NLP score: -0.1295
Random Forest Tab and NLP score: -0.1277
NuSVR Tab, NLP, Image score: -0.1284
KNN_4 Tabular score: -0.1296
KNN_8 Tab and Image score: -0.1303

```
Gradient Boost Tab and Image score: -0.1301
Random Forest Tabular score: -0.129
XGBR Tab, NLP, Image score: -0.1289
KNN_15 Tab and Image score: -0.1298
KNN_8 Tab, NLP, Image score: -0.1303
KNN_15 Tab and NLP score: -0.1303
NuSVR Tab and Image score: -0.1283
Extra Trees Tab and Image score: -0.1284
KNN_15 Tabular score: -0.1297
KNN_8 Tabular score: -0.1296
Gradient Boost Tab and NLP score: -0.1294
KNN_4 Tab and Image score: -0.13
NN CNN Image Only Preds score: -0.1279
Extra Trees Tab and NLP score: -0.1286
NN Tabular Only Preds score: -0.1283
XGBR Tab and Image score: -0.1283
KNN_15 Tab, NLP, Image score: -0.1298
NuSVR Tab and NLP score: -0.1283
Random Forest Tab and Image score: -0.1268
XGBR Tabular score: -0.1287
Gradient Boost Tab, NLP, Image score: -0.1289
Best mae: -0.1268
```

Add Random Forest Tab and Image with mae -0.1268

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab and NLP', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'Random Forest Tab and Image']

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabula r', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGB R Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NL P', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabular', 'KNN_8 Tabula r', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Ext ra Trees Tab and NLP', 'NN Tabular Only Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NuSVR Tabular (1309, 2)
Adding XGBR Tab and NLP (1309, 3)
Adding Gradient Boost Tabular (1309, 4)
Adding NN Multi Input Preds (1309, 5)
Adding Random Forest Tab and Image (1309, 6)
Starting mae: -0.12676
```

```
KNN_4 Tab, NLP, Image score: -0.13
NN TL Image Only Preds score: -0.1325
Extra Trees Tab, NLP, Image score: -0.1291
Random Forest Tab, NLP, Image score: -0.1282
NN NLP Only Preds score: -0.1316
KNN_4 Tab and NLP score: -0.1295
KNN_8 Tab and NLP score: -0.1289
Random Forest Tab and NLP score: -0.1272
NuSVR Tab, NLP, Image score: -0.1273
KNN_4 Tabular score: -0.1285
KNN_8 Tab and Image score: -0.1293
Gradient Boost Tab and Image score: -0.129
```

```
Random Forest Tabular score: -0.128
XGBR Tab, NLP, Image score: -0.1286
KNN_15 Tab and Image score: -0.1295
KNN_8 Tab, NLP, Image score: -0.1292
KNN_15 Tab and NLP score: -0.1291
NuSVR Tab and Image score: -0.1275
Extra Trees Tab and Image score: -0.1275
KNN_15 Tabular score: -0.1292
KNN_8 Tabular score: -0.1296
Gradient Boost Tab and NLP score: -0.1275
KNN_4 Tab and Image score: -0.13
NN CNN Image Only Preds score: -0.1268
Extra Trees Tab and NLP score: -0.128
NN Tabular Only Preds score: -0.1279
XGBR Tab and Image score: -0.1285
KNN_15 Tab, NLP, Image score: -0.1295
NuSVR Tab and NLP score: -0.127
XGBR Tabular score: -0.1278
Gradient Boost Tab, NLP, Image score: -0.1288
Best mae: -0.1268
```

```
KNN_15 model optimized
resulting models: ['Extra Trees Tabular', 'NuSVR Tabular', 'XGBR Tab and NLP', 'Gradient Boost Tabular', 'NN Multi Input Preds', 'Random Forest Tab and Image']
MAE: -0.12676
```

Running model selector for Linear Regression

NEW ROUND - Setting up score charts

Included models: []

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'Extra Trees Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN _8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and I mage', 'KNN_15 Tabular', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and I mage', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'G radient Boost Tabular', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR T abular', 'Gradient Boost Tab, NLP, Image']

```
KNN_4 Tab, NLP, Image score: -0.322049
NN TL Image Only Preds score: -0.34094
Extra Trees Tab, NLP, Image score: -0.1491
Random Forest Tab, NLP, Image score: -0.162712
NN NLP Only Preds score: -0.275411
KNN_4 Tab and NLP score: -0.175842
KNN_8 Tab and NLP score: -0.169986
Random Forest Tab and NLP score: -0.148248
NuSVR Tabular score: -0.133916
NuSVR Tab, NLP, Image score: -0.332651
KNN_4 Tabular score: -0.176349
KNN_8 Tab and Image score: -0.320446
Gradient Boost Tab and Image score: -0.146992
Random Forest Tabular score: -0.140297
Extra Trees Tabular score: -0.132564
XGBR Tab, NLP, Image score: -0.151633
```

```
KNN_15 Tab and Image score: -0.317853
KNN_8 Tab, NLP, Image score: -0.320355
KNN_15 Tab and NLP score: -0.1695
NuSVR Tab and Image score: -0.33328
Extra Trees Tab and Image score: -0.144062
KNN_15 Tabular score: -0.169742
KNN_8 Tabular score: -0.170822
Gradient Boost Tab and NLP score: -0.142979
KNN_4 Tab and Image score: -0.322097
NN CNN Image Only Preds score: -0.340951
Extra Trees Tab and NLP score: -0.139508
NN Tabular Only Preds score: -0.137445
Gradient Boost Tabular score: -0.135217
NN Multi Input Preds score: -0.14388
XGBR Tab and Image score: -0.148215
KNN_15 Tab, NLP, Image score: -0.317853
NuSVR Tab and NLP score: -0.137856
Random Forest Tab and Image score: -0.156905
XGBR Tab and NLP score: -0.142663
XGBR Tabular score: -0.137348
Gradient Boost Tab, NLP, Image score: -0.150117
Best mae: -0.132564
```

Add Extra Trees Tabular with mae -0.132564

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'NN Multi Input Preds', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab a nd NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Bo ost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)

Starting mae: -0.132564

```
KNN_4 Tab, NLP, Image score: -0.1325
NN TL Image Only Preds score: -0.1331
Extra Trees Tab, NLP, Image score: -0.1325
Random Forest Tab, NLP, Image score: -0.1328
NN NLP Only Preds score: -0.1321
KNN_4 Tab and NLP score: -0.1331
KNN_8 Tab and NLP score: -0.1331
Random Forest Tab and NLP score: -0.1323
NuSVR Tabular score: -0.1289
NuSVR Tab, NLP, Image score: -0.1326
KNN_4 Tabular score: -0.1331
KNN_8 Tab and Image score: -0.1324
Gradient Boost Tab and Image score: -0.1316
Random Forest Tabular score: -0.133
XGBR Tab, NLP, Image score: -0.1313
KNN_15 Tab and Image score: -0.1322
```

```
KNN_8 Tab, NLP, Image score: -0.1324
KNN_15 Tab and NLP score: -0.1331
NuSVR Tab and Image score: -0.1326
Extra Trees Tab and Image score: -0.1328
KNN_15 Tabular score: -0.1331
KNN_8 Tabular score: -0.1331
Gradient Boost Tab and NLP score: -0.1293
KNN_4 Tab and Image score: -0.1325
NN CNN Image Only Preds score: -0.1326
Extra Trees Tab and NLP score: -0.1318
NN Tabular Only Preds score: -0.1289
Gradient Boost Tabular score: -0.1292
NN Multi Input Preds score: -0.128
XGBR Tab and Image score: -0.1326
KNN_15 Tab, NLP, Image score: -0.1322
NuSVR Tab and NLP score: -0.1298
Random Forest Tab and Image score: -0.133
XGBR Tab and NLP score: -0.1293
XGBR Tabular score: -0.1311
Gradient Boost Tab, NLP, Image score: -0.1304
Best mae: -0.128
```

Add NN Multi Input Preds with mae -0.128

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'NN Tabular Only Preds', 'Gradient Boost Tabula r', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Starting mae: -0.128013

```
KNN_4 Tab, NLP, Image score: -0.1283
NN TL Image Only Preds score: -0.1284
Extra Trees Tab, NLP, Image score: -0.1279
Random Forest Tab, NLP, Image score: -0.1283
NN NLP Only Preds score: -0.1281
KNN_4 Tab and NLP score: -0.1284
KNN_8 Tab and NLP score: -0.1284
Random Forest Tab and NLP score: -0.1281
NuSVR Tabular score: -0.1271
NuSVR Tab, NLP, Image score: -0.1281
KNN_4 Tabular score: -0.1285
KNN_8 Tab and Image score: -0.1282
Gradient Boost Tab and Image score: -0.1278
Random Forest Tabular score: -0.1282
XGBR Tab, NLP, Image score: -0.1275
KNN_15 Tab and Image score: -0.1279
KNN_8 Tab, NLP, Image score: -0.1282
```

```
KNN_15 Tab and NLP score: -0.1284
NuSVR Tab and Image score: -0.1281
Extra Trees Tab and Image score: -0.1281
KNN_15 Tabular score: -0.1284
KNN_8 Tabular score: -0.1284
Gradient Boost Tab and NLP score: -0.1265
KNN_4 Tab and Image score: -0.1283
NN CNN Image Only Preds score: -0.128
Extra Trees Tab and NLP score: -0.1274
NN Tabular Only Preds score: -0.1257
Gradient Boost Tabular score: -0.1263
XGBR Tab and Image score: -0.1282
KNN_15 Tab, NLP, Image score: -0.1279
NuSVR Tab and NLP score: -0.1274
Random Forest Tab and Image score: -0.1284
XGBR Tab and NLP score: -0.1266
XGBR Tabular score: -0.1274
Gradient Boost Tab, NLP, Image score: -0.1271
Best mae: -0.1257
```

Add NN Tabular Only Preds with mae -0.1257

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tab and NLP', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Starting mae: -0.125708

```
KNN_4 Tab, NLP, Image score: -0.1259
NN TL Image Only Preds score: -0.126
Extra Trees Tab, NLP, Image score: -0.1257
Random Forest Tab, NLP, Image score: -0.1258
NN NLP Only Preds score: -0.1257
KNN_4 Tab and NLP score: -0.1262
KNN_8 Tab and NLP score: -0.1261
Random Forest Tab and NLP score: -0.1255
NuSVR Tabular score: -0.1258
NuSVR Tab, NLP, Image score: -0.1257
KNN_4 Tabular score: -0.1263
KNN_8 Tab and Image score: -0.1259
Gradient Boost Tab and Image score: -0.1257
Random Forest Tabular score: -0.1258
XGBR Tab, NLP, Image score: -0.1253
KNN_15 Tab and Image score: -0.1257
KNN_8 Tab, NLP, Image score: -0.126
```

```
KNN_15 Tab and NLP score: -0.1261
NuSVR Tab and Image score: -0.1257
Extra Trees Tab and Image score: -0.1257
KNN_15 Tabular score: -0.126
KNN_8 Tabular score: -0.1261
Gradient Boost Tab and NLP score: -0.1248
KNN_4 Tab and Image score: -0.1259
NN CNN Image Only Preds score: -0.1257
Extra Trees Tab and NLP score: -0.1253
Gradient Boost Tabular score: -0.125
XGBR Tab and Image score: -0.1258
KNN_15 Tab, NLP, Image score: -0.1257
NuSVR Tab and NLP score: -0.1258
Random Forest Tab and Image score: -0.1258
XGBR Tab and NLP score: -0.1246
XGBR Tabular score: -0.1254
Gradient Boost Tab, NLP, Image score: -0.1253
Best mae: -0.1246
```

Add XGBR Tab and NLP with mae -0.1246

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'XGBR Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_15 Tabula r', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabu lar', 'Gradient Boost Tab, NLP, Image']

Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding XGBR Tab and NLP (1309, 4)
Starting mae: -0.124622

```
KNN_4 Tab, NLP, Image score: -0.1248
NN TL Image Only Preds score: -0.1248
Extra Trees Tab, NLP, Image score: -0.1246
Random Forest Tab, NLP, Image score: -0.1247
NN NLP Only Preds score: -0.1247
KNN_4 Tab and NLP score: -0.1248
KNN_8 Tab and NLP score: -0.1246
Random Forest Tab and NLP score: -0.1247
NuSVR Tabular score: -0.1249
NuSVR Tab, NLP, Image score: -0.1247
KNN_4 Tabular score: -0.1249
KNN_8 Tab and Image score: -0.1248
Gradient Boost Tab and Image score: -0.1248
Random Forest Tabular score: -0.1247
XGBR Tab, NLP, Image score: -0.1246
KNN_15 Tab and Image score: -0.1246
KNN_8 Tab, NLP, Image score: -0.1248
```

```
KNN_15 Tab and NLP score: -0.1245
NuSVR Tab and Image score: -0.1247
Extra Trees Tab and Image score: -0.1246
KNN_15 Tabular score: -0.1244
KNN_8 Tabular score: -0.1247
Gradient Boost Tab and NLP score: -0.1246
KNN_4 Tab and Image score: -0.1248
NN CNN Image Only Preds score: -0.1246
Extra Trees Tab and NLP score: -0.1247
Gradient Boost Tabular score: -0.1244
XGBR Tab and Image score: -0.1247
KNN_15 Tab, NLP, Image score: -0.1246
NuSVR Tab and NLP score: -0.1249
Random Forest Tab and Image score: -0.1246
XGBR Tabular score: -0.1248
Gradient Boost Tab, NLP, Image score: -0.1248
Best mae: -0.1244
```

Add KNN_15 Tabular with mae -0.1244

NEW ROUND - Setting up score charts

```
Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'XGBR Tab and NLP', 'KNN_15 Tabular']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'Gradient Boost Tabular', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding XGBR Tab and NLP (1309, 4)
Adding KNN_15 Tabular (1309, 5)
Starting mae: -0.12441
```

```
KNN_4 Tab, NLP, Image score: -0.1246
NN TL Image Only Preds score: -0.1246
Extra Trees Tab, NLP, Image score: -0.1244
Random Forest Tab, NLP, Image score: -0.1245
NN NLP Only Preds score: -0.1245
KNN_4 Tab and NLP score: -0.1245
KNN_8 Tab and NLP score: -0.1244
Random Forest Tab and NLP score: -0.1245
NuSVR Tabular score: -0.1246
NuSVR Tab, NLP, Image score: -0.1245
KNN_4 Tabular score: -0.1246
KNN_8 Tab and Image score: -0.1246
Gradient Boost Tab and Image score: -0.1246
Random Forest Tabular score: -0.1244
XGBR Tab, NLP, Image score: -0.1245
KNN_15 Tab and Image score: -0.1244
KNN_8 Tab, NLP, Image score: -0.1246
```

```
KNN_15 Tab and NLP score: -0.1244
NuSVR Tab and Image score: -0.1245
Extra Trees Tab and Image score: -0.1244
KNN_8 Tabular score: -0.1244
Gradient Boost Tab and NLP score: -0.1243
KNN_4 Tab and Image score: -0.1246
NN CNN Image Only Preds score: -0.1244
Extra Trees Tab and NLP score: -0.1245
Gradient Boost Tabular score: -0.124
XGBR Tab and Image score: -0.1245
KNN_15 Tab, NLP, Image score: -0.1244
NuSVR Tab and NLP score: -0.1247
Random Forest Tab and Image score: -0.1245
XGBR Tabular score: -0.1246
Gradient Boost Tab, NLP, Image score: -0.1245
Best mae: -0.124
```

Add Gradient Boost Tabular with mae -0.124

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'XGBR Tab and NLP', 'KNN_15 Tabular', 'Gradient Boost Tabular']

Exluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Extra Trees Tab, NL P, Image', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'K NN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Imag e', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Fore st Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'K NN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra T rees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding XGBR Tab and NLP (1309, 4)
Adding KNN_15 Tabular (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Starting mae: -0.124047
```

```
KNN_4 Tab, NLP, Image score: -0.1243
NN TL Image Only Preds score: -0.1242
Extra Trees Tab, NLP, Image score: -0.124
Random Forest Tab, NLP, Image score: -0.1241
NN NLP Only Preds score: -0.1242
KNN_4 Tab and NLP score: -0.1242
KNN_8 Tab and NLP score: -0.124
Random Forest Tab and NLP score: -0.1241
NuSVR Tabular score: -0.1245
NuSVR Tab, NLP, Image score: -0.1241
KNN_4 Tabular score: -0.1242
KNN_8 Tab and Image score: -0.1243
Gradient Boost Tab and Image score: -0.124
Random Forest Tabular score: -0.124
XGBR Tab, NLP, Image score: -0.1242
KNN_15 Tab and Image score: -0.124
KNN_8 Tab, NLP, Image score: -0.1243
KNN_15 Tab and NLP score: -0.1241
```

```
NuSVR Tab and Image score: -0.1241
Extra Trees Tab and Image score: -0.124
KNN_8 Tabular score: -0.1241
Gradient Boost Tab and NLP score: -0.1241
KNN_4 Tab and Image score: -0.1243
NN CNN Image Only Preds score: -0.124
Extra Trees Tab and NLP score: -0.1241
XGBR Tab and Image score: -0.1241
KNN_15 Tab, NLP, Image score: -0.124
NuSVR Tab and NLP score: -0.1244
Random Forest Tab and Image score: -0.1241
XGBR Tabular score: -0.1243
Gradient Boost Tab, NLP, Image score: -0.1242
Best mae: -0.124
```

Add Extra Trees Tab, NLP, Image with mae -0.124

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'XGBR Tab and NLP', 'KNN_15 Tabular', 'Gradient Boost Tabular', 'Extra Trees Tab, NLP, Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_15 Tab and Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding XGBR Tab and NLP (1309, 4)
Adding KNN_15 Tabular (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Adding Extra Trees Tab, NLP, Image (1309, 7)
Starting mae: -0.124045
```

```
KNN_4 Tab, NLP, Image score: -0.1243
NN TL Image Only Preds score: -0.1242
Random Forest Tab, NLP, Image score: -0.1242
NN NLP Only Preds score: -0.1242
KNN_4 Tab and NLP score: -0.1242
KNN_8 Tab and NLP score: -0.124
Random Forest Tab and NLP score: -0.1241
NuSVR Tabular score: -0.1245
NuSVR Tab, NLP, Image score: -0.1241
KNN_4 Tabular score: -0.1242
KNN_8 Tab and Image score: -0.1242
Gradient Boost Tab and Image score: -0.124
Random Forest Tabular score: -0.124
XGBR Tab, NLP, Image score: -0.1242
KNN_15 Tab and Image score: -0.1239
KNN_8 Tab, NLP, Image score: -0.1243
KNN_15 Tab and NLP score: -0.1241
NuSVR Tab and Image score: -0.1241
```

```
Extra Trees Tab and Image score: -0.1242
KNN_8 Tabular score: -0.1241
Gradient Boost Tab and NLP score: -0.124
KNN_4 Tab and Image score: -0.1243
NN CNN Image Only Preds score: -0.124
Extra Trees Tab and NLP score: -0.124
XGBR Tab and Image score: -0.1241
KNN_15 Tab, NLP, Image score: -0.1239
NuSVR Tab and NLP score: -0.1244
Random Forest Tab and Image score: -0.1241
XGBR Tabular score: -0.1243
Gradient Boost Tab, NLP, Image score: -0.1242
Best mae: -0.1239
```

Add KNN_15 Tab and Image with mae -0.1239

NEW ROUND - Setting up score charts

```
Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'XGBR Tab and NLP', 'KNN_15 Tabular', 'Gradient Boost Tabular', 'Extra Trees Tab, NLP, Image', 'KNN_15 Tab and Image']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Gradient Boost Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding XGBR Tab and NLP (1309, 4)
Adding KNN_15 Tabular (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Adding Extra Trees Tab, NLP, Image (1309, 7)
Adding KNN_15 Tab and Image (1309, 8)
Starting mae: -0.123945
```

```
KNN_4 Tab, NLP, Image score: -0.1242
NN TL Image Only Preds score: -0.1242
Random Forest Tab, NLP, Image score: -0.1241
NN NLP Only Preds score: -0.1241
KNN_4 Tab and NLP score: -0.124
KNN_8 Tab and NLP score: -0.124
Random Forest Tab and NLP score: -0.124
NuSVR Tabular score: -0.1244
NuSVR Tab, NLP, Image score: -0.124
KNN_4 Tabular score: -0.1241
KNN_8 Tab and Image score: -0.1243
Gradient Boost Tab and Image score: -0.1239
Random Forest Tabular score: -0.1239
XGBR Tab, NLP, Image score: -0.1241
KNN_8 Tab, NLP, Image score: -0.1243
KNN_15 Tab and NLP score: -0.124
NuSVR Tab and Image score: -0.1241
Extra Trees Tab and Image score: -0.1242
```

```
KNN_8 Tabular score: -0.124
Gradient Boost Tab and NLP score: -0.124
KNN_4 Tab and Image score: -0.1242
NN CNN Image Only Preds score: -0.1239
Extra Trees Tab and NLP score: -0.124
XGBR Tab and Image score: -0.1241
KNN_15 Tab, NLP, Image score: -0.1239
NuSVR Tab and NLP score: -0.1244
Random Forest Tab and Image score: -0.124
XGBR Tabular score: -0.1242
Gradient Boost Tab, NLP, Image score: -0.1242
Best mae: -0.1239
```

Add Gradient Boost Tab and Image with mae -0.1239

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'XGBR Tab and NLP', 'KNN_15 Tabular', 'Gradient Boost Tabular', 'Extra Trees Tab, NLP, Image', 'KNN_15 Tab and Image', 'Gradient Boost Tab and Image']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'KNN_8 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding XGBR Tab and NLP (1309, 4)
Adding KNN_15 Tabular (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Adding Extra Trees Tab, NLP, Image (1309, 7)
Adding KNN_15 Tab and Image (1309, 8)
Adding Gradient Boost Tab and Image (1309, 9)
Starting mae: -0.123928
```

```
KNN_4 Tab, NLP, Image score: -0.1242
NN TL Image Only Preds score: -0.1242
Random Forest Tab, NLP, Image score: -0.1241
NN NLP Only Preds score: -0.124
KNN_4 Tab and NLP score: -0.124
KNN_8 Tab and NLP score: -0.1239
Random Forest Tab and NLP score: -0.124
NuSVR Tabular score: -0.1243
NuSVR Tab, NLP, Image score: -0.124
KNN_4 Tabular score: -0.1241
KNN_8 Tab and Image score: -0.1243
Random Forest Tabular score: -0.124
XGBR Tab, NLP, Image score: -0.1241
KNN_8 Tab, NLP, Image score: -0.1243
KNN_15 Tab and NLP score: -0.124
NuSVR Tab and Image score: -0.124
Extra Trees Tab and Image score: -0.1241
KNN_8 Tabular score: -0.124
Gradient Boost Tab and NLP score: -0.1242
```

```
KNN_4 Tab and Image score: -0.1242
NN CNN Image Only Preds score: -0.1239
Extra Trees Tab and NLP score: -0.124
XGBR Tab and Image score: -0.1241
KNN_15 Tab, NLP, Image score: -0.1239
NuSVR Tab and NLP score: -0.1243
Random Forest Tab and Image score: -0.1241
XGBR Tabular score: -0.1241
Gradient Boost Tab, NLP, Image score: -0.1241
Best mae: -0.1239
```

Add KNN_8 Tab and NLP with mae -0.1239

NEW ROUND - Setting up score charts

Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'XGBR Tab and NLP', 'KNN_15 Tabular', 'Gradient Boost Tabular', 'Extra Trees Tab, NLP, Image', 'KNN_15 Tab and Image', 'Gradient Boost Tab and Image', 'KNN_8 Tab and NLP']

Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'NN CNN Image Only Preds', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding XGBR Tab and NLP (1309, 4)
Adding KNN_15 Tabular (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Adding Extra Trees Tab, NLP, Image (1309, 7)
Adding KNN_15 Tab and Image (1309, 8)
Adding Gradient Boost Tab and Image (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Starting mae: -0.12394
```

```
KNN_4 Tab, NLP, Image score: -0.1242
NN TL Image Only Preds score: -0.1242
Random Forest Tab, NLP, Image score: -0.1241
NN NLP Only Preds score: -0.124
KNN_4 Tab and NLP score: -0.1241
Random Forest Tab and NLP score: -0.124
NuSVR Tabular score: -0.1243
NuSVR Tab, NLP, Image score: -0.124
KNN_4 Tabular score: -0.1242
KNN_8 Tab and Image score: -0.1243
Random Forest Tabular score: -0.124
XGBR Tab, NLP, Image score: -0.1241
KNN_8 Tab, NLP, Image score: -0.1243
KNN_15 Tab and NLP score: -0.124
NuSVR Tab and Image score: -0.124
Extra Trees Tab and Image score: -0.1241
KNN_8 Tabular score: -0.1242
Gradient Boost Tab and NLP score: -0.1242
KNN_4 Tab and Image score: -0.1242
NN CNN Image Only Preds score: -0.1239
```

```
Extra Trees Tab and NLP score: -0.124
XGBR Tab and Image score: -0.1241
KNN_15 Tab, NLP, Image score: -0.1239
NuSVR Tab and NLP score: -0.1243
Random Forest Tab and Image score: -0.1241
XGBR Tabular score: -0.1241
Gradient Boost Tab, NLP, Image score: -0.1242
Best mae: -0.1239
```

```
Add NN CNN Image Only Preds with mae -0.1239
```

```
NEW ROUND - Setting up score charts
```

```
Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'XGBR Tab and NLP', 'KNN_15 Tabular', 'Gradient Boost Tabular', 'Extra Trees Tab, NLP, Image', 'KNN_15 Tab and Image', 'Gradient Boost Tab and Image', 'KNN_8 Tab and NLP', 'NN CNN Image Only Preds']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'KNN_15 Tab, NLP, Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding XGBR Tab and NLP (1309, 4)
Adding KNN_15 Tabular (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Adding Extra Trees Tab, NLP, Image (1309, 7)
Adding KNN_15 Tab and Image (1309, 8)
Adding Gradient Boost Tab and Image (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Adding NN CNN Image Only Preds (1309, 11)
Starting mae: -0.12394
```

```
KNN_4 Tab, NLP, Image score: -0.1242
NN TL Image Only Preds score: -0.1242
Random Forest Tab, NLP, Image score: -0.1241
NN NLP Only Preds score: -0.124
KNN_4 Tab and NLP score: -0.1241
Random Forest Tab and NLP score: -0.124
NuSVR Tabular score: -0.1243
NuSVR Tab, NLP, Image score: -0.124
KNN_4 Tabular score: -0.1242
KNN_8 Tab and Image score: -0.1243
Random Forest Tabular score: -0.124
XGBR Tab, NLP, Image score: -0.1241
KNN_8 Tab, NLP, Image score: -0.1243
KNN_15 Tab and NLP score: -0.124
NuSVR Tab and Image score: -0.124
Extra Trees Tab and Image score: -0.1241
KNN_8 Tabular score: -0.1242
Gradient Boost Tab and NLP score: -0.1242
KNN_4 Tab and Image score: -0.1242
Extra Trees Tab and NLP score: -0.124
```

```
XGBR Tab and Image score: -0.1241
KNN_15 Tab, NLP, Image score: -0.1239
NuSVR Tab and NLP score: -0.1243
Random Forest Tab and Image score: -0.1241
XGBR Tabular score: -0.1241
Gradient Boost Tab, NLP, Image score: -0.1242
Best mae: -0.1239
```

```
Add KNN_15 Tab, NLP, Image with mae -0.1239
```

NEW ROUND - Setting up score charts

```
Included models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'XGBR Tab and NLP', 'KNN_15 Tabular', 'Gradient Boost Tabular', 'Extra Trees Tab, NLP, Image', 'KNN_15 Tab and Image', 'Gradient Boost Tab and Image', 'KNN_8 Tab and NLP', 'NN CNN Image Only Preds', 'KNN_15 Tab, NLP, Image']
```

```
Excluded models: ['KNN_4 Tab, NLP, Image', 'NN TL Image Only Preds', 'Random Forest Tab, NLP, Image', 'NN NLP Only Preds', 'KNN_4 Tab and NLP', 'Random Forest Tab and NLP', 'NuSVR Tabular', 'NuSVR Tab, NLP, Image', 'KNN_4 Tabular', 'KNN_8 Tab and Image', 'Random Forest Tabular', 'XGBR Tab, NLP, Image', 'KNN_8 Tab, NLP, Image', 'KNN_15 Tab and NLP', 'NuSVR Tab and Image', 'Extra Trees Tab and Image', 'KNN_8 Tabular', 'Gradient Boost Tab and NLP', 'KNN_4 Tab and Image', 'Extra Trees Tab and NLP', 'XGBR Tab and Image', 'NuSVR Tab and NLP', 'Random Forest Tab and Image', 'XGBR Tabular', 'Gradient Boost Tab, NLP, Image']
```

```
Adding Extra Trees Tabular (1309, 1)
Adding NN Multi Input Preds (1309, 2)
Adding NN Tabular Only Preds (1309, 3)
Adding XGBR Tab and NLP (1309, 4)
Adding KNN_15 Tabular (1309, 5)
Adding Gradient Boost Tabular (1309, 6)
Adding Extra Trees Tab, NLP, Image (1309, 7)
Adding KNN_15 Tab and Image (1309, 8)
Adding Gradient Boost Tab and Image (1309, 9)
Adding KNN_8 Tab and NLP (1309, 10)
Adding NN CNN Image Only Preds (1309, 11)
Adding KNN_15 Tab, NLP, Image (1309, 12)
Starting mae: -0.12394
```

```
KNN_4 Tab, NLP, Image score: -0.1242
NN TL Image Only Preds score: -0.1242
Random Forest Tab, NLP, Image score: -0.1241
NN NLP Only Preds score: -0.124
KNN_4 Tab and NLP score: -0.1241
Random Forest Tab and NLP score: -0.124
NuSVR Tabular score: -0.1243
NuSVR Tab, NLP, Image score: -0.124
KNN_4 Tabular score: -0.1242
KNN_8 Tab and Image score: -0.1243
Random Forest Tabular score: -0.124
XGBR Tab, NLP, Image score: -0.1241
KNN_8 Tab, NLP, Image score: -0.1243
KNN_15 Tab and NLP score: -0.124
NuSVR Tab and Image score: -0.124
Extra Trees Tab and Image score: -0.1241
KNN_8 Tabular score: -0.1242
Gradient Boost Tab and NLP score: -0.1242
KNN_4 Tab and Image score: -0.1242
Extra Trees Tab and NLP score: -0.124
```

```
XGBR Tab and Image score: -0.1241
NuSVR Tab and NLP score: -0.1243
Random Forest Tab and Image score: -0.1241
XGBR Tabular score: -0.1241
Gradient Boost Tab, NLP, Image score: -0.1242
Best mae: -0.124
```

```
Linear Regression model optimized
resulting models: ['Extra Trees Tabular', 'NN Multi Input Preds', 'NN Tabular Only Preds', 'XGBR Tab and NLP', 'KNN_15 Tabular', 'Gradient Boost Tabular', 'Extra Trees Tab, NL P, Image', 'KNN_15 Tab and Image', 'Gradient Boost Tab and Image', 'KNN_8 Tab and NLP', 'NN CNN Image Only Preds', 'KNN_15 Tab, NLP, Image']
MAE: -0.12394
```

```
In [253...]: # make data frame from our models dictionary
target = pd.DataFrame(scores).reset_index(drop=True)
target.sort_values('MAE', ascending=False)
```

	Model	MAE	Included
3	NuSVR	-0.123086	[Extra Trees Tabular, NN Multi Input Preds, NN...
8	Linear Regression	-0.123940	[Extra Trees Tabular, NN Multi Input Preds, NN...
1	Random Forest	-0.124913	[Extra Trees Tabular, NuSVR Tabular, XGBR Tab,...
0	Extra Trees	-0.125580	[Extra Trees Tabular, NN Multi Input Preds, Nu...
7	KNN_15	-0.126760	[Extra Trees Tabular, NuSVR Tabular, XGBR Tab ...
5	KNN_8	-0.129250	[NuSVR Tabular, Extra Trees Tabular, XGBR Tab ...
4	Gradient Boost	-0.130272	[Extra Trees Tabular, Gradient Boost Tabular, ...
6	KNN_4	-0.133572	[Extra Trees Tabular, NN Multi Input Preds, Ex...
2	XGBR	-0.141794	[Extra Trees Tabular]

```
In [254...]: # What models are included in our lowest MAE model?
target.loc[0]['Included']
```

```
['Extra Trees Tabular',
 'NN Multi Input Preds',
 'NuSVR Tab and NLP',
 'Gradient Boost Tabular',
 'XGBR Tab and NLP',
 'KNN_15 Tab and Image',
 'XGBR Tab and Image',
 'KNN_15 Tabular',
 'NN TL Image Only Preds',
 'NuSVR Tabular',
 'Extra Trees Tab, NLP, Image',
 'KNN_4 Tab and NLP']
```

Final Ensemble and Predictions

```
In [255...]: # the validation predictions to include for fitting
included_val_predictions = {
    "Extra Trees Tabular": baseline_val_predictions['Extra Trees'],
```

```
"NN Multi Input Preds": multi_preds_val,
"NuSVR Tab and NLP":tab_nlp_val_predictions['NuSVR'],
"Gradient Boost Tabular": baseline_val_predictions['Gradient Boost'],
"XGBR Tab and NLP":tab_nlp_val_predictions['XGBR'],
"KNN_15 Tab and Image":tab_images_val_predictions['KNN_15'],
"XGBR Tab and Image": tab_images_val_predictions['XGBR'],
"KNN_15 Tabular": baseline_val_predictions['KNN_15'],
"NN TL Image Only Preds": inc_aug_val_preds,
"NuSVR Tabular": baseline_val_predictions['NuSVR'],
"Extra Trees Tab, NLP, Image": tab_images_nlp_val_predictions['Extra Trees'],
"KNN_8 Tab and NLP":tab_nlp_val_predictions['KNN_8'],
}
```

In [256]:

```
# the test predictions to include for predicting
included_test_predictions = {
    "Extra Trees Tabular": baseline_test_predictions['Extra Trees'],
    "NN Multi Input Preds": multi_preds_test,
    "NuSVR Tab and NLP":tab_nlp_test_predictions['NuSVR'],
    "Gradient Boost Tabular": baseline_test_predictions['Gradient Boost'],
    "XGBR Tab and NLP":tab_nlp_test_predictions['XGBR'],
    "KNN_15 Tab and Image":tab_images_test_predictions['KNN_15'],
    "XGBR Tab and Image": tab_images_test_predictions['XGBR'],
    "KNN_15 Tabular": baseline_test_predictions['KNN_15'],
    "NN TL Image Only Preds": inc_aug_test_preds,
    "NuSVR Tabular": baseline_test_predictions['NuSVR'],
    "Extra Trees Tab, NLP, Image": tab_images_nlp_test_predictions['Extra Trees'],
    "KNN_8 Tab and NLP":tab_nlp_test_predictions['KNN_8'],
}
```

In []:

```
not_included={
    "NN Tabular Only Preds" : tabular_val_preds,
    "NN NLP Only Preds": nlp_val_preds,
    "NN CNN Image Only Preds": cnn_aug_val_preds,
    "Extra Trees Tab and Image": tab_images_val_predictions['Extra Trees'],
    "Extra Trees Tab and NLP":tab_nlp_val_predictions['Extra Trees'],
    "Random Forest Tabular": baseline_val_predictions['Random Forest'],
    "Random Forest Tab and Image": tab_images_val_predictions['Random Forest'],
    "Random Forest Tab and NLP": tab_nlp_val_predictions['Random Forest'],
    "Random Forest Tab, NLP, Image":tab_images_nlp_val_predictions['Random Forest'],
    "XGBR Tabular": baseline_val_predictions['XGBR'],
    "XGBR Tab, NLP, Image":tab_images_nlp_val_predictions['XGBR'],
    "Gradient Boost Tab and Image":tab_images_val_predictions['Gradient Boost'],
    "Gradient Boost Tab and NLP":tab_nlp_val_predictions['Gradient Boost'],
    "Gradient Boost Tab, NLP, Image":tab_images_nlp_val_predictions['Gradient Boost'],
    "KNN_4 Tabular": baseline_val_predictions['KNN_4'],
    "KNN_4 Tab and Image":tab_images_val_predictions['KNN_4'],
    "KNN_4 Tab and NLP":tab_nlp_val_predictions['KNN_4'],
    "KNN_4 Tab, NLP, Image":tab_images_nlp_val_predictions['KNN_4'],
    "KNN_8 Tabular": baseline_val_predictions['KNN_8'],
    "KNN_8 Tab and Image":tab_images_val_predictions['KNN_8'],
    "KNN_8 Tab, NLP, Image":tab_images_nlp_val_predictions['KNN_8'],
    "KNN_15 Tab and NLP":tab_nlp_val_predictions['KNN_15'],
    "KNN_15 Tab, NLP, Image":tab_images_nlp_val_predictions['KNN_15'],
    "NuSVR Tab and Image":tab_images_val_predictions['NuSVR'],
    "NuSVR Tab, NLP, Image":tab_images_nlp_val_predictions['NuSVR'],
}
```

```
In [257...]: # stack included validation predictions into a feature set  
  
val_stack=None  
  
for included in included_val_predictions: # For each model included already in the stack  
  
    entry = np.array(included_val_predictions[included]).reshape(-1, 1) # make and reshape  
    if np.all(val_stack==None): val_stack = entry # if current_meta_x is none, set as t  
    else: val_stack = np.hstack((val_stack, entry)) # if a current_meta_x exists, append  
    print("Adding ",included, val_stack.shape)
```

```
Adding Extra Trees Tabular (1309, 1)  
Adding NN Multi Input Preds (1309, 2)  
Adding NuSVR Tab and NLP (1309, 3)  
Adding Gradient Boost Tabular (1309, 4)  
Adding XGBR Tab and NLP (1309, 5)  
Adding KNN_15 Tab and Image (1309, 6)  
Adding XGBR Tab and Image (1309, 7)  
Adding KNN_15 Tabular (1309, 8)  
Adding NN TL Image Only Preds (1309, 9)  
Adding NuSVR Tabular (1309, 10)  
Adding Extra Trees Tab, NLP, Image (1309, 11)  
Adding KNN_8 Tab and NLP (1309, 12)
```

```
In [258...]: # stack included test predictions into a feature set  
  
test_stack=None  
  
for included in included_test_predictions: # For each model included already in the stack  
  
    entry = np.array(included_test_predictions[included]).reshape(-1, 1) # make and reshape  
    if np.all(test_stack==None): test_stack = entry # if current_meta_x is none, set as t  
    else: test_stack = np.hstack((test_stack, entry)) # if a current_meta_x exists, append  
    print("Adding ",included, test_stack.shape)
```

```
Adding Extra Trees Tabular (1309, 1)  
Adding NN Multi Input Preds (1309, 2)  
Adding NuSVR Tab and NLP (1309, 3)  
Adding Gradient Boost Tabular (1309, 4)  
Adding XGBR Tab and NLP (1309, 5)  
Adding KNN_15 Tab and Image (1309, 6)  
Adding XGBR Tab and Image (1309, 7)  
Adding KNN_15 Tabular (1309, 8)  
Adding NN TL Image Only Preds (1309, 9)  
Adding NuSVR Tabular (1309, 10)  
Adding Extra Trees Tab, NLP, Image (1309, 11)  
Adding KNN_8 Tab and NLP (1309, 12)
```

```
In [259...]: # instantiate our meta model  
  
nu_svr = NuSVR(gamma='auto', kernel='rbf')  
  
# fit on validation stack and predict on test stack  
nu_svr.fit(val_stack, y_val)  
preds = nu_svr.predict(test_stack)
```

```
In [260...]: # score our tuned model on the test set, this is our final score
```

```

pred_exp = np.exp(preds)
y_actual = np.exp(y_test)

print("Final Ensembled Predictions")
print("MAE: ",int(mean_absolute_error(pred_exp, y_actual)))
print("RMSE:",int(np.sqrt(mean_squared_error(pred_exp, y_actual))))
print("R2:", r2_score(pred_exp, y_actual)*100)

```

```

Final Ensembled Predictions
MAE: 56407
RMSE: 94786
R2: 75.7790164485249

```

In []:

```
break
```

Analysis

Our final model utilizes a wide combination of continuous variables, one-hot-encoded categoricals, extracted image features, and extracted word embeddings to produce an ensembled model with a mean absolute error of 56.4k and a root mean squared error of 94.8k. This MAE is a huge 8.59% improvement over the 61.7k MAE baseline prediction using a single best tuned model, which did not include listing description NLP or image features. The categorical features were processed with a combination of target encoding and one-hot encoding. The text description features were vector embedded using the pre-trained Stanford GloVe 300d word embeddings NLP model. The images were processed using the pre-trained Google InceptionV3 image classification model. The final model was produced using model ensembling which included a mixture of neural networks, standard models, and image/text extracted features from the aforementioned pre-trained GloVe and InceptionV3 models.



What are the primary factors influencing housing prices in the Austin metro area?

Square footage is, unsurprisingly, a key player in house pricing. House prices rise in a near-linear fashion with square footage - at least for the bottom 75% of zip codes. There is a key point where the zip code causes the price per square foot to rise sharply. The following image demonstrates this in a scatter of price per square feet, colored by zip code rank based on zip code median sales price. The darkest zip code medians exhibit the strongest breakaway in price as square footage rises, while the lighter yellow, orange, red and even purple ranks are relatively linear.



And as they say, location is everything, and it is the primary influencing factor for a home price in the Austin metro area. This scatter of latitude and longitude for the greater Austin area, colored by price, shows quite clearly how prices reduce as the location moves further from the city center into the suburbs.



Number of bathrooms, school rating, and lot size all contributed a large amount as well.

What home elements from the listing descriptions are important to the price?

To determine features that we should highlight in the listings, we determine features that have relevance to the home price. If they DO exist, these features should be mentioned in our listing descriptions.

Home features: sprinkler system, pool, hardwood, laminate, main (master on the main?), tankless water heater, stainless steel appliances, office, built ins, breakfast bar, washer/dryer, garden tub, wine cellar, gourmet kitchen, fire pit, marble

Location elements: areas such as Barton and Zilker, easy access, conveniently located, restaurant, airport, nature, hiking, bike trail, walkable, lake

Exterior words: country, corner lot, view, south (facings)

Descriptive elements: natural light (abundance, ton), open concept, move in ready, community, fresh paint, luxury, brand new, condo, original

In this image, words are sized according to their importance for the model, showing us quite clearly the descriptors that matter. They should be used in the description, when accurate.  important words

It is important to note here that the text feature importances don't necessarily imply causality. Sprinkler Systems, for example, may simply be a feature common to more expensive houses, and therefore be considered important by the model while not necessarily contributing an increase in price on their own. Where we can particularly leverage this information is for informing our photographs.

Do housing images contribute to predictive power?

The features that we extracted from the InceptionV3 pre-trained model were considered important to the model and were used in the ensemble. Unfortunately, this process results in low explainability, and we're not sure HOW or WHY they were important to the model. Anecdotally however, we know that pictures are important, so we could use what we learn about other important model features to inform the things that we picture in the listings. For example some home features that were important are a fire pit, or a garden tub - ensure that pictures of the bathroom or outdoors centrally show and highlight this feature. For exterior features like a corner lot or a view, get a quality shot that really emphasizes this orientation. And since we know that location is everything and that words such as hiking, biking, walkable are important, take shots if possible that emphasize green space or nature on or near the property. A picture of a walkable local park or community pool for example wouldn't be out of place, and would help highlight descriptors that were flagged as important.

Can we effectively use a regression model based system for realtors to determine a proper list price?

Our model, while explaining about 76% of the price variance with our features, was nonetheless far from accurate in absolute terms. A mean average error of 56.4k in either direction is a huge variance to a home price - one that is so large that it renders the prediction much less meaningful and useful. Other models need to be explored, better data needs to be sourced, or easy-to-use features that an average realtor is capable of evaluating/acquiring should be added to the model to improve its predictive quality. The model is providing at best a baseline starting point.

What are the features missing?

I believe this data set to be missing some key features that have high influence in other housing sets, foremost among them reasonable metrics of home condition, home quality, and neighborhood quality. Other data sets that focus on home prices and include quality of build materials and home condition (see [King County Dataset](#)) can achieve a higher R^2 and lower MAE. We attempted to pick up some of the quality and condition metrics via NLP. While the NLP did contribute to the model, it was insufficient to explain all of these missing metrics.

We'd also benefit greatly from the addition of google satellite images of the property and surrounding neighborhood. This would provide a great visual of the "green" spaces and walkability of a property.

Future Work

- Custom generators with Image Data Augmentation - We currently only used image augmentation in the singular NN image model. If I take the time to create and understand custom generators, I could integrate image data augmentation into the multi-input neural network.
- Model Explainability - Image details and information are lacking. We know that images are important, but we don't know how. We could explore other image features methods such as: Getting the dominant colors of an image (looking for green space?), measuring an image's entropy, or pulling satellite imagery of the address via Google and using those images instead or in addition to the MLS images.
- "Snapshot" Ensembling - Creates model snapshots at every local minima which can then be used to add to the ensembling stack. The method involves a cyclical learning rate which has the model "escape" when it reaches a minima and find a new one. Each minima will be looking at the model data in a different way and carry different errors and biases, which is a key strength of model ensembling.
- To take this model to deployment - Instead of using validation set, fit and predict the included predictions types on the entire data set using out-of-fold predictions with a 10-fold, then stack those predictions and fit on those for a final deployment model.

Supplementary Visuals

Creating a word cloud from single n-grams

In [228...]

```
# prepare the vectorizer with the chosen parameters
tfidf_proc_1only = TfidfVectorizer(sublinear_tf=True, use_idf=True, max_df=0.9, min_df=.

# fit the vectorizer to the train data, transform train and holdout
one_vectors = tfidf_proc_1only.fit_transform(listing_desc['sentences'])

# cast the vector array to a data frame with columns named by the features selected by
visual_vectors_df = pd.DataFrame(one_vectors.toarray(), columns=tfidf_proc_1only.get_fea
```

ERROR! Session/line number was not unique in database. History logging moved to new session 3480

In [352...]

```
# Run permutation importance on the TF-IDF vectors

y = df['price']

model = LinearRegression()
model.fit(visual_vectors_df, y)

from sklearn.inspection import permutation_importance
r = permutation_importance(model, visual_vectors_df, y,
                            n_repeats=10,
                            random_state=0,
                            n_jobs=-1)

single_importances = {}

for i in r.importances_mean.argsort()[:-1]:
    if r.importances_mean[i] >= 0.001:
        single_importances[visual_vectors_df.columns[i]] = r.importances_mean[i]
    else: continue

print(single_importances)
single_importances_ngrams = list(single_importances.keys())
print(single_importances_ngrams)
```

ERROR! Session/line number was not unique in database. History logging moved to new session 3496

```
{'zilker': 0.015321390020647386, 'default': 0.014507770303532851, 'barton': 0.0119306883
31420691, 'pool': 0.010705719259307056, 'community': 0.009056661643714315, 'outdoor': 0.
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```

```
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s': 0.0010650304478034723, 'easy': 0.001061673263346885, 'unique': 0.001060748633148300  
7, 'glass': 0.0010596824082409362, 'garden': 0.0010585108269001275, 'spacious': 0.001053  
0272531611095, 'steiner': 0.0010456282160733576, 'playground': 0.001031289724433737, 'ad  
orable': 0.0010287117078037976, 'window': 0.0010277462241207957}  
['zilker', 'default', 'barton', 'pool', 'community', 'outdoor', 'design', 'lake', 'vie  
w', 'congress', 'wine', 'heart', 'condo', 'luxury', 'laminate', 'height', 'builtin', 'ma  
in', 'south', 'northwest', 'detach', 'guest', 'marble', 'flat', 'courtyard', 'classic',  
'chef', 'level', 'ut', 'gourmet', 'tankless', 'hardwood', 'isd', 'tile', 'west', 'constr  
uction', 'washer', 'finish', 'modern', 'counter', 'great', 'office', 'original', 'vanit  
y', 'east', 'custom', 'investment', 'vinyl', 'sysye', 'minute', 'cover', 'central', 'add  
ition', 'north', 'suite', 'private', 'convenient', 'contemporary', 'set', 'airport', 'ca  
r', 'house', 'desirable', 'build', 'downstairs', 'heater', 'true', 'mile', 'close', 'lux  
urious', 'investor', 'quality', 'charm', 'medium', 'island', 'city', 'gate', 'restauran  
t', 'price', 'stainless', 'flow', 'shed', 'appliance', 'travis', 'easy', 'unique', 'glas  
s', 'garden', 'spacious', 'steiner', 'playground', 'adorable', 'window']
```

In [353...]

```
# pop off 'default'  
del single_importances['default']
```

ERROR! Session/line number was not unique in database. History logging moved to new sess
ion 3497

In [354...]

```
from wordcloud import WordCloud  
from PIL import Image  
  
mask = np.array(Image.open("images/house.png"))  
wordcloud = WordCloud(background_color="white", width=2000, height=2000, mask=mask, max  
plt.figure(figsize=[25,25])  
  
plt.imshow(wordcloud, interpolation = 'bilinear')  
  
plt.axis('off')  
  
plt.savefig('images/listing_words.png')  
  
plt.show();
```



Create a word cloud from the 1-3 n-grams used in the model

In [261...]

```
# prepare the vectorizer with the chosen parameters
tfid_proc_13 = TfidfVectorizer(sublinear_tf=True, use_idf=True, max_df=0.9, min_df=.01)

# fit the vectorizer to the train data, transform train and holdout
vectors_13 = tfid_proc_13.fit_transform(listing_desc['sentences'])

# cast the vector array to a data frame with columns named by the features selected by
vectors_13_df = pd.DataFrame(vectors_13.toarray(), columns=tfid_proc_13.get_feature_names)
```

In [355...]

```
# Run permutation importance on the TF-IDF vectors
```

```
model = LinearRegression()  
model.fit(vectors 13 df, y)
```

```
from sklearn.inspection import permutation_importance
r = permutation_importance(model, vectors_13_df, y,
```

```

        n_repeats=10,
        random_state=0,
        n_jobs=-1)

importances = {}

for i in r.importances_mean.argsort()[:-1]:
    if r.importances_mean[i] >= 0.002:
        importances[vectors_13_df.columns[i]] = r.importances_mean[i]
    else: continue

print(importances)
important_ngrams = list(importances.keys())
print(important_ngrams)

{'sprinkler sysye': 8.180080807227547e+23, 'sysye': 8.1800808072269e+23, 'vault ceiling': 0.02556312556197158, 'vault': 0.021309609520117467, 'gourmet kitchen': 0.018595421652611455, 'pool': 0.018159748279784015, 'default': 0.016328017084574355, 'stainless steel': 0.014761540540613427, 'country': 0.01309484587709342, 'main': 0.012529873568010452, 'zilker': 0.012212283182183658, 'barton': 0.012025242226006672, 'hill country': 0.01135333101068319, 'steel': 0.010483544573855808, 'design': 0.008994766258049514, 'tankless water heater': 0.0070531958202651015, 'gourmet': 0.006965267737362957, 'conveniently': 0.006355680195696034, 'lake': 0.006237175209067502, 'view': 0.00619649222924048, 'heart': 0.00602475101461456, 'washer': 0.005992559554098631, 'outdoor': 0.005758934982660025, 'luxury': 0.005613910611223749, 'congress': 0.005355906801875443, 'community': 0.0052495633543313104, 'level': 0.005239397864951678, 'garden tub': 0.005019334300973888, 'access m opac': 0.0048017080958215105, 'ton natural light': 0.0044365690630448155, 'conveniently locate': 0.0043686195272144126, 'hardwood': 0.004113195475012732, 'washer dryer': 0.004076165260021603, 'wine': 0.004045711680193154, 'ut': 0.004008923314541946, 'isd': 0.003907370066114135, 'guest': 0.00387896380896835, 'detach': 0.0038203964927471913, 'tile': 0.0036709300459513926, 'height': 0.0036229341454963814, 'condo': 0.003557320549153953, 'builtin': 0.0035351655011268577, 'tennis court': 0.0035291354954855468, 'marble': 0.0033053634948295605, 'easy access mopac': 0.003261873875350807, 'steel appliance': 0.0032510942483464757, 'classic': 0.0031832550306123085, 'laminate': 0.0030555469906421327, 'courtyard': 0.003024283048381926, 'minute': 0.002998949292585429, 'ton natural': 0.0029845309071571346, 'brand new': 0.002962067658255052, 'hill': 0.0029196359524520155, 'park pool': 0.0028815627489939487, 'south': 0.0027680462729852582, 'convenient': 0.0027675588970365594, 'wood': 0.002652506085564199, 'northwest': 0.0026426253791214773, 'natural': 0.0026297647662860022, 'large corner lot': 0.002597062954363538, 'freshly paint': 0.0025908247023814224, 'soak tub': 0.0025875734716551578, 'restaurant': 0.0025469533678268543, 'large corner': 0.002525766467457147, 'fan': 0.002507867795648, 'quartz': 0.0024234094594323243, 'stainless steel appliance': 0.00240888787373601, 'open concept': 0.002390206374870596, 'island': 0.0023636546276367466, 'chef kitchen': 0.002345138795510504, 'office': 0.0023407988853219484, 'avery': 0.0023394164779556247, 'great': 0.0023383619174768833, 'away': 0.0023381797564296924, 'master suite': 0.0022816944500045123, 'custom': 0.002244174744653804, 'main level': 0.0022373343569174198, 'bath': 0.0022175415763941776, 'formal': 0.002198737930753736, 'community pool': 0.0021984385673290753, 'investment': 0.0021825616617401123, 'easy access': 0.002089291600036258, 'water': 0.0020873423940673264, 'water': 0.0020841681335223793, 'nt long': 0.0020749818819433053, 'west': 0.0020293650498036664}
['sprinkler sysye', 'sysye', 'vault ceiling', 'vault', 'gourmet kitchen', 'pool', 'default', 'stainless steel', 'country', 'main', 'zilker', 'barton', 'hill country', 'steel', 'design', 'tankless water heater', 'gourmet', 'conveniently', 'lake', 'view', 'heart', 'washer', 'outdoor', 'luxury', 'congress', 'community', 'level', 'garden tub', 'access m opac', 'ton natural light', 'conveniently locate', 'hardwood', 'washer dryer', 'wine', 'ut', 'isd', 'guest', 'detach', 'tile', 'height', 'condo', 'builtin', 'tennis court', 'marble', 'easy access mopac', 'steel appliance', 'classic', 'laminate', 'courtyard', 'minute', 'ton natural', 'brand new', 'hill', 'park pool', 'south', 'convenient', 'wood', 'northwest', 'natural', 'large corner lot', 'freshly paint', 'soak tub', 'restaurant', 'large corner', 'fan', 'quartz', 'stainless steel appliance', 'open concept', 'island', 'chef kitchen', 'office', 'avery', 'great', 'away', 'master suite', 'custom', 'main level', 'nt long', 'west']

```

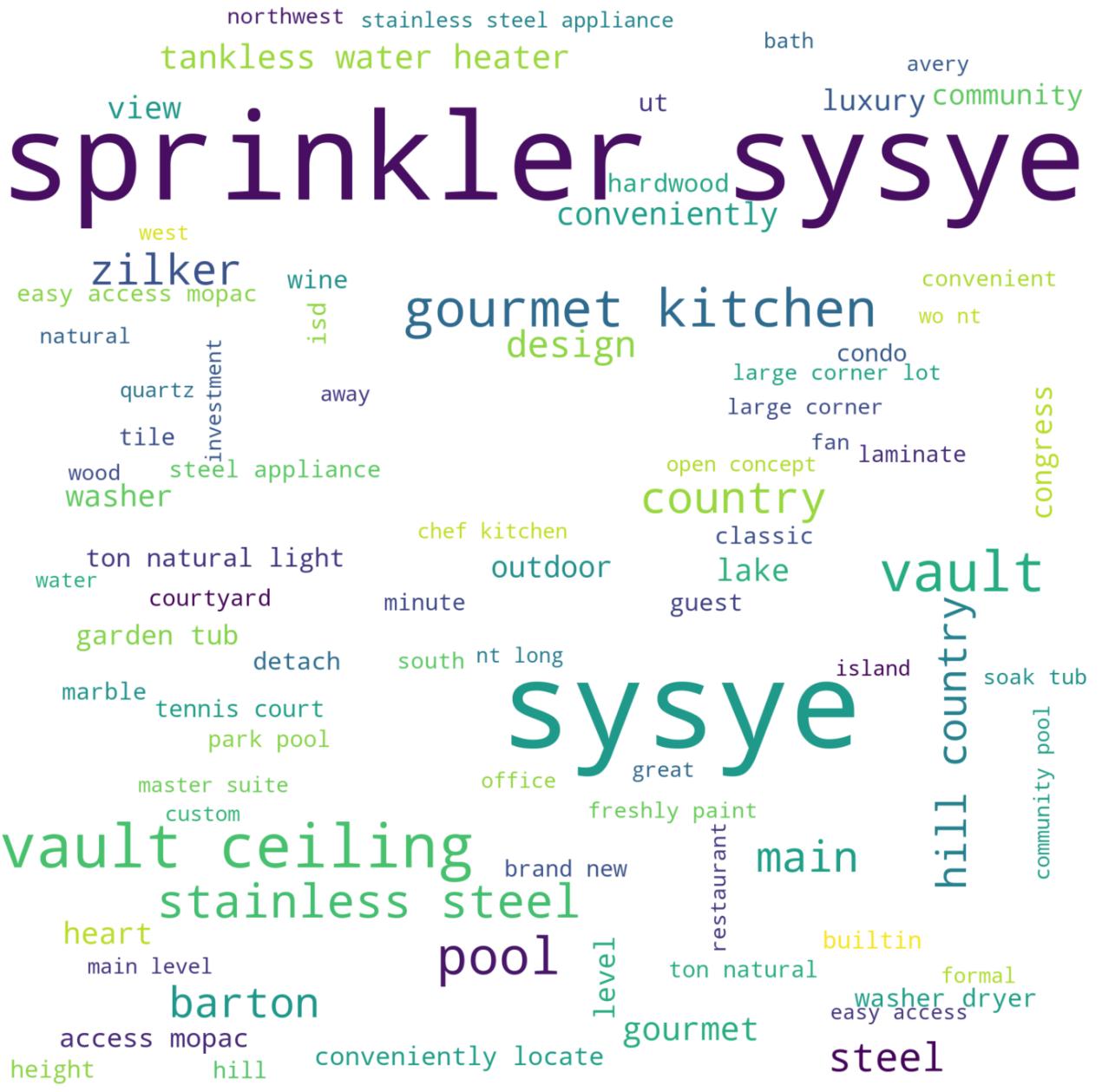
```
'bath', 'formal', 'community pool', 'investment', 'easy access', 'wo nt', 'water', 'nt l  
ong', 'west']
```

In [356...]

```
# Pop off 'default'  
del importances['default']
```

In [365...]

```
mask = np.array(Image.open("images/house.png"))  
wordcloud = WordCloud(background_color="white", width=2000, height=2000, max_words=500,  
plt.figure(figsize=[25,25])  
plt.imshow(wordcloud, interpolation = 'bilinear')  
plt.axis('off')  
plt.savefig('images/listing_grams_house.png')  
plt.show()  
;
```



Out[365...]

We'll use the single n-grams in a visual

APPENDIX

Neural Network Training and Tuning

In [165...]

```
# prepare a new dictionary to store neural net score results  
  
neural_networks = {}  
neural_networks['model'] = []  
neural_networks['r2'] = []  
neural_networks['mae'] = []  
neural_networks['rmse'] = []
```

ERROR! Session/line number was not unique in database. History logging moved to new sess

```
ion 3460
```

Tabular Model

```
In [166...]
```

```
# define a list of layer combos to try out
layers_to_try = [
    [1024, 512, 256, 128, 64, 32, 16, 8, 4],
    [512, 256, 128, 64, 32, 16, 8, 4],
    [128, 64, 32, 16, 8, 4],
    [64, 32, 16, 8, 4], # best
    [1024, 512, 256, 128, 64, 32, 16], #5
    [64, 64, 64],
    [128, 64],
    [512, 128, 32, 8],
    [1024, 512, 256],
    [256, 256, 256], #10
    [128, 128, 128],
    [64, 64, 64],
    [265, 128, 64],
    [1024, 1024, 1024],
    [512, 512, 512], #15
    [128, 128, 128, 128],
    [256, 256, 256, 256],
    [100, 100, 100, 100],
    [128, 128, 64, 64, 32, 32],
    [64, 64, 64, 64], #20
    [32, 32, 32, 32, 32],
    [64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64],
    [64, 64, 64, 64, 64, 64, 64, 64], #24
    [32, 32, 32, 32, 32, 32, 32, 32]
]
```

```
In [167...]
```

```
model_num = 0

# try all of our layer combos and append to our model scores list
for layer in layers_to_try:
    model_num += 1
    layers_list = layer
    label='Neural Net Baseline '+str(model_num)
    neural_networks = mlp_test(X_train_tabular, y_train, X_val_tabular, y_val, label, n
```

```
Adding initial Dense layers with 1024
Adding Dense layer with 512
Adding Dense layer with 256
Adding Dense layer with 128
Adding Dense layer with 64
Adding Dense layer with 32
Adding Dense layer with 16
Adding Dense layer with 8
Adding last layer with 4
Outputting predictive model - Tabular
Model: "model_54"
```

Layer (type)	Output Shape	Param #
input_55 (InputLayer)	[(None, 61)]	0
dense_412 (Dense)	(None, 1024)	63488

dense_413 (Dense)	(None, 512)	524800
dense_414 (Dense)	(None, 256)	131328
dense_415 (Dense)	(None, 128)	32896
dense_416 (Dense)	(None, 64)	8256
dense_417 (Dense)	(None, 32)	2080
dense_418 (Dense)	(None, 16)	528
dense_419 (Dense)	(None, 8)	136
dense_420 (Dense)	(None, 4)	36
dense_421 (Dense)	(None, 1)	5

Total params: 763,553

Trainable params: 763,553

Non-trainable params: 0

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

9888/10471 [=====>..] - ETA: 0s - loss: 3.7944 - mean_absolute_error: 3.7944 - mean_squared_error: 40.0558

Epoch 00001: val_loss improved from inf to 0.19418, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 131us/sample - loss: 3.5982 - mean_absolute_error: 3.5903 - mean_squared_error: 37.7422 - val_loss: 0.1942 - val_mean_absolute_error: 0.1941 - val_mean_squared_error: 0.0704

Epoch 2/500

10144/10471 [=====>..] - ETA: 0s - loss: 0.2004 - mean_absolute_error: 0.2004 - mean_squared_error: 0.0706

Epoch 00002: val_loss improved from 0.19418 to 0.16176, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 84us/sample - loss: 0.1990 - mean_absolute_error: 0.1987 - mean_squared_error: 0.0700 - val_loss: 0.1618 - val_mean_absolute_error: 0.1618 - val_mean_squared_error: 0.0518

Epoch 3/500

9888/10471 [=====>..] - ETA: 0s - loss: 0.1636 - mean_absolute_error: 0.1636 - mean_squared_error: 0.0513

Epoch 00003: val_loss did not improve from 0.16176

10471/10471 [=====] - 1s 77us/sample - loss: 0.1633 - mean_absolute_error: 0.1633 - mean_squared_error: 0.0512 - val_loss: 0.1888 - val_mean_absolute_error: 0.1887 - val_mean_squared_error: 0.0671

Epoch 4/500

10464/10471 [=====>..] - ETA: 0s - loss: 0.1606 - mean_absolute_error: 0.1606 - mean_squared_error: 0.0502

Epoch 00004: val_loss did not improve from 0.16176

10471/10471 [=====] - 1s 78us/sample - loss: 0.1606 - mean_absolute_error: 0.1605 - mean_squared_error: 0.0501 - val_loss: 0.1755 - val_mean_absolute_error: 0.1754 - val_mean_squared_error: 0.0582

Epoch 5/500

9824/10471 [=====>..] - ETA: 0s - loss: 0.1558 - mean_absolute_error: 0.1558 - mean_squared_error: 0.0482

Epoch 00005: val_loss did not improve from 0.16176

10471/10471 [=====] - 1s 78us/sample - loss: 0.1564 - mean_absolute_error: 0.1564 - mean_squared_error: 0.0482

```
lute_error: 0.1562 - mean_squared_error: 0.0485 - val_loss: 0.1940 - val_mean_absolute_e
rror: 0.1941 - val_mean_squared_error: 0.0614
Epoch 6/500
 9984/10471 [=====>..] - ETA: 0s - loss: 0.1638 - mean_absolute_er
ror: 0.1638 - mean_squared_error: 0.0506
Epoch 00006: val_loss improved from 0.16176 to 0.15059, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 81us/sample - loss: 0.1639 - mean_abso
lute_error: 0.1638 - mean_squared_error: 0.0507 - val_loss: 0.1506 - val_mean_absolute_e
rror: 0.1506 - val_mean_squared_error: 0.0458
Epoch 7/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1470 - mean_absolute_er
ror: 0.1470 - mean_squared_error: 0.0435
Epoch 00007: val_loss did not improve from 0.15059
10471/10471 [=====] - 1s 79us/sample - loss: 0.1473 - mean_abso
lute_error: 0.1471 - mean_squared_error: 0.0436 - val_loss: 0.1685 - val_mean_absolute_e
rror: 0.1684 - val_mean_squared_error: 0.0551
Epoch 8/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1479 - mean_absolute_er
ror: 0.1479 - mean_squared_error: 0.0440
Epoch 00008: val_loss improved from 0.15059 to 0.14705, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 84us/sample - loss: 0.1479 - mean_abso
lute_error: 0.1480 - mean_squared_error: 0.0440 - val_loss: 0.1470 - val_mean_absolute_e
rror: 0.1471 - val_mean_squared_error: 0.0439
Epoch 9/500
 9856/10471 [=====>..] - ETA: 0s - loss: 0.1456 - mean_absolute_er
ror: 0.1456 - mean_squared_error: 0.0431
Epoch 00009: val_loss improved from 0.14705 to 0.14272, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 82us/sample - loss: 0.1447 - mean_abso
lute_error: 0.1446 - mean_squared_error: 0.0428 - val_loss: 0.1427 - val_mean_absolute_e
rror: 0.1427 - val_mean_squared_error: 0.0451
Epoch 10/500
 9824/10471 [=====>..] - ETA: 0s - loss: 0.1460 - mean_absolute_er
ror: 0.1460 - mean_squared_error: 0.0447
Epoch 00010: val_loss did not improve from 0.14272
10471/10471 [=====] - 1s 78us/sample - loss: 0.1454 - mean_abso
lute_error: 0.1452 - mean_squared_error: 0.0441 - val_loss: 0.1441 - val_mean_absolute_e
rror: 0.1440 - val_mean_squared_error: 0.0439
Epoch 11/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.1444 - mean_absolute_er
ror: 0.1444 - mean_squared_error: 0.0424
Epoch 00011: val_loss improved from 0.14272 to 0.13998, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 82us/sample - loss: 0.1444 - mean_abso
lute_error: 0.1444 - mean_squared_error: 0.0424 - val_loss: 0.1400 - val_mean_absolute_e
rror: 0.1400 - val_mean_squared_error: 0.0416
Epoch 12/500
 9856/10471 [=====>..] - ETA: 0s - loss: 0.1330 - mean_absolute_er
ror: 0.1330 - mean_squared_error: 0.0378
Epoch 00012: val_loss did not improve from 0.13998
10471/10471 [=====] - 1s 77us/sample - loss: 0.1329 - mean_abso
lute_error: 0.1331 - mean_squared_error: 0.0381 - val_loss: 0.1426 - val_mean_absolute_e
rror: 0.1426 - val_mean_squared_error: 0.0424
Epoch 13/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1355 - mean_absolute_er
ror: 0.1355 - mean_squared_error: 0.0387
Epoch 00013: val_loss improved from 0.13998 to 0.13945, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 84us/sample - loss: 0.1355 - mean_abso
```

lute_error: 0.1356 - mean_squared_error: 0.0386 - val_loss: 0.1394 - val_mean_absolute_error: 0.1394 - val_mean_squared_error: 0.0418

Epoch 14/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1280 - mean_absolute_error: 0.1280 - mean_squared_error: 0.0363

Epoch 00014: val_loss did not improve from 0.13945

10471/10471 [=====] - 1s 78us/sample - loss: 0.1290 - mean_absolute_error: 0.1289 - mean_squared_error: 0.0363 - val_loss: 0.2064 - val_mean_absolute_error: 0.2063 - val_mean_squared_error: 0.0712

Epoch 15/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1322 - mean_absolute_error: 0.1322 - mean_squared_error: 0.0378

Epoch 00015: val_loss did not improve from 0.13945

10471/10471 [=====] - 1s 78us/sample - loss: 0.1339 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0383 - val_loss: 0.1779 - val_mean_absolute_error: 0.1779 - val_mean_squared_error: 0.0586

Epoch 16/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1330 - mean_absolute_error: 0.1330 - mean_squared_error: 0.0374

Epoch 00016: val_loss did not improve from 0.13945

10471/10471 [=====] - 1s 77us/sample - loss: 0.1326 - mean_absolute_error: 0.1325 - mean_squared_error: 0.0370 - val_loss: 0.1645 - val_mean_absolute_error: 0.1646 - val_mean_squared_error: 0.0504

Epoch 17/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1315 - mean_absolute_error: 0.1315 - mean_squared_error: 0.0370

Epoch 00017: val_loss did not improve from 0.13945

10471/10471 [=====] - 1s 77us/sample - loss: 0.1311 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0366 - val_loss: 0.1421 - val_mean_absolute_error: 0.1421 - val_mean_squared_error: 0.0408

Epoch 18/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1220 - mean_absolute_error: 0.1220 - mean_squared_error: 0.0333

Epoch 00018: val_loss did not improve from 0.13945

10471/10471 [=====] - 1s 78us/sample - loss: 0.1220 - mean_absolute_error: 0.1219 - mean_squared_error: 0.0335 - val_loss: 0.1683 - val_mean_absolute_error: 0.1683 - val_mean_squared_error: 0.0528

Epoch 19/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1253 - mean_absolute_error: 0.1253 - mean_squared_error: 0.0340

Epoch 00019: val_loss did not improve from 0.13945

10471/10471 [=====] - 1s 76us/sample - loss: 0.1260 - mean_absolute_error: 0.1259 - mean_squared_error: 0.0344 - val_loss: 0.1906 - val_mean_absolute_error: 0.1905 - val_mean_squared_error: 0.0631

Epoch 20/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1200 - mean_absolute_error: 0.1200 - mean_squared_error: 0.0319

Epoch 00020: val_loss did not improve from 0.13945

10471/10471 [=====] - 1s 76us/sample - loss: 0.1208 - mean_absolute_error: 0.1208 - mean_squared_error: 0.0322 - val_loss: 0.2237 - val_mean_absolute_error: 0.2237 - val_mean_squared_error: 0.0902

Epoch 21/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1235 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0332

Epoch 00021: val_loss did not improve from 0.13945

10471/10471 [=====] - 1s 80us/sample - loss: 0.1235 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0332 - val_loss: 0.1577 - val_mean_absolute_error: 0.1577 - val_mean_squared_error: 0.0483

Epoch 22/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1236 - mean_absolute_error: 0.1236 - mean_squared_error: 0.0326

```
Epoch 00022: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 77us/sample - loss: 0.1237 - mean_absolute_error: 0.1241 - mean_squared_error: 0.0329 - val_loss: 0.1654 - val_mean_absolute_error: 0.1654 - val_mean_squared_error: 0.0500
Epoch 23/500
    9824/10471 [=====>..] - ETA: 0s - loss: 0.1180 - mean_absolute_error: 0.1180 - mean_squared_error: 0.0308
Epoch 00023: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 78us/sample - loss: 0.1192 - mean_absolute_error: 0.1193 - mean_squared_error: 0.0312 - val_loss: 0.1633 - val_mean_absolute_error: 0.1633 - val_mean_squared_error: 0.0512
Epoch 24/500
    10080/10471 [=====>..] - ETA: 0s - loss: 0.1145 - mean_absolute_error: 0.1145 - mean_squared_error: 0.0292
Epoch 00024: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 76us/sample - loss: 0.1149 - mean_absolute_error: 0.1151 - mean_squared_error: 0.0296 - val_loss: 0.1528 - val_mean_absolute_error: 0.1528 - val_mean_squared_error: 0.0459
Epoch 25/500
    10240/10471 [=====>.] - ETA: 0s - loss: 0.1141 - mean_absolute_error: 0.1141 - mean_squared_error: 0.0288
Epoch 00025: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 75us/sample - loss: 0.1137 - mean_absolute_error: 0.1137 - mean_squared_error: 0.0290 - val_loss: 0.1476 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0455
Epoch 26/500
    10144/10471 [=====>.] - ETA: 0s - loss: 0.1150 - mean_absolute_error: 0.1150 - mean_squared_error: 0.0290
Epoch 00026: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 75us/sample - loss: 0.1159 - mean_absolute_error: 0.1160 - mean_squared_error: 0.0294 - val_loss: 0.1998 - val_mean_absolute_error: 0.1997 - val_mean_squared_error: 0.0676
Epoch 27/500
    9952/10471 [=====>..] - ETA: 0s - loss: 0.1130 - mean_absolute_error: 0.1130 - mean_squared_error: 0.0281
Epoch 00027: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 76us/sample - loss: 0.1127 - mean_absolute_error: 0.1128 - mean_squared_error: 0.0281 - val_loss: 0.1444 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0428
Epoch 28/500
    10016/10471 [=====>..] - ETA: 0s - loss: 0.1191 - mean_absolute_error: 0.1191 - mean_squared_error: 0.0302
Epoch 00028: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 76us/sample - loss: 0.1195 - mean_absolute_error: 0.1196 - mean_squared_error: 0.0302 - val_loss: 0.1967 - val_mean_absolute_error: 0.1968 - val_mean_squared_error: 0.0668
Epoch 29/500
    10432/10471 [=====>.] - ETA: 0s - loss: 0.1085 - mean_absolute_error: 0.1085 - mean_squared_error: 0.0266
Epoch 00029: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 78us/sample - loss: 0.1086 - mean_absolute_error: 0.1086 - mean_squared_error: 0.0266 - val_loss: 0.1598 - val_mean_absolute_error: 0.1597 - val_mean_squared_error: 0.0512
Epoch 30/500
    10432/10471 [=====>.] - ETA: 0s - loss: 0.1065 - mean_absolute_error: 0.1065 - mean_squared_error: 0.0260
Epoch 00030: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 79us/sample - loss: 0.1063 - mean_absolute_error: 0.1063 - mean_squared_error: 0.0258 - val_loss: 0.1546 - val_mean_absolute_error: 0.1546 - val_mean_squared_error: 0.0455
Epoch 31/500
```

```
9888/10471 [=====>..] - ETA: 0s - loss: 0.1048 - mean_absolute_error: 0.1048 - mean_squared_error: 0.0252
Epoch 00031: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 78us/sample - loss: 0.1049 - mean_absolute_error: 0.1050 - mean_squared_error: 0.0252 - val_loss: 0.1435 - val_mean_absolute_error: 0.1435 - val_mean_squared_error: 0.0429
Epoch 32/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1075 - mean_absolute_error: 0.1075 - mean_squared_error: 0.0259
Epoch 00032: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 79us/sample - loss: 0.1077 - mean_absolute_error: 0.1077 - mean_squared_error: 0.0260 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0458
Epoch 33/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1040 - mean_absolute_error: 0.1040 - mean_squared_error: 0.0245
Epoch 00033: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 80us/sample - loss: 0.1042 - mean_absolute_error: 0.1040 - mean_squared_error: 0.0245 - val_loss: 0.1706 - val_mean_absolute_error: 0.1705 - val_mean_squared_error: 0.0560
Epoch 34/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1029 - mean_absolute_error: 0.1029 - mean_squared_error: 0.0242
Epoch 00034: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 81us/sample - loss: 0.1027 - mean_absolute_error: 0.1027 - mean_squared_error: 0.0241 - val_loss: 0.1772 - val_mean_absolute_error: 0.1773 - val_mean_squared_error: 0.0554
Epoch 35/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.1042 - mean_absolute_error: 0.1042 - mean_squared_error: 0.0243
Epoch 00035: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 79us/sample - loss: 0.1042 - mean_absolute_error: 0.1043 - mean_squared_error: 0.0242 - val_loss: 0.1761 - val_mean_absolute_error: 0.1762 - val_mean_squared_error: 0.0555
Epoch 36/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1083 - mean_absolute_error: 0.1083 - mean_squared_error: 0.0251
Epoch 00036: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 77us/sample - loss: 0.1076 - mean_absolute_error: 0.1076 - mean_squared_error: 0.0247 - val_loss: 0.1831 - val_mean_absolute_error: 0.1832 - val_mean_squared_error: 0.0597
Epoch 37/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1020 - mean_absolute_error: 0.1020 - mean_squared_error: 0.0231
Epoch 00037: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 79us/sample - loss: 0.1020 - mean_absolute_error: 0.1020 - mean_squared_error: 0.0230 - val_loss: 0.1423 - val_mean_absolute_error: 0.1423 - val_mean_squared_error: 0.0436
Epoch 38/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.0950 - mean_absolute_error: 0.0950 - mean_squared_error: 0.0211Restoring model weights from the end of the best epoch.

Epoch 00038: val_loss did not improve from 0.13945
10471/10471 [=====] - 1s 82us/sample - loss: 0.0950 - mean_absolute_error: 0.0949 - mean_squared_error: 0.0209 - val_loss: 0.1452 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0445
Epoch 00038: early stopping
MAE: 0.13942066
RMSE: 0.20452267
Adding initial Dense layers with 512
```

```

Adding Dense layer with 256
Adding Dense layer with 128
Adding Dense layer with 64
Adding Dense layer with 32
Adding Dense layer with 16
Adding Dense layer with 8
Adding last layer with 4
Outputting predictive model - Tabular
Model: "model_55"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_56 (InputLayer)	[(None, 61)]	0
dense_422 (Dense)	(None, 512)	31744
dense_423 (Dense)	(None, 256)	131328
dense_424 (Dense)	(None, 128)	32896
dense_425 (Dense)	(None, 64)	8256
dense_426 (Dense)	(None, 32)	2080
dense_427 (Dense)	(None, 16)	528
dense_428 (Dense)	(None, 8)	136
dense_429 (Dense)	(None, 4)	36
dense_430 (Dense)	(None, 1)	5
<hr/>		

```

Total params: 207,009
Trainable params: 207,009
Non-trainable params: 0

```

```

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
    9728/10471 [=====>...] - ETA: 0s - loss: 1.6853 - mean_absolute_error: 1.6853 - mean_squared_error: 9.4628
Epoch 00001: val_loss improved from inf to 1.13938, saving model to best_basic_model.hdf5
    10471/10471 [=====] - 1s 124us/sample - loss: 1.6250 - mean_absolute_error: 1.6235 - mean_squared_error: 8.8498 - val_loss: 1.1394 - val_mean_absolute_error: 1.1395 - val_mean_squared_error: 1.6026
Epoch 2/500
    10240/10471 [=====>.] - ETA: 0s - loss: 0.7307 - mean_absolute_error: 0.7307 - mean_squared_error: 0.9359
Epoch 00002: val_loss improved from 1.13938 to 0.19488, saving model to best_basic_mode1.hdf5
    10471/10471 [=====] - 1s 77us/sample - loss: 0.7204 - mean_absolute_error: 0.7196 - mean_squared_error: 0.9161 - val_loss: 0.1949 - val_mean_absolute_error: 0.1949 - val_mean_squared_error: 0.0689
Epoch 3/500
    10080/10471 [=====>..] - ETA: 0s - loss: 0.2135 - mean_absolute_error: 0.2135 - mean_squared_error: 0.0783
Epoch 00003: val_loss improved from 0.19488 to 0.19108, saving model to best_basic_mode1.hdf5
    10471/10471 [=====] - 1s 78us/sample - loss: 0.2119 - mean_abso

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lute_error: 0.2120 - mean_squared_error: 0.0773 - val_loss: 0.1911 - val_mean_absolute_error: 0.1910 - val_mean_squared_error: 0.0670

Epoch 4/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.2006 - mean_absolute_error: 0.2006 - mean_squared_error: 0.0710

Epoch 00004: val_loss did not improve from 0.19108

10471/10471 [=====] - 1s 74us/sample - loss: 0.2006 - mean_absolute_error: 0.2006 - mean_squared_error: 0.0710 - val_loss: 0.2621 - val_mean_absolute_error: 0.2620 - val_mean_squared_error: 0.1088

Epoch 5/500

9760/10471 [=====>...] - ETA: 0s - loss: 0.1891 - mean_absolute_error: 0.1891 - mean_squared_error: 0.0641

Epoch 00005: val_loss did not improve from 0.19108

10471/10471 [=====] - 1s 72us/sample - loss: 0.1984 - mean_absolute_error: 0.1985 - mean_squared_error: 0.0703 - val_loss: 0.2798 - val_mean_absolute_error: 0.2796 - val_mean_squared_error: 0.1151

Epoch 6/500

9760/10471 [=====>...] - ETA: 0s - loss: 0.1751 - mean_absolute_error: 0.1751 - mean_squared_error: 0.0570

Epoch 00006: val_loss did not improve from 0.19108

10471/10471 [=====] - 1s 73us/sample - loss: 0.1747 - mean_absolute_error: 0.1747 - mean_squared_error: 0.0564 - val_loss: 0.2202 - val_mean_absolute_error: 0.2203 - val_mean_squared_error: 0.0737

Epoch 7/500

10240/10471 [=====>.] - ETA: 0s - loss: 0.1816 - mean_absolute_error: 0.1816 - mean_squared_error: 0.0600

Epoch 00007: val_loss did not improve from 0.19108

10471/10471 [=====] - 1s 74us/sample - loss: 0.1813 - mean_absolute_error: 0.1812 - mean_squared_error: 0.0598 - val_loss: 0.2245 - val_mean_absolute_error: 0.2246 - val_mean_squared_error: 0.0784

Epoch 8/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.1748 - mean_absolute_error: 0.1748 - mean_squared_error: 0.0561

Epoch 00008: val_loss did not improve from 0.19108

10471/10471 [=====] - 1s 74us/sample - loss: 0.1746 - mean_absolute_error: 0.1748 - mean_squared_error: 0.0562 - val_loss: 0.2095 - val_mean_absolute_error: 0.2096 - val_mean_squared_error: 0.0696

Epoch 9/500

10432/10471 [=====>.] - ETA: 0s - loss: 0.1876 - mean_absolute_error: 0.1876 - mean_squared_error: 0.0623

Epoch 00009: val_loss improved from 0.19108 to 0.16202, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 76us/sample - loss: 0.1875 - mean_absolute_error: 0.1876 - mean_squared_error: 0.0622 - val_loss: 0.1620 - val_mean_absolute_error: 0.1621 - val_mean_squared_error: 0.0498

Epoch 10/500

10208/10471 [=====>.] - ETA: 0s - loss: 0.1743 - mean_absolute_error: 0.1743 - mean_squared_error: 0.0553

Epoch 00010: val_loss did not improve from 0.16202

10471/10471 [=====] - 1s 75us/sample - loss: 0.1742 - mean_absolute_error: 0.1744 - mean_squared_error: 0.0556 - val_loss: 0.1655 - val_mean_absolute_error: 0.1655 - val_mean_squared_error: 0.0549

Epoch 11/500

10336/10471 [=====>.] - ETA: 0s - loss: 0.1535 - mean_absolute_error: 0.1535 - mean_squared_error: 0.0458

Epoch 00011: val_loss improved from 0.16202 to 0.15485, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 77us/sample - loss: 0.1537 - mean_absolute_error: 0.1536 - mean_squared_error: 0.0459 - val_loss: 0.1548 - val_mean_absolute_error: 0.1549 - val_mean_squared_error: 0.0494

Epoch 12/500

```
10336/10471 [=====>.] - ETA: 0s - loss: 0.1664 - mean_absolute_error: 0.1664 - mean_squared_error: 0.0524
Epoch 00012: val_loss improved from 0.15485 to 0.14550, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.1661 - mean_absolute_error: 0.1661 - mean_squared_error: 0.0523 - val_loss: 0.1455 - val_mean_absolute_error: 0.1455 - val_mean_squared_error: 0.0453
Epoch 13/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1460 - mean_absolute_error: 0.1460 - mean_squared_error: 0.0432
Epoch 00013: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 73us/sample - loss: 0.1459 - mean_absolute_error: 0.1459 - mean_squared_error: 0.0431 - val_loss: 0.1703 - val_mean_absolute_error: 0.1703 - val_mean_squared_error: 0.0568
Epoch 14/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1464 - mean_absolute_error: 0.1464 - mean_squared_error: 0.0429
Epoch 00014: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 73us/sample - loss: 0.1464 - mean_absolute_error: 0.1463 - mean_squared_error: 0.0428 - val_loss: 0.1462 - val_mean_absolute_error: 0.1463 - val_mean_squared_error: 0.0448
Epoch 15/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1481 - mean_absolute_error: 0.1481 - mean_squared_error: 0.0438
Epoch 00015: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 73us/sample - loss: 0.1482 - mean_absolute_error: 0.1481 - mean_squared_error: 0.0439 - val_loss: 0.1598 - val_mean_absolute_error: 0.1599 - val_mean_squared_error: 0.0486
Epoch 16/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1496 - mean_absolute_error: 0.1496 - mean_squared_error: 0.0446
Epoch 00016: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 73us/sample - loss: 0.1496 - mean_absolute_error: 0.1497 - mean_squared_error: 0.0446 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0462
Epoch 17/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1402 - mean_absolute_error: 0.1402 - mean_squared_error: 0.0399
Epoch 00017: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 72us/sample - loss: 0.1403 - mean_absolute_error: 0.1405 - mean_squared_error: 0.0402 - val_loss: 0.1652 - val_mean_absolute_error: 0.1651 - val_mean_squared_error: 0.0528
Epoch 18/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1424 - mean_absolute_error: 0.1424 - mean_squared_error: 0.0404
Epoch 00018: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 77us/sample - loss: 0.1426 - mean_absolute_error: 0.1427 - mean_squared_error: 0.0406 - val_loss: 0.1670 - val_mean_absolute_error: 0.1669 - val_mean_squared_error: 0.0537
Epoch 19/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1456 - mean_absolute_error: 0.1456 - mean_squared_error: 0.0414
Epoch 00019: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 74us/sample - loss: 0.1455 - mean_absolute_error: 0.1454 - mean_squared_error: 0.0412 - val_loss: 0.1611 - val_mean_absolute_error: 0.1611 - val_mean_squared_error: 0.0508
Epoch 20/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1418 - mean_absolute_error: 0.1418 - mean_squared_error: 0.0397
Epoch 00020: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 71us/sample - loss: 0.1415 - mean_absolute_error: 0.1415 - mean_squared_error: 0.0395
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lute_error: 0.1415 - mean_squared_error: 0.0400 - val_loss: 0.1531 - val_mean_absolute_error: 0.1532 - val_mean_squared_error: 0.0469

Epoch 21/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1483 - mean_absolute_error: 0.1483 - mean_squared_error: 0.0422

Epoch 00021: val_loss did not improve from 0.14550

10471/10471 [=====] - 1s 73us/sample - loss: 0.1472 - mean_absolute_error: 0.1471 - mean_squared_error: 0.0417 - val_loss: 0.2501 - val_mean_absolute_error: 0.2499 - val_mean_squared_error: 0.0931

Epoch 22/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1328 - mean_absolute_error: 0.1328 - mean_squared_error: 0.0363

Epoch 00022: val_loss did not improve from 0.14550

10471/10471 [=====] - 1s 74us/sample - loss: 0.1329 - mean_absolute_error: 0.1327 - mean_squared_error: 0.0362 - val_loss: 0.1551 - val_mean_absolute_error: 0.1550 - val_mean_squared_error: 0.0491

Epoch 23/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0387

Epoch 00023: val_loss did not improve from 0.14550

10471/10471 [=====] - 1s 74us/sample - loss: 0.1393 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0384 - val_loss: 0.1553 - val_mean_absolute_error: 0.1553 - val_mean_squared_error: 0.0468

Epoch 24/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1250 - mean_absolute_error: 0.1250 - mean_squared_error: 0.0331

Epoch 00024: val_loss did not improve from 0.14550

10471/10471 [=====] - 1s 75us/sample - loss: 0.1252 - mean_absolute_error: 0.1252 - mean_squared_error: 0.0331 - val_loss: 0.1828 - val_mean_absolute_error: 0.1829 - val_mean_squared_error: 0.0581

Epoch 25/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1300 - mean_absolute_error: 0.1300 - mean_squared_error: 0.0350

Epoch 00025: val_loss did not improve from 0.14550

10471/10471 [=====] - 1s 80us/sample - loss: 0.1297 - mean_absolute_error: 0.1297 - mean_squared_error: 0.0348 - val_loss: 0.1542 - val_mean_absolute_error: 0.1542 - val_mean_squared_error: 0.0487

Epoch 26/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1337 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0364

Epoch 00026: val_loss did not improve from 0.14550

10471/10471 [=====] - 1s 81us/sample - loss: 0.1335 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0364 - val_loss: 0.1486 - val_mean_absolute_error: 0.1486 - val_mean_squared_error: 0.0453

Epoch 27/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1256 - mean_absolute_error: 0.1256 - mean_squared_error: 0.0334

Epoch 00027: val_loss did not improve from 0.14550

10471/10471 [=====] - 1s 81us/sample - loss: 0.1253 - mean_absolute_error: 0.1251 - mean_squared_error: 0.0331 - val_loss: 0.1635 - val_mean_absolute_error: 0.1635 - val_mean_squared_error: 0.0528

Epoch 28/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1303 - mean_absolute_error: 0.1303 - mean_squared_error: 0.0346

Epoch 00028: val_loss did not improve from 0.14550

10471/10471 [=====] - 1s 82us/sample - loss: 0.1304 - mean_absolute_error: 0.1304 - mean_squared_error: 0.0345 - val_loss: 0.2490 - val_mean_absolute_error: 0.2488 - val_mean_squared_error: 0.0931

Epoch 29/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1212 - mean_absolute_error: 0.1212 - mean_squared_error: 0.0315

```
Epoch 00029: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 73us/sample - loss: 0.1212 - mean_absolute_error: 0.1210 - mean_squared_error: 0.0315 - val_loss: 0.1457 - val_mean_absolute_error: 0.1457 - val_mean_squared_error: 0.0450
Epoch 30/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1210 - mean_absolute_error: 0.1210 - mean_squared_error: 0.0311
Epoch 00030: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 74us/sample - loss: 0.1208 - mean_absolute_error: 0.1208 - mean_squared_error: 0.0309 - val_loss: 0.1626 - val_mean_absolute_error: 0.1626 - val_mean_squared_error: 0.0523
Epoch 31/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1181 - mean_absolute_error: 0.1181 - mean_squared_error: 0.0300
Epoch 00031: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 74us/sample - loss: 0.1179 - mean_absolute_error: 0.1178 - mean_squared_error: 0.0299 - val_loss: 0.1481 - val_mean_absolute_error: 0.1481 - val_mean_squared_error: 0.0456
Epoch 32/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1192 - mean_absolute_error: 0.1192 - mean_squared_error: 0.0298
Epoch 00032: val_loss did not improve from 0.14550
10471/10471 [=====] - 1s 74us/sample - loss: 0.1192 - mean_absolute_error: 0.1193 - mean_squared_error: 0.0299 - val_loss: 0.1926 - val_mean_absolute_error: 0.1925 - val_mean_squared_error: 0.0642
Epoch 33/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1134 - mean_absolute_error: 0.1134 - mean_squared_error: 0.0280
Epoch 00033: val_loss improved from 0.14550 to 0.14527, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 75us/sample - loss: 0.1131 - mean_absolute_error: 0.1130 - mean_squared_error: 0.0277 - val_loss: 0.1453 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0443
Epoch 34/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1131 - mean_absolute_error: 0.1131 - mean_squared_error: 0.0280
Epoch 00034: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 75us/sample - loss: 0.1133 - mean_absolute_error: 0.1133 - mean_squared_error: 0.0279 - val_loss: 0.1498 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0459
Epoch 35/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1114 - mean_absolute_error: 0.1114 - mean_squared_error: 0.0268
Epoch 00035: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 75us/sample - loss: 0.1116 - mean_absolute_error: 0.1117 - mean_squared_error: 0.0270 - val_loss: 0.1508 - val_mean_absolute_error: 0.1507 - val_mean_squared_error: 0.0468
Epoch 36/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1057 - mean_absolute_error: 0.1057 - mean_squared_error: 0.0251
Epoch 00036: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 76us/sample - loss: 0.1053 - mean_absolute_error: 0.1052 - mean_squared_error: 0.0248 - val_loss: 0.1461 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0447
Epoch 37/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1092 - mean_absolute_error: 0.1092 - mean_squared_error: 0.0262
Epoch 00037: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 74us/sample - loss: 0.1093 - mean_absolute_error: 0.1093 - mean_squared_error: 0.0262 - val_loss: 0.1561 - val_mean_absolute_error: 0.1561 - val_mean_squared_error: 0.0480
```

Epoch 38/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1074 - mean_absolute_error: 0.1074 - mean_squared_error: 0.0252
Epoch 00038: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 75us/sample - loss: 0.1072 - mean_absolute_error: 0.1071 - mean_squared_error: 0.0252 - val_loss: 0.1495 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0466
Epoch 39/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1007 - mean_absolute_error: 0.1007 - mean_squared_error: 0.0232
Epoch 00039: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 73us/sample - loss: 0.1009 - mean_absolute_error: 0.1010 - mean_squared_error: 0.0233 - val_loss: 0.1521 - val_mean_absolute_error: 0.1520 - val_mean_squared_error: 0.0484
Epoch 40/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1097 - mean_absolute_error: 0.1097 - mean_squared_error: 0.0259
Epoch 00040: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 73us/sample - loss: 0.1089 - mean_absolute_error: 0.1089 - mean_squared_error: 0.0255 - val_loss: 0.1689 - val_mean_absolute_error: 0.1688 - val_mean_squared_error: 0.0547
Epoch 41/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.1056 - mean_absolute_error: 0.1056 - mean_squared_error: 0.0245
Epoch 00041: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 74us/sample - loss: 0.1054 - mean_absolute_error: 0.1054 - mean_squared_error: 0.0245 - val_loss: 0.1523 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0467
Epoch 42/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1031 - mean_absolute_error: 0.1031 - mean_squared_error: 0.0233
Epoch 00042: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 73us/sample - loss: 0.1043 - mean_absolute_error: 0.1043 - mean_squared_error: 0.0235 - val_loss: 0.1699 - val_mean_absolute_error: 0.1698 - val_mean_squared_error: 0.0553
Epoch 43/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1033 - mean_absolute_error: 0.1033 - mean_squared_error: 0.0236
Epoch 00043: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 73us/sample - loss: 0.1035 - mean_absolute_error: 0.1034 - mean_squared_error: 0.0234 - val_loss: 0.1723 - val_mean_absolute_error: 0.1722 - val_mean_squared_error: 0.0571
Epoch 44/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.0992 - mean_absolute_error: 0.0992 - mean_squared_error: 0.0223
Epoch 00044: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 72us/sample - loss: 0.0982 - mean_absolute_error: 0.0983 - mean_squared_error: 0.0218 - val_loss: 0.1495 - val_mean_absolute_error: 0.1495 - val_mean_squared_error: 0.0450
Epoch 45/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.0995 - mean_absolute_error: 0.0995 - mean_squared_error: 0.0222
Epoch 00045: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 74us/sample - loss: 0.0993 - mean_absolute_error: 0.0991 - mean_squared_error: 0.0221 - val_loss: 0.1490 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0454
Epoch 46/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.0989 - mean_absolute_error: 0.0989 - mean_squared_error: 0.0218
Epoch 00046: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 74us/sample - loss: 0.0990 - mean_absolute_error:

lute_error: 0.0992 - mean_squared_error: 0.0220 - val_loss: 0.1616 - val_mean_absolute_error: 0.1615 - val_mean_squared_error: 0.0510

Epoch 47/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.0976 - mean_absolute_error: 0.0976 - mean_squared_error: 0.0209

Epoch 00047: val_loss did not improve from 0.14527

10471/10471 [=====] - 1s 74us/sample - loss: 0.0976 - mean_absolute_error: 0.0978 - mean_squared_error: 0.0210 - val_loss: 0.1518 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0460

Epoch 48/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.0959 - mean_absolute_error: 0.0959 - mean_squared_error: 0.0208

Epoch 00048: val_loss did not improve from 0.14527

10471/10471 [=====] - 1s 72us/sample - loss: 0.0957 - mean_absolute_error: 0.0955 - mean_squared_error: 0.0207 - val_loss: 0.1805 - val_mean_absolute_error: 0.1804 - val_mean_squared_error: 0.0615

Epoch 49/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.0948 - mean_absolute_error: 0.0948 - mean_squared_error: 0.0201

Epoch 00049: val_loss did not improve from 0.14527

10471/10471 [=====] - 1s 75us/sample - loss: 0.0945 - mean_absolute_error: 0.0945 - mean_squared_error: 0.0200 - val_loss: 0.1627 - val_mean_absolute_error: 0.1627 - val_mean_squared_error: 0.0507

Epoch 50/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.0923 - mean_absolute_error: 0.0923 - mean_squared_error: 0.0198

Epoch 00050: val_loss did not improve from 0.14527

10471/10471 [=====] - 1s 74us/sample - loss: 0.0921 - mean_absolute_error: 0.0920 - mean_squared_error: 0.0197 - val_loss: 0.1546 - val_mean_absolute_error: 0.1546 - val_mean_squared_error: 0.0483

Epoch 51/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.0920 - mean_absolute_error: 0.0920 - mean_squared_error: 0.0195

Epoch 00051: val_loss did not improve from 0.14527

10471/10471 [=====] - 1s 75us/sample - loss: 0.0916 - mean_absolute_error: 0.0916 - mean_squared_error: 0.0192 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0475

Epoch 52/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.0908 - mean_absolute_error: 0.0908 - mean_squared_error: 0.0191

Epoch 00052: val_loss did not improve from 0.14527

10471/10471 [=====] - 1s 72us/sample - loss: 0.0901 - mean_absolute_error: 0.0901 - mean_squared_error: 0.0187 - val_loss: 0.1464 - val_mean_absolute_error: 0.1463 - val_mean_squared_error: 0.0446

Epoch 53/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.0906 - mean_absolute_error: 0.0906 - mean_squared_error: 0.0188

Epoch 00053: val_loss did not improve from 0.14527

10471/10471 [=====] - 1s 72us/sample - loss: 0.0902 - mean_absolute_error: 0.0903 - mean_squared_error: 0.0187 - val_loss: 0.1458 - val_mean_absolute_error: 0.1457 - val_mean_squared_error: 0.0446

Epoch 54/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.0868 - mean_absolute_error: 0.0868 - mean_squared_error: 0.0181

Epoch 00054: val_loss did not improve from 0.14527

10471/10471 [=====] - 1s 71us/sample - loss: 0.0868 - mean_absolute_error: 0.0870 - mean_squared_error: 0.0180 - val_loss: 0.1759 - val_mean_absolute_error: 0.1759 - val_mean_squared_error: 0.0567

Epoch 55/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.0958 - mean_absolute_error: 0.0958 - mean_squared_error: 0.0199

```

Epoch 00055: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 71us/sample - loss: 0.0950 - mean_absolute_error: 0.0948 - mean_squared_error: 0.0197 - val_loss: 0.1561 - val_mean_absolute_error: 0.1561 - val_mean_squared_error: 0.0484
Epoch 56/500
    9792/10471 [=====>..] - ETA: 0s - loss: 0.0838 - mean_absolute_error: 0.0838 - mean_squared_error: 0.0168
Epoch 00056: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 73us/sample - loss: 0.0849 - mean_absolute_error: 0.0851 - mean_squared_error: 0.0172 - val_loss: 0.1721 - val_mean_absolute_error: 0.1721 - val_mean_squared_error: 0.0547
Epoch 57/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0857 - mean_absolute_error: 0.0857 - mean_squared_error: 0.0170
Epoch 00057: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 73us/sample - loss: 0.0857 - mean_absolute_error: 0.0857 - mean_squared_error: 0.0171 - val_loss: 0.1578 - val_mean_absolute_error: 0.1577 - val_mean_squared_error: 0.0494
Epoch 58/500
    9952/10471 [=====>..] - ETA: 0s - loss: 0.0853 - mean_absolute_error: 0.0853 - mean_squared_error: 0.0169Restoring model weights from the end of the best epoch.

```

```

Epoch 00058: val_loss did not improve from 0.14527
10471/10471 [=====] - 1s 72us/sample - loss: 0.0848 - mean_absolute_error: 0.0847 - mean_squared_error: 0.0166 - val_loss: 0.1534 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0484
Epoch 00058: early stopping
MAE: 0.14521156
RMSE: 0.210517
Adding initial Dense layers with 128
Adding Dense layer with 64
Adding Dense layer with 32
Adding Dense layer with 16
Adding Dense layer with 8
Adding last layer with 4
Outputting predictive model - Tabular
Model: "model_56"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_57 (InputLayer)	[(None, 61)]	0
dense_431 (Dense)	(None, 128)	7936
dense_432 (Dense)	(None, 64)	8256
dense_433 (Dense)	(None, 32)	2080
dense_434 (Dense)	(None, 16)	528
dense_435 (Dense)	(None, 8)	136
dense_436 (Dense)	(None, 4)	36
dense_437 (Dense)	(None, 1)	5
<hr/>		
Total params: 18,977		
Trainable params: 18,977		
Non-trainable params: 0		

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
    9920/10471 [=====>..] - ETA: 0s - loss: 1.2329 - mean_absolute_error: 1.2329 - mean_squared_error: 4.3239
Epoch 00001: val_loss improved from inf to 0.52113, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 112us/sample - loss: 1.1895 - mean_absolute_error: 1.1875 - mean_squared_error: 4.1023 - val_loss: 0.5211 - val_mean_absolute_error: 0.5212 - val_mean_squared_error: 0.4082
Epoch 2/500
    9856/10471 [=====>..] - ETA: 0s - loss: 0.3915 - mean_absolute_error: 0.3915 - mean_squared_error: 0.2859
Epoch 00002: val_loss improved from 0.52113 to 0.18610, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 69us/sample - loss: 0.3815 - mean_absolute_error: 0.3816 - mean_squared_error: 0.2735 - val_loss: 0.1861 - val_mean_absolute_error: 0.1861 - val_mean_squared_error: 0.0658
Epoch 3/500
    10016/10471 [=====>..] - ETA: 0s - loss: 0.2501 - mean_absolute_error: 0.2501 - mean_squared_error: 0.1133
Epoch 00003: val_loss did not improve from 0.18610
10471/10471 [=====] - 1s 66us/sample - loss: 0.2473 - mean_absolute_error: 0.2473 - mean_squared_error: 0.1109 - val_loss: 0.1887 - val_mean_absolute_error: 0.1888 - val_mean_squared_error: 0.0631
Epoch 4/500
    10048/10471 [=====>..] - ETA: 0s - loss: 0.2205 - mean_absolute_error: 0.2205 - mean_squared_error: 0.0835
Epoch 00004: val_loss improved from 0.18610 to 0.17859, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 67us/sample - loss: 0.2195 - mean_absolute_error: 0.2196 - mean_squared_error: 0.0828 - val_loss: 0.1786 - val_mean_absolute_error: 0.1785 - val_mean_squared_error: 0.0607
Epoch 5/500
    10016/10471 [=====>..] - ETA: 0s - loss: 0.2175 - mean_absolute_error: 0.2175 - mean_squared_error: 0.0790
Epoch 00005: val_loss did not improve from 0.17859
10471/10471 [=====] - 1s 65us/sample - loss: 0.2164 - mean_absolute_error: 0.2165 - mean_squared_error: 0.0783 - val_loss: 0.1919 - val_mean_absolute_error: 0.1917 - val_mean_squared_error: 0.0668
Epoch 6/500
    9888/10471 [=====>..] - ETA: 0s - loss: 0.1973 - mean_absolute_error: 0.1973 - mean_squared_error: 0.0670
Epoch 00006: val_loss did not improve from 0.17859
10471/10471 [=====] - 1s 66us/sample - loss: 0.1973 - mean_absolute_error: 0.1971 - mean_squared_error: 0.0669 - val_loss: 0.2090 - val_mean_absolute_error: 0.2089 - val_mean_squared_error: 0.0740
Epoch 7/500
    9984/10471 [=====>..] - ETA: 0s - loss: 0.2031 - mean_absolute_error: 0.2031 - mean_squared_error: 0.0724
Epoch 00007: val_loss did not improve from 0.17859
10471/10471 [=====] - 1s 66us/sample - loss: 0.2011 - mean_absolute_error: 0.2012 - mean_squared_error: 0.0712 - val_loss: 0.3342 - val_mean_absolute_error: 0.3343 - val_mean_squared_error: 0.1411
Epoch 8/500
    9888/10471 [=====>..] - ETA: 0s - loss: 0.1875 - mean_absolute_error: 0.1875 - mean_squared_error: 0.0623
Epoch 00008: val_loss did not improve from 0.17859
10471/10471 [=====] - 1s 66us/sample - loss: 0.1859 - mean_absolute_error: 0.1857 - mean_squared_error: 0.0612 - val_loss: 0.2017 - val_mean_absolute_error: 0.2015 - val_mean_squared_error: 0.1411
```

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rror: 0.2018 - val_mean_squared_error: 0.0663
Epoch 9/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1679 - mean_absolute_error: 0.1679 - mean_squared_error: 0.0521
Epoch 00009: val_loss improved from 0.17859 to 0.14976, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 68us/sample - loss: 0.1677 - mean_absolute_error: 0.1677 - mean_squared_error: 0.0522 - val_loss: 0.1498 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0446
Epoch 10/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1741 - mean_absolute_error: 0.1741 - mean_squared_error: 0.0549
Epoch 00010: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 65us/sample - loss: 0.1740 - mean_absolute_error: 0.1740 - mean_squared_error: 0.0548 - val_loss: 0.1553 - val_mean_absolute_error: 0.1554 - val_mean_squared_error: 0.0462
Epoch 11/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1605 - mean_absolute_error: 0.1605 - mean_squared_error: 0.0486
Epoch 00011: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 66us/sample - loss: 0.1604 - mean_absolute_error: 0.1604 - mean_squared_error: 0.0487 - val_loss: 0.1957 - val_mean_absolute_error: 0.1957 - val_mean_squared_error: 0.0634
Epoch 12/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1566 - mean_absolute_error: 0.1566 - mean_squared_error: 0.0479
Epoch 00012: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 64us/sample - loss: 0.1565 - mean_absolute_error: 0.1564 - mean_squared_error: 0.0477 - val_loss: 0.2736 - val_mean_absolute_error: 0.2735 - val_mean_squared_error: 0.1105
Epoch 13/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1716 - mean_absolute_error: 0.1716 - mean_squared_error: 0.0539
Epoch 00013: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 64us/sample - loss: 0.1714 - mean_absolute_error: 0.1712 - mean_squared_error: 0.0538 - val_loss: 0.2085 - val_mean_absolute_error: 0.2086 - val_mean_squared_error: 0.0671
Epoch 14/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1570 - mean_absolute_error: 0.1570 - mean_squared_error: 0.0480
Epoch 00014: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 65us/sample - loss: 0.1574 - mean_absolute_error: 0.1577 - mean_squared_error: 0.0481 - val_loss: 0.2385 - val_mean_absolute_error: 0.2386 - val_mean_squared_error: 0.0804
Epoch 15/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.1620 - mean_absolute_error: 0.1620 - mean_squared_error: 0.0495
Epoch 00015: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 63us/sample - loss: 0.1619 - mean_absolute_error: 0.1622 - mean_squared_error: 0.0498 - val_loss: 0.2615 - val_mean_absolute_error: 0.2614 - val_mean_squared_error: 0.1011
Epoch 16/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1620 - mean_absolute_error: 0.1620 - mean_squared_error: 0.0500
Epoch 00016: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 66us/sample - loss: 0.1610 - mean_absolute_error: 0.1612 - mean_squared_error: 0.0499 - val_loss: 0.1529 - val_mean_absolute_error: 0.1529 - val_mean_squared_error: 0.0478
Epoch 17/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1561 - mean_absolute_error: 0.1561 - mean_squared_error: 0.0467
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Epoch 00017: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 66us/sample - loss: 0.1550 - mean_absolute_error: 0.1548 - mean_squared_error: 0.0459 - val_loss: 0.1698 - val_mean_absolute_error: 0.1699 - val_mean_squared_error: 0.0509
Epoch 18/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1551 - mean_absolute_error: 0.1551 - mean_squared_error: 0.0460
Epoch 00018: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 65us/sample - loss: 0.1547 - mean_absolute_error: 0.1547 - mean_squared_error: 0.0460 - val_loss: 0.1943 - val_mean_absolute_error: 0.1944 - val_mean_squared_error: 0.0615
Epoch 19/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1491 - mean_absolute_error: 0.1491 - mean_squared_error: 0.0436
Epoch 00019: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 66us/sample - loss: 0.1503 - mean_absolute_error: 0.1503 - mean_squared_error: 0.0440 - val_loss: 0.1769 - val_mean_absolute_error: 0.1770 - val_mean_squared_error: 0.0560
Epoch 20/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1544 - mean_absolute_error: 0.1544 - mean_squared_error: 0.0457
Epoch 00020: val_loss did not improve from 0.14976
10471/10471 [=====] - 1s 64us/sample - loss: 0.1565 - mean_absolute_error: 0.1568 - mean_squared_error: 0.0469 - val_loss: 0.2348 - val_mean_absolute_error: 0.2346 - val_mean_squared_error: 0.0868
Epoch 21/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1455 - mean_absolute_error: 0.1455 - mean_squared_error: 0.0417
Epoch 00021: val_loss improved from 0.14976 to 0.13923, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 67us/sample - loss: 0.1452 - mean_absolute_error: 0.1452 - mean_squared_error: 0.0415 - val_loss: 0.1392 - val_mean_absolute_error: 0.1392 - val_mean_squared_error: 0.0416
Epoch 22/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1507 - mean_absolute_error: 0.1507 - mean_squared_error: 0.0437
Epoch 00022: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 70us/sample - loss: 0.1513 - mean_absolute_error: 0.1511 - mean_squared_error: 0.0440 - val_loss: 0.1800 - val_mean_absolute_error: 0.1799 - val_mean_squared_error: 0.0593
Epoch 23/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1440 - mean_absolute_error: 0.1440 - mean_squared_error: 0.0415
Epoch 00023: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 66us/sample - loss: 0.1430 - mean_absolute_error: 0.1431 - mean_squared_error: 0.0412 - val_loss: 0.1788 - val_mean_absolute_error: 0.1789 - val_mean_squared_error: 0.0563
Epoch 24/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1407 - mean_absolute_error: 0.1407 - mean_squared_error: 0.0397
Epoch 00024: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 66us/sample - loss: 0.1402 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0394 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0446
Epoch 25/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1416 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0396
Epoch 00025: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 68us/sample - loss: 0.1414 - mean_absolute_error: 0.1412 - mean_squared_error: 0.0398 - val_loss: 0.1449 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0439
```

Epoch 26/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1573 - mean_absolute_error: 0.1573 - mean_squared_error: 0.0462
Epoch 00026: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 67us/sample - loss: 0.1569 - mean_absolute_error: 0.1569 - mean_squared_error: 0.0460 - val_loss: 0.1402 - val_mean_absolute_error: 0.1402 - val_mean_squared_error: 0.0415
Epoch 27/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1435 - mean_absolute_error: 0.1435 - mean_squared_error: 0.0405
Epoch 00027: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 67us/sample - loss: 0.1449 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0409 - val_loss: 0.1945 - val_mean_absolute_error: 0.1946 - val_mean_squared_error: 0.0633
Epoch 28/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1449 - mean_absolute_error: 0.1449 - mean_squared_error: 0.0412
Epoch 00028: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 67us/sample - loss: 0.1435 - mean_absolute_error: 0.1434 - mean_squared_error: 0.0404 - val_loss: 0.2348 - val_mean_absolute_error: 0.2349 - val_mean_squared_error: 0.0802
Epoch 29/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1466 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0422
Epoch 00029: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 68us/sample - loss: 0.1458 - mean_absolute_error: 0.1456 - mean_squared_error: 0.0417 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0435
Epoch 30/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1335 - mean_absolute_error: 0.1335 - mean_squared_error: 0.0370
Epoch 00030: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 66us/sample - loss: 0.1362 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0380 - val_loss: 0.2400 - val_mean_absolute_error: 0.2398 - val_mean_squared_error: 0.0890
Epoch 31/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1306 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0357
Epoch 00031: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 65us/sample - loss: 0.1310 - mean_absolute_error: 0.1312 - mean_squared_error: 0.0358 - val_loss: 0.1801 - val_mean_absolute_error: 0.1802 - val_mean_squared_error: 0.0574
Epoch 32/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1330 - mean_absolute_error: 0.1330 - mean_squared_error: 0.0361
Epoch 00032: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 65us/sample - loss: 0.1327 - mean_absolute_error: 0.1327 - mean_squared_error: 0.0360 - val_loss: 0.1846 - val_mean_absolute_error: 0.1846 - val_mean_squared_error: 0.0566
Epoch 33/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1354 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0373
Epoch 00033: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 65us/sample - loss: 0.1354 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0372 - val_loss: 0.1518 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0447
Epoch 34/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1320 - mean_absolute_error: 0.1320 - mean_squared_error: 0.0355
Epoch 00034: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 65us/sample - loss: 0.1323 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0358 - val_loss: 0.1521 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0449

lute_error: 0.1323 - mean_squared_error: 0.0360 - val_loss: 0.1680 - val_mean_absolute_error: 0.1680 - val_mean_squared_error: 0.0508

Epoch 35/500

10112/10471 [=====>..] - ETA: 0s - loss: 0.1261 - mean_absolute_error: 0.1261 - mean_squared_error: 0.0338

Epoch 00035: val_loss did not improve from 0.13923

10471/10471 [=====] - 1s 65us/sample - loss: 0.1267 - mean_absolute_error: 0.1266 - mean_squared_error: 0.0340 - val_loss: 0.1793 - val_mean_absolute_error: 0.1793 - val_mean_squared_error: 0.0536

Epoch 36/500

10208/10471 [=====>.] - ETA: 0s - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0388

Epoch 00036: val_loss did not improve from 0.13923

10471/10471 [=====] - 1s 64us/sample - loss: 0.1399 - mean_absolute_error: 0.1398 - mean_squared_error: 0.0388 - val_loss: 0.1566 - val_mean_absolute_error: 0.1566 - val_mean_squared_error: 0.0473

Epoch 37/500

10176/10471 [=====>.] - ETA: 0s - loss: 0.1253 - mean_absolute_error: 0.1253 - mean_squared_error: 0.0330

Epoch 00037: val_loss did not improve from 0.13923

10471/10471 [=====] - 1s 65us/sample - loss: 0.1250 - mean_absolute_error: 0.1250 - mean_squared_error: 0.0331 - val_loss: 0.1448 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0433

Epoch 38/500

10176/10471 [=====>.] - ETA: 0s - loss: 0.1231 - mean_absolute_error: 0.1231 - mean_squared_error: 0.0326

Epoch 00038: val_loss did not improve from 0.13923

10471/10471 [=====] - 1s 65us/sample - loss: 0.1230 - mean_absolute_error: 0.1229 - mean_squared_error: 0.0324 - val_loss: 0.1454 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0442

Epoch 39/500

10336/10471 [=====>.] - ETA: 0s - loss: 0.1224 - mean_absolute_error: 0.1224 - mean_squared_error: 0.0322

Epoch 00039: val_loss did not improve from 0.13923

10471/10471 [=====] - 1s 64us/sample - loss: 0.1223 - mean_absolute_error: 0.1222 - mean_squared_error: 0.0322 - val_loss: 0.1753 - val_mean_absolute_error: 0.1754 - val_mean_squared_error: 0.0547

Epoch 40/500

10240/10471 [=====>.] - ETA: 0s - loss: 0.1205 - mean_absolute_error: 0.1205 - mean_squared_error: 0.0314

Epoch 00040: val_loss did not improve from 0.13923

10471/10471 [=====] - 1s 64us/sample - loss: 0.1205 - mean_absolute_error: 0.1205 - mean_squared_error: 0.0313 - val_loss: 0.1510 - val_mean_absolute_error: 0.1510 - val_mean_squared_error: 0.0459

Epoch 41/500

9888/10471 [=====>..] - ETA: 0s - loss: 0.1251 - mean_absolute_error: 0.1251 - mean_squared_error: 0.0331

Epoch 00041: val_loss did not improve from 0.13923

10471/10471 [=====] - 1s 67us/sample - loss: 0.1266 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0339 - val_loss: 0.2011 - val_mean_absolute_error: 0.2010 - val_mean_squared_error: 0.0684

Epoch 42/500

9760/10471 [=====>...] - ETA: 0s - loss: 0.1194 - mean_absolute_error: 0.1194 - mean_squared_error: 0.0313

Epoch 00042: val_loss did not improve from 0.13923

10471/10471 [=====] - 1s 68us/sample - loss: 0.1198 - mean_absolute_error: 0.1198 - mean_squared_error: 0.0312 - val_loss: 0.1670 - val_mean_absolute_error: 0.1670 - val_mean_squared_error: 0.0493

Epoch 43/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.1203 - mean_absolute_error: 0.1203 - mean_squared_error: 0.0311

```
Epoch 00043: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 64us/sample - loss: 0.1203 - mean_absolute_error: 0.1202 - mean_squared_error: 0.0310 - val_loss: 0.1559 - val_mean_absolute_error: 0.1558 - val_mean_squared_error: 0.0473
Epoch 44/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1187 - mean_absolute_error: 0.1187 - mean_squared_error: 0.0305
Epoch 00044: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 65us/sample - loss: 0.1187 - mean_absolute_error: 0.1187 - mean_squared_error: 0.0306 - val_loss: 0.1672 - val_mean_absolute_error: 0.1671 - val_mean_squared_error: 0.0533
Epoch 45/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1187 - mean_absolute_error: 0.1187 - mean_squared_error: 0.0303
Epoch 00045: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 64us/sample - loss: 0.1185 - mean_absolute_error: 0.1184 - mean_squared_error: 0.0303 - val_loss: 0.1599 - val_mean_absolute_error: 0.1598 - val_mean_squared_error: 0.0507
Epoch 46/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1181 - mean_absolute_error: 0.1181 - mean_squared_error: 0.0304Restoring model weights from the end of the best epoch.
```

```
Epoch 00046: val_loss did not improve from 0.13923
10471/10471 [=====] - 1s 65us/sample - loss: 0.1187 - mean_absolute_error: 0.1186 - mean_squared_error: 0.0306 - val_loss: 0.1461 - val_mean_absolute_error: 0.1461 - val_mean_squared_error: 0.0435
Epoch 00046: early stopping
MAE: 0.13923436
RMSE: 0.20389363
Adding initial Dense layers with 64
Adding Dense layer with 32
Adding Dense layer with 16
Adding Dense layer with 8
Adding last layer with 4
Outputting predictive model - Tabular
Model: "model_57"
```

Layer (type)	Output Shape	Param #
=====		
input_58 (InputLayer)	[(None, 61)]	0
dense_438 (Dense)	(None, 64)	3968
dense_439 (Dense)	(None, 32)	2080
dense_440 (Dense)	(None, 16)	528
dense_441 (Dense)	(None, 8)	136
dense_442 (Dense)	(None, 4)	36
dense_443 (Dense)	(None, 1)	5
=====		

```
Total params: 6,753
Trainable params: 6,753
Non-trainable params: 0
```

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
```

```
Epoch 1/500
9920/10471 [=====>..] - ETA: 0s - loss: 1.2087 - mean_absolute_error: 1.2087 - mean_squared_error: 5.3114
Epoch 00001: val_loss improved from inf to 0.43637, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 103us/sample - loss: 1.1633 - mean_absolute_error: 1.1616 - mean_squared_error: 5.0316 - val_loss: 0.4364 - val_mean_absolute_error: 0.4362 - val_mean_squared_error: 0.2951
Epoch 2/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.3922 - mean_absolute_error: 0.3922 - mean_squared_error: 0.2608
Epoch 00002: val_loss improved from 0.43637 to 0.26318, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.3810 - mean_absolute_error: 0.3807 - mean_squared_error: 0.2478 - val_loss: 0.2632 - val_mean_absolute_error: 0.2631 - val_mean_squared_error: 0.1112
Epoch 3/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2326 - mean_absolute_error: 0.2326 - mean_squared_error: 0.0908
Epoch 00003: val_loss improved from 0.26318 to 0.18377, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 66us/sample - loss: 0.2324 - mean_absolute_error: 0.2325 - mean_squared_error: 0.0907 - val_loss: 0.1838 - val_mean_absolute_error: 0.1837 - val_mean_squared_error: 0.0648
Epoch 4/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.2000 - mean_absolute_error: 0.2000 - mean_squared_error: 0.0707
Epoch 00004: val_loss did not improve from 0.18377
10471/10471 [=====] - 1s 62us/sample - loss: 0.1996 - mean_absolute_error: 0.1997 - mean_squared_error: 0.0702 - val_loss: 0.1876 - val_mean_absolute_error: 0.1875 - val_mean_squared_error: 0.0651
Epoch 5/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2080 - mean_absolute_error: 0.2080 - mean_squared_error: 0.0741
Epoch 00005: val_loss did not improve from 0.18377
10471/10471 [=====] - 1s 63us/sample - loss: 0.2080 - mean_absolute_error: 0.2081 - mean_squared_error: 0.0742 - val_loss: 0.1879 - val_mean_absolute_error: 0.1880 - val_mean_squared_error: 0.0623
Epoch 6/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1878 - mean_absolute_error: 0.1878 - mean_squared_error: 0.0633
Epoch 00006: val_loss improved from 0.18377 to 0.15867, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 66us/sample - loss: 0.1872 - mean_absolute_error: 0.1871 - mean_squared_error: 0.0628 - val_loss: 0.1587 - val_mean_absolute_error: 0.1586 - val_mean_squared_error: 0.0505
Epoch 7/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1876 - mean_absolute_error: 0.1876 - mean_squared_error: 0.0627
Epoch 00007: val_loss did not improve from 0.15867
10471/10471 [=====] - 1s 64us/sample - loss: 0.1884 - mean_absolute_error: 0.1887 - mean_squared_error: 0.0632 - val_loss: 0.2006 - val_mean_absolute_error: 0.2005 - val_mean_squared_error: 0.0707
Epoch 8/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1754 - mean_absolute_error: 0.1754 - mean_squared_error: 0.0565
Epoch 00008: val_loss did not improve from 0.15867
10471/10471 [=====] - 1s 63us/sample - loss: 0.1768 - mean_absolute_error: 0.1768 - mean_squared_error: 0.0571 - val_loss: 0.1743 - val_mean_absolute_error: 0.1744 - val_mean_squared_error: 0.0549
Epoch 9/500
```

```
10464/10471 [=====>.] - ETA: 0s - loss: 0.1817 - mean_absolute_error: 0.1817 - mean_squared_error: 0.0605
Epoch 00009: val_loss did not improve from 0.15867
10471/10471 [=====] - 1s 63us/sample - loss: 0.1816 - mean_absolute_error: 0.1815 - mean_squared_error: 0.0603 - val_loss: 0.1650 - val_mean_absolute_error: 0.1651 - val_mean_squared_error: 0.0517
Epoch 10/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1745 - mean_absolute_error: 0.1745 - mean_squared_error: 0.0569
Epoch 00010: val_loss did not improve from 0.15867
10471/10471 [=====] - 1s 60us/sample - loss: 0.1768 - mean_absolute_error: 0.1769 - mean_squared_error: 0.0579 - val_loss: 0.2915 - val_mean_absolute_error: 0.2917 - val_mean_squared_error: 0.1150
Epoch 11/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1796 - mean_absolute_error: 0.1796 - mean_squared_error: 0.0584
Epoch 00011: val_loss did not improve from 0.15867
10471/10471 [=====] - 1s 61us/sample - loss: 0.1790 - mean_absolute_error: 0.1789 - mean_squared_error: 0.0583 - val_loss: 0.1800 - val_mean_absolute_error: 0.1799 - val_mean_squared_error: 0.0616
Epoch 12/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1645 - mean_absolute_error: 0.1645 - mean_squared_error: 0.0521
Epoch 00012: val_loss improved from 0.15867 to 0.15730, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.1648 - mean_absolute_error: 0.1648 - mean_squared_error: 0.0519 - val_loss: 0.1573 - val_mean_absolute_error: 0.1572 - val_mean_squared_error: 0.0505
Epoch 13/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1738 - mean_absolute_error: 0.1738 - mean_squared_error: 0.0558
Epoch 00013: val_loss improved from 0.15730 to 0.15725, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 69us/sample - loss: 0.1717 - mean_absolute_error: 0.1719 - mean_squared_error: 0.0550 - val_loss: 0.1573 - val_mean_absolute_error: 0.1573 - val_mean_squared_error: 0.0468
Epoch 14/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1780 - mean_absolute_error: 0.1780 - mean_squared_error: 0.0580
Epoch 00014: val_loss did not improve from 0.15725
10471/10471 [=====] - 1s 62us/sample - loss: 0.1771 - mean_absolute_error: 0.1769 - mean_squared_error: 0.0576 - val_loss: 0.2008 - val_mean_absolute_error: 0.2007 - val_mean_squared_error: 0.0707
Epoch 15/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1616 - mean_absolute_error: 0.1616 - mean_squared_error: 0.0496
Epoch 00015: val_loss improved from 0.15725 to 0.14270, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1600 - mean_absolute_error: 0.1601 - mean_squared_error: 0.0489 - val_loss: 0.1427 - val_mean_absolute_error: 0.1427 - val_mean_squared_error: 0.0433
Epoch 16/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1683 - mean_absolute_error: 0.1683 - mean_squared_error: 0.0527
Epoch 00016: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 65us/sample - loss: 0.1678 - mean_absolute_error: 0.1677 - mean_squared_error: 0.0523 - val_loss: 0.1848 - val_mean_absolute_error: 0.1849 - val_mean_squared_error: 0.0579
Epoch 17/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1629 - mean_absolute_error: 0.1629 - mean_squared_error: 0.0502
```

```
Epoch 00017: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 64us/sample - loss: 0.1627 - mean_absolute_error: 0.1628 - mean_squared_error: 0.0501 - val_loss: 0.2096 - val_mean_absolute_error: 0.2097 - val_mean_squared_error: 0.0689
Epoch 18/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1602 - mean_absolute_error: 0.1602 - mean_squared_error: 0.0493
Epoch 00018: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 64us/sample - loss: 0.1600 - mean_absolute_error: 0.1600 - mean_squared_error: 0.0491 - val_loss: 0.1531 - val_mean_absolute_error: 0.1531 - val_mean_squared_error: 0.0468
Epoch 19/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1461 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0437
Epoch 00019: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 65us/sample - loss: 0.1467 - mean_absolute_error: 0.1469 - mean_squared_error: 0.0440 - val_loss: 0.2454 - val_mean_absolute_error: 0.2455 - val_mean_squared_error: 0.0855
Epoch 20/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1712 - mean_absolute_error: 0.1712 - mean_squared_error: 0.0546
Epoch 00020: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 61us/sample - loss: 0.1723 - mean_absolute_error: 0.1727 - mean_squared_error: 0.0551 - val_loss: 0.1923 - val_mean_absolute_error: 0.1924 - val_mean_squared_error: 0.0613
Epoch 21/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1586 - mean_absolute_error: 0.1586 - mean_squared_error: 0.0483
Epoch 00021: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 63us/sample - loss: 0.1587 - mean_absolute_error: 0.1591 - mean_squared_error: 0.0491 - val_loss: 0.1548 - val_mean_absolute_error: 0.1548 - val_mean_squared_error: 0.0494
Epoch 22/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1684 - mean_absolute_error: 0.1684 - mean_squared_error: 0.0520
Epoch 00022: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 64us/sample - loss: 0.1683 - mean_absolute_error: 0.1683 - mean_squared_error: 0.0520 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0467
Epoch 23/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1478 - mean_absolute_error: 0.1478 - mean_squared_error: 0.0435
Epoch 00023: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 67us/sample - loss: 0.1483 - mean_absolute_error: 0.1484 - mean_squared_error: 0.0440 - val_loss: 0.1431 - val_mean_absolute_error: 0.1431 - val_mean_squared_error: 0.0434
Epoch 24/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1465 - mean_absolute_error: 0.1465 - mean_squared_error: 0.0431
Epoch 00024: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 63us/sample - loss: 0.1468 - mean_absolute_error: 0.1468 - mean_squared_error: 0.0433 - val_loss: 0.2506 - val_mean_absolute_error: 0.2505 - val_mean_squared_error: 0.0963
Epoch 25/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1522 - mean_absolute_error: 0.1522 - mean_squared_error: 0.0459
Epoch 00025: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 67us/sample - loss: 0.1517 - mean_absolute_error: 0.1518 - mean_squared_error: 0.0455 - val_loss: 0.1471 - val_mean_absolute_error: 0.1471 - val_mean_squared_error: 0.0450
Epoch 26/500
```

9664/10471 [=====>...] - ETA: 0s - loss: 0.1514 - mean_absolute_error: 0.1514 - mean_squared_error: 0.0449
Epoch 00026: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 67us/sample - loss: 0.1531 - mean_absolute_error: 0.1530 - mean_squared_error: 0.0456 - val_loss: 0.1542 - val_mean_absolute_error: 0.1541 - val_mean_squared_error: 0.0477
Epoch 27/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1528 - mean_absolute_error: 0.1528 - mean_squared_error: 0.0455
Epoch 00027: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 66us/sample - loss: 0.1526 - mean_absolute_error: 0.1526 - mean_squared_error: 0.0454 - val_loss: 0.1520 - val_mean_absolute_error: 0.1519 - val_mean_squared_error: 0.0472
Epoch 28/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1406 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0407
Epoch 00028: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 63us/sample - loss: 0.1405 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0407 - val_loss: 0.1499 - val_mean_absolute_error: 0.1499 - val_mean_squared_error: 0.0454
Epoch 29/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1437 - mean_absolute_error: 0.1437 - mean_squared_error: 0.0422
Epoch 00029: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 67us/sample - loss: 0.1449 - mean_absolute_error: 0.1450 - mean_squared_error: 0.0425 - val_loss: 0.1848 - val_mean_absolute_error: 0.1847 - val_mean_squared_error: 0.0611
Epoch 30/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1412 - mean_absolute_error: 0.1412 - mean_squared_error: 0.0405
Epoch 00030: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 64us/sample - loss: 0.1417 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0408 - val_loss: 0.2417 - val_mean_absolute_error: 0.2418 - val_mean_squared_error: 0.0843
Epoch 31/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1409 - mean_absolute_error: 0.1409 - mean_squared_error: 0.0409
Epoch 00031: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 64us/sample - loss: 0.1408 - mean_absolute_error: 0.1407 - mean_squared_error: 0.0408 - val_loss: 0.1616 - val_mean_absolute_error: 0.1616 - val_mean_squared_error: 0.0522
Epoch 32/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1458 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0431
Epoch 00032: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 61us/sample - loss: 0.1460 - mean_absolute_error: 0.1459 - mean_squared_error: 0.0429 - val_loss: 0.1504 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0478
Epoch 33/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1397 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0410
Epoch 00033: val_loss did not improve from 0.14270
10471/10471 [=====] - 1s 62us/sample - loss: 0.1397 - mean_absolute_error: 0.1398 - mean_squared_error: 0.0408 - val_loss: 0.1483 - val_mean_absolute_error: 0.1483 - val_mean_squared_error: 0.0448
Epoch 34/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1361 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0391
Epoch 00034: val_loss improved from 0.14270 to 0.13811, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1360 - mean_absolute_error:

lute_error: 0.1360 - mean_squared_error: 0.0390 - val_loss: 0.1381 - val_mean_absolute_error: 0.1381 - val_mean_squared_error: 0.0417
Epoch 35/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1411 - mean_absolute_error: 0.1411 - mean_squared_error: 0.0413
Epoch 00035: val_loss did not improve from 0.13811
10471/10471 [=====] - 1s 64us/sample - loss: 0.1411 - mean_absolute_error: 0.1409 - mean_squared_error: 0.0412 - val_loss: 0.1797 - val_mean_absolute_error: 0.1798 - val_mean_squared_error: 0.0565
Epoch 36/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1378 - mean_absolute_error: 0.1378 - mean_squared_error: 0.0397
Epoch 00036: val_loss did not improve from 0.13811
10471/10471 [=====] - 1s 63us/sample - loss: 0.1377 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0396 - val_loss: 0.2134 - val_mean_absolute_error: 0.2135 - val_mean_squared_error: 0.0688
Epoch 37/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1426 - mean_absolute_error: 0.1426 - mean_squared_error: 0.0410
Epoch 00037: val_loss did not improve from 0.13811
10471/10471 [=====] - 1s 64us/sample - loss: 0.1426 - mean_absolute_error: 0.1425 - mean_squared_error: 0.0410 - val_loss: 0.1746 - val_mean_absolute_error: 0.1745 - val_mean_squared_error: 0.0575
Epoch 38/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1392 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0404
Epoch 00038: val_loss did not improve from 0.13811
10471/10471 [=====] - 1s 61us/sample - loss: 0.1386 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0400 - val_loss: 0.1398 - val_mean_absolute_error: 0.1397 - val_mean_squared_error: 0.0427
Epoch 39/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1328 - mean_absolute_error: 0.1328 - mean_squared_error: 0.0381
Epoch 00039: val_loss improved from 0.13811 to 0.13803, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1330 - mean_absolute_error: 0.1330 - mean_squared_error: 0.0382 - val_loss: 0.1380 - val_mean_absolute_error: 0.1380 - val_mean_squared_error: 0.0417
Epoch 40/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0397
Epoch 00040: val_loss did not improve from 0.13803
10471/10471 [=====] - 1s 65us/sample - loss: 0.1375 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0397 - val_loss: 0.1578 - val_mean_absolute_error: 0.1579 - val_mean_squared_error: 0.0468
Epoch 41/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0396
Epoch 00041: val_loss did not improve from 0.13803
10471/10471 [=====] - 1s 64us/sample - loss: 0.1384 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0395 - val_loss: 0.1441 - val_mean_absolute_error: 0.1441 - val_mean_squared_error: 0.0441
Epoch 42/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0395
Epoch 00042: val_loss did not improve from 0.13803
10471/10471 [=====] - 1s 64us/sample - loss: 0.1381 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0395 - val_loss: 0.1593 - val_mean_absolute_error: 0.1594 - val_mean_squared_error: 0.0465
Epoch 43/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1328 - mean_absolute_error:

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ror: 0.1328 - mean_squared_error: 0.0376
Epoch 00043: val_loss did not improve from 0.13803
10471/10471 [=====] - 1s 64us/sample - loss: 0.1329 - mean_absolute_error: 0.1328 - mean_squared_error: 0.0375 - val_loss: 0.1393 - val_mean_absolute_error: 0.1393 - val_mean_squared_error: 0.0408
Epoch 44/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1343 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0383
Epoch 00044: val_loss did not improve from 0.13803
10471/10471 [=====] - 1s 64us/sample - loss: 0.1343 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0383 - val_loss: 0.1406 - val_mean_absolute_error: 0.1406 - val_mean_squared_error: 0.0421
Epoch 45/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1305 - mean_absolute_error: 0.1305 - mean_squared_error: 0.0367
Epoch 00045: val_loss did not improve from 0.13803
10471/10471 [=====] - 1s 67us/sample - loss: 0.1306 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0366 - val_loss: 0.1405 - val_mean_absolute_error: 0.1405 - val_mean_squared_error: 0.0421
Epoch 46/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1317 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0369
Epoch 00046: val_loss did not improve from 0.13803
10471/10471 [=====] - 1s 72us/sample - loss: 0.1313 - mean_absolute_error: 0.1312 - mean_squared_error: 0.0367 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0441
Epoch 47/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1273 - mean_absolute_error: 0.1273 - mean_squared_error: 0.0356
Epoch 00047: val_loss did not improve from 0.13803
10471/10471 [=====] - 1s 64us/sample - loss: 0.1274 - mean_absolute_error: 0.1274 - mean_squared_error: 0.0356 - val_loss: 0.1759 - val_mean_absolute_error: 0.1758 - val_mean_squared_error: 0.0576
Epoch 48/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0383
Epoch 00048: val_loss did not improve from 0.13803
10471/10471 [=====] - 1s 64us/sample - loss: 0.1338 - mean_absolute_error: 0.1338 - mean_squared_error: 0.0382 - val_loss: 0.1462 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0431
Epoch 49/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1342 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0375
Epoch 00049: val_loss did not improve from 0.13803
10471/10471 [=====] - 1s 63us/sample - loss: 0.1341 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0375 - val_loss: 0.1436 - val_mean_absolute_error: 0.1436 - val_mean_squared_error: 0.0440
Epoch 50/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1338 - mean_absolute_error: 0.1338 - mean_squared_error: 0.0377
Epoch 00050: val_loss improved from 0.13803 to 0.13742, saving model to best_basic_mode.1.hdf5
10471/10471 [=====] - 1s 62us/sample - loss: 0.1336 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0375 - val_loss: 0.1374 - val_mean_absolute_error: 0.1374 - val_mean_squared_error: 0.0413
Epoch 51/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1308 - mean_absolute_error: 0.1308 - mean_squared_error: 0.0369
Epoch 00051: val_loss did not improve from 0.13742
10471/10471 [=====] - 1s 59us/sample - loss: 0.1305 - mean_absolute_error: 0.1305 - mean_squared_error: 0.0367 - val_loss: 0.2242 - val_mean_absolute_error: 0.2242 - val_mean_squared_error: 0.0421
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rror: 0.2240 - val_mean_squared_error: 0.0798
Epoch 52/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0379
Epoch 00052: val_loss did not improve from 0.13742
10471/10471 [=====] - 1s 60us/sample - loss: 0.1366 - mean_absolute_error: 0.1366 - mean_squared_error: 0.0383 - val_loss: 0.1940 - val_mean_absolute_error: 0.1939 - val_mean_squared_error: 0.0664
Epoch 53/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1334 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0383
Epoch 00053: val_loss did not improve from 0.13742
10471/10471 [=====] - 1s 63us/sample - loss: 0.1325 - mean_absolute_error: 0.1324 - mean_squared_error: 0.0374 - val_loss: 0.2037 - val_mean_absolute_error: 0.2036 - val_mean_squared_error: 0.0702
Epoch 54/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1283 - mean_absolute_error: 0.1283 - mean_squared_error: 0.0354
Epoch 00054: val_loss did not improve from 0.13742
10471/10471 [=====] - 1s 69us/sample - loss: 0.1283 - mean_absolute_error: 0.1283 - mean_squared_error: 0.0355 - val_loss: 0.1504 - val_mean_absolute_error: 0.1505 - val_mean_squared_error: 0.0436
Epoch 55/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1289 - mean_absolute_error: 0.1289 - mean_squared_error: 0.0354
Epoch 00055: val_loss improved from 0.13742 to 0.13707, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.1291 - mean_absolute_error: 0.1294 - mean_squared_error: 0.0357 - val_loss: 0.1371 - val_mean_absolute_error: 0.1370 - val_mean_squared_error: 0.0408
Epoch 56/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1291 - mean_absolute_error: 0.1291 - mean_squared_error: 0.0356
Epoch 00056: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 60us/sample - loss: 0.1288 - mean_absolute_error: 0.1287 - mean_squared_error: 0.0353 - val_loss: 0.1647 - val_mean_absolute_error: 0.1646 - val_mean_squared_error: 0.0539
Epoch 57/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1256 - mean_absolute_error: 0.1256 - mean_squared_error: 0.0344
Epoch 00057: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 61us/sample - loss: 0.1255 - mean_absolute_error: 0.1256 - mean_squared_error: 0.0345 - val_loss: 0.1800 - val_mean_absolute_error: 0.1801 - val_mean_squared_error: 0.0552
Epoch 58/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1284 - mean_absolute_error: 0.1284 - mean_squared_error: 0.0352
Epoch 00058: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 62us/sample - loss: 0.1285 - mean_absolute_error: 0.1286 - mean_squared_error: 0.0355 - val_loss: 0.1418 - val_mean_absolute_error: 0.1417 - val_mean_squared_error: 0.0434
Epoch 59/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1292 - mean_absolute_error: 0.1292 - mean_squared_error: 0.0358
Epoch 00059: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 63us/sample - loss: 0.1289 - mean_absolute_error: 0.1291 - mean_squared_error: 0.0358 - val_loss: 0.1382 - val_mean_absolute_error: 0.1383 - val_mean_squared_error: 0.0408
Epoch 60/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1248 - mean_absolute_error: 0.1248 - mean_squared_error: 0.0341
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Epoch 00060: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 62us/sample - loss: 0.1251 - mean_absolute_error: 0.1252 - mean_squared_error: 0.0342 - val_loss: 0.1404 - val_mean_absolute_error: 0.1405 - val_mean_squared_error: 0.0418
Epoch 61/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1287 - mean_absolute_error: 0.1287 - mean_squared_error: 0.0349
Epoch 00061: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 61us/sample - loss: 0.1294 - mean_absolute_error: 0.1292 - mean_squared_error: 0.0351 - val_loss: 0.2162 - val_mean_absolute_error: 0.2163 - val_mean_squared_error: 0.0703
Epoch 62/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1273 - mean_absolute_error: 0.1273 - mean_squared_error: 0.0350
Epoch 00062: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 60us/sample - loss: 0.1270 - mean_absolute_error: 0.1270 - mean_squared_error: 0.0347 - val_loss: 0.1417 - val_mean_absolute_error: 0.1417 - val_mean_squared_error: 0.0430
Epoch 63/500
9760/10471 [=====>..] - ETA: 0s - loss: 0.1286 - mean_absolute_error: 0.1286 - mean_squared_error: 0.0353
Epoch 00063: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 61us/sample - loss: 0.1287 - mean_absolute_error: 0.1287 - mean_squared_error: 0.0353 - val_loss: 0.1542 - val_mean_absolute_error: 0.1542 - val_mean_squared_error: 0.0460
Epoch 64/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1255 - mean_absolute_error: 0.1255 - mean_squared_error: 0.0342
Epoch 00064: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 60us/sample - loss: 0.1253 - mean_absolute_error: 0.1253 - mean_squared_error: 0.0341 - val_loss: 0.1565 - val_mean_absolute_error: 0.1565 - val_mean_squared_error: 0.0495
Epoch 65/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1262 - mean_absolute_error: 0.1262 - mean_squared_error: 0.0348
Epoch 00065: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 60us/sample - loss: 0.1257 - mean_absolute_error: 0.1257 - mean_squared_error: 0.0344 - val_loss: 0.1639 - val_mean_absolute_error: 0.1640 - val_mean_squared_error: 0.0491
Epoch 66/500
9664/10471 [=====>..] - ETA: 0s - loss: 0.1262 - mean_absolute_error: 0.1262 - mean_squared_error: 0.0344
Epoch 00066: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 63us/sample - loss: 0.1260 - mean_absolute_error: 0.1261 - mean_squared_error: 0.0345 - val_loss: 0.1505 - val_mean_absolute_error: 0.1505 - val_mean_squared_error: 0.0469
Epoch 67/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1205 - mean_absolute_error: 0.1205 - mean_squared_error: 0.0322
Epoch 00067: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 62us/sample - loss: 0.1207 - mean_absolute_error: 0.1206 - mean_squared_error: 0.0323 - val_loss: 0.1425 - val_mean_absolute_error: 0.1424 - val_mean_squared_error: 0.0436
Epoch 68/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1258 - mean_absolute_error: 0.1258 - mean_squared_error: 0.0345
Epoch 00068: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 61us/sample - loss: 0.1258 - mean_absolute_error: 0.1257 - mean_squared_error: 0.0345 - val_loss: 0.1396 - val_mean_absolute_error: 0.1396 - val_mean_squared_error: 0.0412
Epoch 69/500
```

9792/10471 [=====>..] - ETA: 0s - loss: 0.1276 - mean_absolute_error: 0.1276 - mean_squared_error: 0.0350
Epoch 00069: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 62us/sample - loss: 0.1276 - mean_absolute_error: 0.1277 - mean_squared_error: 0.0351 - val_loss: 0.1407 - val_mean_absolute_error: 0.1407 - val_mean_squared_error: 0.0425
Epoch 70/500
9696/10471 [=====>..] - ETA: 0s - loss: 0.1324 - mean_absolute_error: 0.1324 - mean_squared_error: 0.0365
Epoch 00070: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 62us/sample - loss: 0.1320 - mean_absolute_error: 0.1321 - mean_squared_error: 0.0363 - val_loss: 0.1439 - val_mean_absolute_error: 0.1439 - val_mean_squared_error: 0.0447
Epoch 71/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1207 - mean_absolute_error: 0.1207 - mean_squared_error: 0.0330
Epoch 00071: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 61us/sample - loss: 0.1202 - mean_absolute_error: 0.1204 - mean_squared_error: 0.0325 - val_loss: 0.1473 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0435
Epoch 72/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1250 - mean_absolute_error: 0.1250 - mean_squared_error: 0.0341
Epoch 00072: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 61us/sample - loss: 0.1249 - mean_absolute_error: 0.1249 - mean_squared_error: 0.0338 - val_loss: 0.1478 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0434
Epoch 73/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1243 - mean_absolute_error: 0.1243 - mean_squared_error: 0.0333
Epoch 00073: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 61us/sample - loss: 0.1242 - mean_absolute_error: 0.1242 - mean_squared_error: 0.0334 - val_loss: 0.1921 - val_mean_absolute_error: 0.1923 - val_mean_squared_error: 0.0601
Epoch 74/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1230 - mean_absolute_error: 0.1230 - mean_squared_error: 0.0332
Epoch 00074: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 61us/sample - loss: 0.1228 - mean_absolute_error: 0.1227 - mean_squared_error: 0.0331 - val_loss: 0.1426 - val_mean_absolute_error: 0.1426 - val_mean_squared_error: 0.0428
Epoch 75/500
9696/10471 [=====>..] - ETA: 0s - loss: 0.1231 - mean_absolute_error: 0.1231 - mean_squared_error: 0.0330
Epoch 00075: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 63us/sample - loss: 0.1233 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0332 - val_loss: 0.1558 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0494
Epoch 76/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1228 - mean_absolute_error: 0.1228 - mean_squared_error: 0.0333
Epoch 00076: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 60us/sample - loss: 0.1225 - mean_absolute_error: 0.1225 - mean_squared_error: 0.0329 - val_loss: 0.1692 - val_mean_absolute_error: 0.1691 - val_mean_squared_error: 0.0545
Epoch 77/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1253 - mean_absolute_error: 0.1253 - mean_squared_error: 0.0339
Epoch 00077: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 60us/sample - loss: 0.1246 - mean_absolute_error: 0.1246 - mean_squared_error: 0.0338 - val_loss: 0.1454 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0447

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rror: 0.1455 - val_mean_squared_error: 0.0431
Epoch 78/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1228 - mean_absolute_error: 0.1228 - mean_squared_error: 0.0325
Epoch 00078: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 59us/sample - loss: 0.1236 - mean_absolute_error: 0.1237 - mean_squared_error: 0.0332 - val_loss: 0.1509 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0465
Epoch 79/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1224 - mean_absolute_error: 0.1224 - mean_squared_error: 0.0326
Epoch 00079: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 60us/sample - loss: 0.1225 - mean_absolute_error: 0.1224 - mean_squared_error: 0.0328 - val_loss: 0.1720 - val_mean_absolute_error: 0.1721 - val_mean_squared_error: 0.0518
Epoch 80/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1272 - mean_absolute_error: 0.1272 - mean_squared_error: 0.0341Restoring model weights from the end of the best epoch.

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Epoch 00080: val_loss did not improve from 0.13707
10471/10471 [=====] - 1s 62us/sample - loss: 0.1282 - mean_absolute_error: 0.1282 - mean_squared_error: 0.0348 - val_loss: 0.1638 - val_mean_absolute_error: 0.1637 - val_mean_squared_error: 0.0530
Epoch 00080: early stopping
MAE: 0.13702798
RMSE: 0.2020836
Adding initial Dense layers with 1024
Adding Dense layer with 512
Adding Dense layer with 256
Adding Dense layer with 128
Adding Dense layer with 64
Adding Dense layer with 32
Adding last layer with 16
Outputting predictive model - Tabular
Model: "model_58"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_59 (InputLayer)	[(None, 61)]	0
dense_444 (Dense)	(None, 1024)	63488
dense_445 (Dense)	(None, 512)	524800
dense_446 (Dense)	(None, 256)	131328
dense_447 (Dense)	(None, 128)	32896
dense_448 (Dense)	(None, 64)	8256
dense_449 (Dense)	(None, 32)	2080
dense_450 (Dense)	(None, 16)	528
dense_451 (Dense)	(None, 1)	17
<hr/>		
Total params: 763,393		
Trainable params: 763,393		
Non-trainable params: 0		

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
    9952/10471 [=====>..] - ETA: 0s - loss: 1.7655 - mean_absolute_error: 1.7655 - mean_squared_error: 6.6936
Epoch 00001: val_loss improved from inf to 0.99923, saving model to best_basic_model.hdf5
    10471/10471 [=====] - 2s 156us/sample - loss: 1.7043 - mean_absolute_error: 1.7016 - mean_squared_error: 6.3714 - val_loss: 0.9992 - val_mean_absolute_error: 0.9995 - val_mean_squared_error: 1.3050
Epoch 2/500
    10368/10471 [=====>.] - ETA: 0s - loss: 0.4389 - mean_absolute_error: 0.4389 - mean_squared_error: 0.3685
Epoch 00002: val_loss improved from 0.99923 to 0.23282, saving model to best_basic_mode1.hdf5
    10471/10471 [=====] - 1s 77us/sample - loss: 0.4369 - mean_absolute_error: 0.4370 - mean_squared_error: 0.3657 - val_loss: 0.2328 - val_mean_absolute_error: 0.2328 - val_mean_squared_error: 0.0968
Epoch 3/500
    10400/10471 [=====>.] - ETA: 0s - loss: 0.2279 - mean_absolute_error: 0.2279 - mean_squared_error: 0.0894
Epoch 00003: val_loss improved from 0.23282 to 0.17930, saving model to best_basic_mode1.hdf5
    10471/10471 [=====] - 1s 77us/sample - loss: 0.2278 - mean_absolute_error: 0.2278 - mean_squared_error: 0.0893 - val_loss: 0.1793 - val_mean_absolute_error: 0.1793 - val_mean_squared_error: 0.0605
Epoch 4/500
    10400/10471 [=====>.] - ETA: 0s - loss: 0.2054 - mean_absolute_error: 0.2054 - mean_squared_error: 0.0734
Epoch 00004: val_loss did not improve from 0.17930
    10471/10471 [=====] - 1s 73us/sample - loss: 0.2059 - mean_absolute_error: 0.2063 - mean_squared_error: 0.0738 - val_loss: 0.2340 - val_mean_absolute_error: 0.2341 - val_mean_squared_error: 0.0838
Epoch 5/500
    10176/10471 [=====>.] - ETA: 0s - loss: 0.1958 - mean_absolute_error: 0.1958 - mean_squared_error: 0.0666
Epoch 00005: val_loss improved from 0.17930 to 0.17498, saving model to best_basic_mode1.hdf5
    10471/10471 [=====] - 1s 79us/sample - loss: 0.1959 - mean_absolute_error: 0.1958 - mean_squared_error: 0.0666 - val_loss: 0.1750 - val_mean_absolute_error: 0.1749 - val_mean_squared_error: 0.0576
Epoch 6/500
    10048/10471 [=====>..] - ETA: 0s - loss: 0.2164 - mean_absolute_error: 0.2164 - mean_squared_error: 0.0786
Epoch 00006: val_loss improved from 0.17498 to 0.17372, saving model to best_basic_mode1.hdf5
    10471/10471 [=====] - 1s 79us/sample - loss: 0.2161 - mean_absolute_error: 0.2163 - mean_squared_error: 0.0786 - val_loss: 0.1737 - val_mean_absolute_error: 0.1737 - val_mean_squared_error: 0.0580
Epoch 7/500
    9856/10471 [=====>..] - ETA: 0s - loss: 0.1676 - mean_absolute_error: 0.1676 - mean_squared_error: 0.0521
Epoch 00007: val_loss improved from 0.17372 to 0.16194, saving model to best_basic_mode1.hdf5
    10471/10471 [=====] - 1s 75us/sample - loss: 0.1686 - mean_absolute_error: 0.1687 - mean_squared_error: 0.0529 - val_loss: 0.1619 - val_mean_absolute_error: 0.1619 - val_mean_squared_error: 0.0513
Epoch 8/500
    9824/10471 [=====>..] - ETA: 0s - loss: 0.1882 - mean_absolute_error: 0.1882 - mean_squared_error: 0.0628
```

```
Epoch 00008: val_loss did not improve from 0.16194
10471/10471 [=====] - 1s 72us/sample - loss: 0.1868 - mean_absolute_error: 0.1867 - mean_squared_error: 0.0622 - val_loss: 0.1899 - val_mean_absolute_error: 0.1899 - val_mean_squared_error: 0.0647
Epoch 9/500
    9824/10471 [=====>..] - ETA: 0s - loss: 0.1822 - mean_absolute_error: 0.1822 - mean_squared_error: 0.0593
Epoch 00009: val_loss improved from 0.16194 to 0.15101, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 75us/sample - loss: 0.1816 - mean_absolute_error: 0.1816 - mean_squared_error: 0.0588 - val_loss: 0.1510 - val_mean_absolute_error: 0.1510 - val_mean_squared_error: 0.0455
Epoch 10/500
    9920/10471 [=====>..] - ETA: 0s - loss: 0.1774 - mean_absolute_error: 0.1774 - mean_squared_error: 0.0568
Epoch 00010: val_loss did not improve from 0.15101
10471/10471 [=====] - 1s 72us/sample - loss: 0.1786 - mean_absolute_error: 0.1790 - mean_squared_error: 0.0575 - val_loss: 0.2831 - val_mean_absolute_error: 0.2831 - val_mean_squared_error: 0.1208
Epoch 11/500
    9792/10471 [=====>..] - ETA: 0s - loss: 0.1644 - mean_absolute_error: 0.1644 - mean_squared_error: 0.0503
Epoch 00011: val_loss improved from 0.15101 to 0.14282, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 75us/sample - loss: 0.1642 - mean_absolute_error: 0.1643 - mean_squared_error: 0.0500 - val_loss: 0.1428 - val_mean_absolute_error: 0.1428 - val_mean_squared_error: 0.0422
Epoch 12/500
    9920/10471 [=====>..] - ETA: 0s - loss: 0.1774 - mean_absolute_error: 0.1774 - mean_squared_error: 0.0571
Epoch 00012: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 73us/sample - loss: 0.1758 - mean_absolute_error: 0.1758 - mean_squared_error: 0.0565 - val_loss: 0.2007 - val_mean_absolute_error: 0.2008 - val_mean_squared_error: 0.0682
Epoch 13/500
    10208/10471 [=====>..] - ETA: 0s - loss: 0.1609 - mean_absolute_error: 0.1609 - mean_squared_error: 0.0488
Epoch 00013: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 75us/sample - loss: 0.1603 - mean_absolute_error: 0.1605 - mean_squared_error: 0.0487 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0443
Epoch 14/500
    9696/10471 [=====>..] - ETA: 0s - loss: 0.1680 - mean_absolute_error: 0.1680 - mean_squared_error: 0.0510
Epoch 00014: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 73us/sample - loss: 0.1685 - mean_absolute_error: 0.1687 - mean_squared_error: 0.0514 - val_loss: 0.1868 - val_mean_absolute_error: 0.1868 - val_mean_squared_error: 0.0574
Epoch 15/500
    10240/10471 [=====>..] - ETA: 0s - loss: 0.1436 - mean_absolute_error: 0.1436 - mean_squared_error: 0.0412
Epoch 00015: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 74us/sample - loss: 0.1433 - mean_absolute_error: 0.1432 - mean_squared_error: 0.0410 - val_loss: 0.1662 - val_mean_absolute_error: 0.1663 - val_mean_squared_error: 0.0500
Epoch 16/500
    10016/10471 [=====>..] - ETA: 0s - loss: 0.1581 - mean_absolute_error: 0.1581 - mean_squared_error: 0.0476
Epoch 00016: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 71us/sample - loss: 0.1573 - mean_absolute_error: 0.1574 - mean_squared_error: 0.0471 - val_loss: 0.1447 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0471
```

```
rror: 0.1447 - val_mean_squared_error: 0.0425
Epoch 17/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1686 - mean_absolute_error: 0.1686 - mean_squared_error: 0.0516
Epoch 00017: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 70us/sample - loss: 0.1678 - mean_absolute_error: 0.1677 - mean_squared_error: 0.0511 - val_loss: 0.1821 - val_mean_absolute_error: 0.1822 - val_mean_squared_error: 0.0568
Epoch 18/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1366 - mean_absolute_error: 0.1366 - mean_squared_error: 0.0372
Epoch 00018: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 72us/sample - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0374 - val_loss: 0.1809 - val_mean_absolute_error: 0.1809 - val_mean_squared_error: 0.0577
Epoch 19/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1456 - mean_absolute_error: 0.1456 - mean_squared_error: 0.0408
Epoch 00019: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 72us/sample - loss: 0.1457 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0409 - val_loss: 0.1788 - val_mean_absolute_error: 0.1787 - val_mean_squared_error: 0.0564
Epoch 20/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0373
Epoch 00020: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 71us/sample - loss: 0.1353 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0370 - val_loss: 0.1653 - val_mean_absolute_error: 0.1653 - val_mean_squared_error: 0.0494
Epoch 21/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.1347 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0359
Epoch 00021: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 74us/sample - loss: 0.1348 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0359 - val_loss: 0.1953 - val_mean_absolute_error: 0.1952 - val_mean_squared_error: 0.0665
Epoch 22/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0378
Epoch 00022: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 75us/sample - loss: 0.1384 - mean_absolute_error: 0.1385 - mean_squared_error: 0.0377 - val_loss: 0.1431 - val_mean_absolute_error: 0.1431 - val_mean_squared_error: 0.0429
Epoch 23/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1245 - mean_absolute_error: 0.1245 - mean_squared_error: 0.0323
Epoch 00023: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 77us/sample - loss: 0.1243 - mean_absolute_error: 0.1243 - mean_squared_error: 0.0321 - val_loss: 0.1659 - val_mean_absolute_error: 0.1660 - val_mean_squared_error: 0.0505
Epoch 24/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1385 - mean_absolute_error: 0.1385 - mean_squared_error: 0.0370
Epoch 00024: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 74us/sample - loss: 0.1390 - mean_absolute_error: 0.1389 - mean_squared_error: 0.0370 - val_loss: 0.1616 - val_mean_absolute_error: 0.1617 - val_mean_squared_error: 0.0495
Epoch 25/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.1243 - mean_absolute_error: 0.1243 - mean_squared_error: 0.0318
Epoch 00025: val_loss improved from 0.14282 to 0.14080, saving model to best_basic_mode
```

1.hdf5

10471/10471 [=====] - 1s 77us/sample - loss: 0.1242 - mean_absolute_error: 0.1241 - mean_squared_error: 0.0316 - val_loss: 0.1408 - val_mean_absolute_error: 0.1408 - val_mean_squared_error: 0.0416

Epoch 26/500

10368/10471 [=====>.] - ETA: 0s - loss: 0.1180 - mean_absolute_error: 0.1180 - mean_squared_error: 0.0296

Epoch 00026: val_loss did not improve from 0.14080

10471/10471 [=====] - 1s 75us/sample - loss: 0.1181 - mean_absolute_error: 0.1180 - mean_squared_error: 0.0297 - val_loss: 0.1415 - val_mean_absolute_error: 0.1415 - val_mean_squared_error: 0.0421

Epoch 27/500

10080/10471 [=====>..] - ETA: 0s - loss: 0.1197 - mean_absolute_error: 0.1197 - mean_squared_error: 0.0298

Epoch 00027: val_loss did not improve from 0.14080

10471/10471 [=====] - 1s 75us/sample - loss: 0.1198 - mean_absolute_error: 0.1198 - mean_squared_error: 0.0299 - val_loss: 0.1824 - val_mean_absolute_error: 0.1823 - val_mean_squared_error: 0.0599

Epoch 28/500

10336/10471 [=====>.] - ETA: 0s - loss: 0.1251 - mean_absolute_error: 0.1251 - mean_squared_error: 0.0318

Epoch 00028: val_loss did not improve from 0.14080

10471/10471 [=====] - 1s 74us/sample - loss: 0.1250 - mean_absolute_error: 0.1251 - mean_squared_error: 0.0318 - val_loss: 0.1474 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0445

Epoch 29/500

10368/10471 [=====>.] - ETA: 0s - loss: 0.1099 - mean_absolute_error: 0.1099 - mean_squared_error: 0.0261

Epoch 00029: val_loss did not improve from 0.14080

10471/10471 [=====] - 1s 74us/sample - loss: 0.1101 - mean_absolute_error: 0.1101 - mean_squared_error: 0.0263 - val_loss: 0.1445 - val_mean_absolute_error: 0.1445 - val_mean_squared_error: 0.0428

Epoch 30/500

10240/10471 [=====>.] - ETA: 0s - loss: 0.1125 - mean_absolute_error: 0.1125 - mean_squared_error: 0.0268

Epoch 00030: val_loss did not improve from 0.14080

10471/10471 [=====] - 1s 79us/sample - loss: 0.1131 - mean_absolute_error: 0.1130 - mean_squared_error: 0.0272 - val_loss: 0.1639 - val_mean_absolute_error: 0.1639 - val_mean_squared_error: 0.0511

Epoch 31/500

9920/10471 [=====>..] - ETA: 0s - loss: 0.1145 - mean_absolute_error: 0.1145 - mean_squared_error: 0.0271

Epoch 00031: val_loss did not improve from 0.14080

10471/10471 [=====] - 1s 77us/sample - loss: 0.1150 - mean_absolute_error: 0.1154 - mean_squared_error: 0.0279 - val_loss: 0.1569 - val_mean_absolute_error: 0.1570 - val_mean_squared_error: 0.0502

Epoch 32/500

10144/10471 [=====>..] - ETA: 0s - loss: 0.1078 - mean_absolute_error: 0.1078 - mean_squared_error: 0.0253

Epoch 00032: val_loss did not improve from 0.14080

10471/10471 [=====] - 1s 75us/sample - loss: 0.1077 - mean_absolute_error: 0.1077 - mean_squared_error: 0.0251 - val_loss: 0.1500 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0447

Epoch 33/500

10208/10471 [=====>..] - ETA: 0s - loss: 0.1062 - mean_absolute_error: 0.1062 - mean_squared_error: 0.0242

Epoch 00033: val_loss did not improve from 0.14080

10471/10471 [=====] - 1s 80us/sample - loss: 0.1062 - mean_absolute_error: 0.1062 - mean_squared_error: 0.0242 - val_loss: 0.1613 - val_mean_absolute_error: 0.1612 - val_mean_squared_error: 0.0503

Epoch 34/500

9984/10471 [=====>..] - ETA: 0s - loss: 0.1051 - mean_absolute_error: 0.1051 - mean_squared_error: 0.0236
Epoch 00034: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 82us/sample - loss: 0.1052 - mean_absolute_error: 0.1051 - mean_squared_error: 0.0236 - val_loss: 0.1752 - val_mean_absolute_error: 0.1753 - val_mean_squared_error: 0.0556
Epoch 35/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1021 - mean_absolute_error: 0.1021 - mean_squared_error: 0.0228
Epoch 00035: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 76us/sample - loss: 0.1022 - mean_absolute_error: 0.1022 - mean_squared_error: 0.0228 - val_loss: 0.1446 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0445
Epoch 36/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1081 - mean_absolute_error: 0.1081 - mean_squared_error: 0.0245
Epoch 00036: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 76us/sample - loss: 0.1074 - mean_absolute_error: 0.1073 - mean_squared_error: 0.0242 - val_loss: 0.1545 - val_mean_absolute_error: 0.1545 - val_mean_squared_error: 0.0477
Epoch 37/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1042 - mean_absolute_error: 0.1042 - mean_squared_error: 0.0228
Epoch 00037: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 79us/sample - loss: 0.1042 - mean_absolute_error: 0.1042 - mean_squared_error: 0.0229 - val_loss: 0.1561 - val_mean_absolute_error: 0.1561 - val_mean_squared_error: 0.0471
Epoch 38/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.0977 - mean_absolute_error: 0.0977 - mean_squared_error: 0.0200
Epoch 00038: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 76us/sample - loss: 0.0988 - mean_absolute_error: 0.0987 - mean_squared_error: 0.0207 - val_loss: 0.1608 - val_mean_absolute_error: 0.1607 - val_mean_squared_error: 0.0512
Epoch 39/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.0988 - mean_absolute_error: 0.0988 - mean_squared_error: 0.0210
Epoch 00039: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 71us/sample - loss: 0.0985 - mean_absolute_error: 0.0986 - mean_squared_error: 0.0209 - val_loss: 0.1816 - val_mean_absolute_error: 0.1817 - val_mean_squared_error: 0.0590
Epoch 40/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1008 - mean_absolute_error: 0.1008 - mean_squared_error: 0.0212
Epoch 00040: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 71us/sample - loss: 0.1004 - mean_absolute_error: 0.1003 - mean_squared_error: 0.0212 - val_loss: 0.1561 - val_mean_absolute_error: 0.1560 - val_mean_squared_error: 0.0500
Epoch 41/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1040 - mean_absolute_error: 0.1040 - mean_squared_error: 0.0224
Epoch 00041: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 70us/sample - loss: 0.1033 - mean_absolute_error: 0.1031 - mean_squared_error: 0.0221 - val_loss: 0.1510 - val_mean_absolute_error: 0.1510 - val_mean_squared_error: 0.0461
Epoch 42/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.0928 - mean_absolute_error: 0.0928 - mean_squared_error: 0.0188
Epoch 00042: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 70us/sample - loss: 0.0926 - mean_absolute_error: 0.0931 - mean_squared_error: 0.0193 - val_loss: 0.1434 - val_mean_absolute_error: 0.1434 - val_mean_squared_error: 0.0445

```
rror: 0.1434 - val_mean_squared_error: 0.0434
Epoch 43/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1030 - mean_absolute_error: 0.1030 - mean_squared_error: 0.0218
Epoch 00043: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 71us/sample - loss: 0.1023 - mean_absolute_error: 0.1022 - mean_squared_error: 0.0215 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0441
Epoch 44/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.0988 - mean_absolute_error: 0.0988 - mean_squared_error: 0.0202
Epoch 00044: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 70us/sample - loss: 0.1001 - mean_absolute_error: 0.1003 - mean_squared_error: 0.0205 - val_loss: 0.1705 - val_mean_absolute_error: 0.1705 - val_mean_squared_error: 0.0545
Epoch 45/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.0896 - mean_absolute_error: 0.0896 - mean_squared_error: 0.0174
Epoch 00045: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 71us/sample - loss: 0.0908 - mean_absolute_error: 0.0909 - mean_squared_error: 0.0178 - val_loss: 0.1606 - val_mean_absolute_error: 0.1606 - val_mean_squared_error: 0.0516
Epoch 46/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.0964 - mean_absolute_error: 0.0964 - mean_squared_error: 0.0191
Epoch 00046: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 72us/sample - loss: 0.0967 - mean_absolute_error: 0.0967 - mean_squared_error: 0.0193 - val_loss: 0.1774 - val_mean_absolute_error: 0.1774 - val_mean_squared_error: 0.0587
Epoch 47/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.0976 - mean_absolute_error: 0.0976 - mean_squared_error: 0.0189
Epoch 00047: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 72us/sample - loss: 0.0975 - mean_absolute_error: 0.0974 - mean_squared_error: 0.0188 - val_loss: 0.1486 - val_mean_absolute_error: 0.1486 - val_mean_squared_error: 0.0461
Epoch 48/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.0895 - mean_absolute_error: 0.0895 - mean_squared_error: 0.0169
Epoch 00048: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 71us/sample - loss: 0.0895 - mean_absolute_error: 0.0895 - mean_squared_error: 0.0169 - val_loss: 0.1511 - val_mean_absolute_error: 0.1510 - val_mean_squared_error: 0.0462
Epoch 49/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.0893 - mean_absolute_error: 0.0893 - mean_squared_error: 0.0167
Epoch 00049: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 71us/sample - loss: 0.0888 - mean_absolute_error: 0.0888 - mean_squared_error: 0.0165 - val_loss: 0.1507 - val_mean_absolute_error: 0.1506 - val_mean_squared_error: 0.0469
Epoch 50/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.0847 - mean_absolute_error: 0.0847 - mean_squared_error: 0.0154Restoring model weights from the end of the best epoch.

Epoch 00050: val_loss did not improve from 0.14080
10471/10471 [=====] - 1s 71us/sample - loss: 0.0846 - mean_absolute_error: 0.0846 - mean_squared_error: 0.0154 - val_loss: 0.1689 - val_mean_absolute_error: 0.1688 - val_mean_squared_error: 0.0532
Epoch 00050: early stopping
MAE: 0.14076869
```

```
RMSE: 0.20400706
Adding initial Dense layers with 64
Adding Dense layer with 64
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_59"
```

Layer (type)	Output Shape	Param #
=====		
input_60 (InputLayer)	[(None, 61)]	0
dense_452 (Dense)	(None, 64)	3968
dense_453 (Dense)	(None, 64)	4160
dense_454 (Dense)	(None, 64)	4160
dense_455 (Dense)	(None, 1)	65
=====		
Total params: 12,353		
Trainable params: 12,353		
Non-trainable params: 0		

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
 9888/10471 [=====>..] - ETA: 0s - loss: 1.4795 - mean_absolute_error: 1.4795 - mean_squared_error: 8.5919
Epoch 00001: val_loss improved from inf to 0.56185, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 93us/sample - loss: 1.4348 - mean_absolute_error: 1.4333 - mean_squared_error: 8.1370 - val_loss: 0.5618 - val_mean_absolute_error: 0.5621 - val_mean_squared_error: 0.5569
Epoch 2/500
 9920/10471 [=====>..] - ETA: 0s - loss: 0.5114 - mean_absolute_error: 0.5114 - mean_squared_error: 0.4581
Epoch 00002: val_loss improved from 0.56185 to 0.29693, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.5020 - mean_absolute_error: 0.5024 - mean_squared_error: 0.4451 - val_loss: 0.2969 - val_mean_absolute_error: 0.2969 - val_mean_squared_error: 0.1776
Epoch 3/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.4163 - mean_absolute_error: 0.4163 - mean_squared_error: 0.2841
Epoch 00003: val_loss did not improve from 0.29693
10471/10471 [=====] - 1s 55us/sample - loss: 0.4104 - mean_absolute_error: 0.4098 - mean_squared_error: 0.2770 - val_loss: 0.5066 - val_mean_absolute_error: 0.5065 - val_mean_squared_error: 0.3317
Epoch 4/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.3865 - mean_absolute_error: 0.3865 - mean_squared_error: 0.2420
Epoch 00004: val_loss improved from 0.29693 to 0.26760, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.3832 - mean_absolute_error: 0.3826 - mean_squared_error: 0.2382 - val_loss: 0.2676 - val_mean_absolute_error: 0.2674 - val_mean_squared_error: 0.1217
Epoch 5/500
 9792/10471 [=====>..] - ETA: 0s - loss: 0.2887 - mean_absolute_error: 0.2887 - mean_squared_error: 0.1360
Epoch 00005: val_loss did not improve from 0.26760
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10471/10471 [=====] - 1s 66us/sample - loss: 0.2845 - mean_absolute_error: 0.2841 - mean_squared_error: 0.1326 - val_loss: 0.3382 - val_mean_absolute_error: 0.3381 - val_mean_squared_error: 0.1670
Epoch 6/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.2486 - mean_absolute_error: 0.2486 - mean_squared_error: 0.1029
Epoch 00006: val_loss improved from 0.26760 to 0.20438, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.2483 - mean_absolute_error: 0.2481 - mean_squared_error: 0.1025 - val_loss: 0.2044 - val_mean_absolute_error: 0.2044 - val_mean_squared_error: 0.0704
Epoch 7/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.2056 - mean_absolute_error: 0.2056 - mean_squared_error: 0.0734
Epoch 00007: val_loss improved from 0.20438 to 0.19630, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 60us/sample - loss: 0.2057 - mean_absolute_error: 0.2061 - mean_squared_error: 0.0740 - val_loss: 0.1963 - val_mean_absolute_error: 0.1963 - val_mean_squared_error: 0.0686
Epoch 8/500
9984/10471 [=====.>..] - ETA: 0s - loss: 0.1930 - mean_absolute_error: 0.1930 - mean_squared_error: 0.0663
Epoch 00008: val_loss did not improve from 0.19630
10471/10471 [=====] - 1s 60us/sample - loss: 0.1930 - mean_absolute_error: 0.1930 - mean_squared_error: 0.0665 - val_loss: 0.2821 - val_mean_absolute_error: 0.2820 - val_mean_squared_error: 0.1166
Epoch 9/500
10112/10471 [=====.>..] - ETA: 0s - loss: 0.1788 - mean_absolute_error: 0.1788 - mean_squared_error: 0.0585
Epoch 00009: val_loss improved from 0.19630 to 0.18391, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.1787 - mean_absolute_error: 0.1786 - mean_squared_error: 0.0583 - val_loss: 0.1839 - val_mean_absolute_error: 0.1840 - val_mean_squared_error: 0.0574
Epoch 10/500
10080/10471 [=====.>..] - ETA: 0s - loss: 0.1845 - mean_absolute_error: 0.1845 - mean_squared_error: 0.0625
Epoch 00010: val_loss improved from 0.18391 to 0.15243, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.1854 - mean_absolute_error: 0.1853 - mean_squared_error: 0.0627 - val_loss: 0.1524 - val_mean_absolute_error: 0.1524 - val_mean_squared_error: 0.0469
Epoch 11/500
9696/10471 [=====.>...] - ETA: 0s - loss: 0.1779 - mean_absolute_error: 0.1779 - mean_squared_error: 0.0588
Epoch 00011: val_loss did not improve from 0.15243
10471/10471 [=====] - 1s 62us/sample - loss: 0.1776 - mean_absolute_error: 0.1774 - mean_squared_error: 0.0582 - val_loss: 0.1999 - val_mean_absolute_error: 0.2000 - val_mean_squared_error: 0.0655
Epoch 12/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1714 - mean_absolute_error: 0.1714 - mean_squared_error: 0.0553
Epoch 00012: val_loss improved from 0.15243 to 0.14856, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1711 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0551 - val_loss: 0.1486 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0479
Epoch 13/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1609 - mean_absolute_error: 0.1609 - mean_squared_error: 0.0502
Epoch 00013: val_loss did not improve from 0.14856
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10471/10471 [=====] - 1s 59us/sample - loss: 0.1610 - mean_absolute_error: 0.1608 - mean_squared_error: 0.0500 - val_loss: 0.1696 - val_mean_absolute_error: 0.1695 - val_mean_squared_error: 0.0563
Epoch 14/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1627 - mean_absolute_error: 0.1627 - mean_squared_error: 0.0512
Epoch 00014: val_loss improved from 0.14856 to 0.14579, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1641 - mean_absolute_error: 0.1642 - mean_squared_error: 0.0517 - val_loss: 0.1458 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0464
Epoch 15/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1664 - mean_absolute_error: 0.1664 - mean_squared_error: 0.0530
Epoch 00015: val_loss did not improve from 0.14579
10471/10471 [=====] - 1s 60us/sample - loss: 0.1649 - mean_absolute_error: 0.1649 - mean_squared_error: 0.0523 - val_loss: 0.1748 - val_mean_absolute_error: 0.1749 - val_mean_squared_error: 0.0541
Epoch 16/500
9664/10471 [=====>..] - ETA: 0s - loss: 0.1504 - mean_absolute_error: 0.1504 - mean_squared_error: 0.0463
Epoch 00016: val_loss did not improve from 0.14579
10471/10471 [=====] - 1s 57us/sample - loss: 0.1510 - mean_absolute_error: 0.1508 - mean_squared_error: 0.0462 - val_loss: 0.2318 - val_mean_absolute_error: 0.2319 - val_mean_squared_error: 0.0786
Epoch 17/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1595 - mean_absolute_error: 0.1595 - mean_squared_error: 0.0491
Epoch 00017: val_loss improved from 0.14579 to 0.14229, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.1596 - mean_absolute_error: 0.1594 - mean_squared_error: 0.0493 - val_loss: 0.1423 - val_mean_absolute_error: 0.1423 - val_mean_squared_error: 0.0438
Epoch 18/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1518 - mean_absolute_error: 0.1518 - mean_squared_error: 0.0451
Epoch 00018: val_loss improved from 0.14229 to 0.14031, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1520 - mean_absolute_error: 0.1522 - mean_squared_error: 0.0462 - val_loss: 0.1403 - val_mean_absolute_error: 0.1403 - val_mean_squared_error: 0.0436
Epoch 19/500
9600/10471 [=====>..] - ETA: 0s - loss: 0.1470 - mean_absolute_error: 0.1470 - mean_squared_error: 0.0443
Epoch 00019: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 57us/sample - loss: 0.1459 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0437 - val_loss: 0.2311 - val_mean_absolute_error: 0.2312 - val_mean_squared_error: 0.0795
Epoch 20/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1562 - mean_absolute_error: 0.1562 - mean_squared_error: 0.0478
Epoch 00020: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 57us/sample - loss: 0.1560 - mean_absolute_error: 0.1559 - mean_squared_error: 0.0474 - val_loss: 0.1558 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0487
Epoch 21/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1425 - mean_absolute_error: 0.1425 - mean_squared_error: 0.0421
Epoch 00021: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 60us/sample - loss: 0.1421 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0418 - val_loss: 0.1429 - val_mean_absolute_error: 0.1429 - val_mean_squared_error: 0.0487
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rror: 0.1429 - val_mean_squared_error: 0.0444
Epoch 22/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1466 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0433
Epoch 00022: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 61us/sample - loss: 0.1464 - mean_absolute_error: 0.1463 - mean_squared_error: 0.0432 - val_loss: 0.1534 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0491
Epoch 23/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.1440 - mean_absolute_error: 0.1440 - mean_squared_error: 0.0420
Epoch 00023: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 60us/sample - loss: 0.1440 - mean_absolute_error: 0.1439 - mean_squared_error: 0.0419 - val_loss: 0.3451 - val_mean_absolute_error: 0.3450 - val_mean_squared_error: 0.1557
Epoch 24/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1481 - mean_absolute_error: 0.1481 - mean_squared_error: 0.0443
Epoch 00024: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 66us/sample - loss: 0.1477 - mean_absolute_error: 0.1477 - mean_squared_error: 0.0440 - val_loss: 0.1437 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0435
Epoch 25/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.1408 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0414
Epoch 00025: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 69us/sample - loss: 0.1408 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0414 - val_loss: 0.1458 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0445
Epoch 26/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1427 - mean_absolute_error: 0.1427 - mean_squared_error: 0.0411
Epoch 00026: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 59us/sample - loss: 0.1426 - mean_absolute_error: 0.1424 - mean_squared_error: 0.0410 - val_loss: 0.1521 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0459
Epoch 27/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1454 - mean_absolute_error: 0.1454 - mean_squared_error: 0.0428
Epoch 00027: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 59us/sample - loss: 0.1454 - mean_absolute_error: 0.1456 - mean_squared_error: 0.0430 - val_loss: 0.1498 - val_mean_absolute_error: 0.1499 - val_mean_squared_error: 0.0457
Epoch 28/500
9600/10471 [=====>...] - ETA: 0s - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0406
Epoch 00028: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 58us/sample - loss: 0.1390 - mean_absolute_error: 0.1389 - mean_squared_error: 0.0406 - val_loss: 0.2403 - val_mean_absolute_error: 0.2404 - val_mean_squared_error: 0.0836
Epoch 29/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1467 - mean_absolute_error: 0.1467 - mean_squared_error: 0.0433
Epoch 00029: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 56us/sample - loss: 0.1456 - mean_absolute_error: 0.1455 - mean_squared_error: 0.0428 - val_loss: 0.1640 - val_mean_absolute_error: 0.1639 - val_mean_squared_error: 0.0537
Epoch 30/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1391 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0402
Epoch 00030: val_loss did not improve from 0.14031
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10471/10471 [=====] - 1s 55us/sample - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0401 - val_loss: 0.1691 - val_mean_absolute_error: 0.1690 - val_mean_squared_error: 0.0543
Epoch 31/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1413 - mean_absolute_error: 0.1413 - mean_squared_error: 0.0412
Epoch 00031: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 55us/sample - loss: 0.1415 - mean_absolute_error: 0.1417 - mean_squared_error: 0.0414 - val_loss: 0.1451 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0443
Epoch 32/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.1411 - mean_absolute_error: 0.1411 - mean_squared_error: 0.0402
Epoch 00032: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 57us/sample - loss: 0.1408 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0402 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0433
Epoch 33/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1302 - mean_absolute_error: 0.1302 - mean_squared_error: 0.0365
Epoch 00033: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 55us/sample - loss: 0.1304 - mean_absolute_error: 0.1302 - mean_squared_error: 0.0365 - val_loss: 0.1409 - val_mean_absolute_error: 0.1409 - val_mean_squared_error: 0.0436
Epoch 34/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0397
Epoch 00034: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 55us/sample - loss: 0.1369 - mean_absolute_error: 0.1369 - mean_squared_error: 0.0392 - val_loss: 0.1462 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0448
Epoch 35/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1422 - mean_absolute_error: 0.1422 - mean_squared_error: 0.0404
Epoch 00035: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 56us/sample - loss: 0.1418 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0403 - val_loss: 0.1842 - val_mean_absolute_error: 0.1841 - val_mean_squared_error: 0.0628
Epoch 36/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1408 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0404
Epoch 00036: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 55us/sample - loss: 0.1404 - mean_absolute_error: 0.1405 - mean_squared_error: 0.0403 - val_loss: 0.2135 - val_mean_absolute_error: 0.2137 - val_mean_squared_error: 0.0702
Epoch 37/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0389
Epoch 00037: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 56us/sample - loss: 0.1382 - mean_absolute_error: 0.1383 - mean_squared_error: 0.0391 - val_loss: 0.2656 - val_mean_absolute_error: 0.2658 - val_mean_squared_error: 0.0959
Epoch 38/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1361 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0384
Epoch 00038: val_loss improved from 0.14031 to 0.13876, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 55us/sample - loss: 0.1358 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0382 - val_loss: 0.1388 - val_mean_absolute_error: 0.1388 - val_mean_squared_error: 0.0415
Epoch 39/500
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10048/10471 [=====>..] - ETA: 0s - loss: 0.1342 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0376
Epoch 00039: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 55us/sample - loss: 0.1339 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0374 - val_loss: 0.1813 - val_mean_absolute_error: 0.1812 - val_mean_squared_error: 0.0597
Epoch 40/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1278 - mean_absolute_error: 0.1278 - mean_squared_error: 0.0351
Epoch 00040: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 55us/sample - loss: 0.1278 - mean_absolute_error: 0.1277 - mean_squared_error: 0.0350 - val_loss: 0.1568 - val_mean_absolute_error: 0.1567 - val_mean_squared_error: 0.0502
Epoch 41/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0373
Epoch 00041: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 59us/sample - loss: 0.1337 - mean_absolute_error: 0.1335 - mean_squared_error: 0.0371 - val_loss: 0.1475 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0454
Epoch 42/500
9536/10471 [=====>...] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0381
Epoch 00042: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 57us/sample - loss: 0.1342 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0378 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0439
Epoch 43/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1263 - mean_absolute_error: 0.1263 - mean_squared_error: 0.0351
Epoch 00043: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 54us/sample - loss: 0.1264 - mean_absolute_error: 0.1265 - mean_squared_error: 0.0350 - val_loss: 0.1735 - val_mean_absolute_error: 0.1736 - val_mean_squared_error: 0.0546
Epoch 44/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0373
Epoch 00044: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 56us/sample - loss: 0.1342 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0368 - val_loss: 0.1596 - val_mean_absolute_error: 0.1596 - val_mean_squared_error: 0.0469
Epoch 45/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1301 - mean_absolute_error: 0.1301 - mean_squared_error: 0.0357
Epoch 00045: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 55us/sample - loss: 0.1301 - mean_absolute_error: 0.1299 - mean_squared_error: 0.0356 - val_loss: 0.1886 - val_mean_absolute_error: 0.1885 - val_mean_squared_error: 0.0636
Epoch 46/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1384 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0381
Epoch 00046: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 57us/sample - loss: 0.1377 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0378 - val_loss: 0.1806 - val_mean_absolute_error: 0.1807 - val_mean_squared_error: 0.0560
Epoch 47/500
9600/10471 [=====>...] - ETA: 0s - loss: 0.1275 - mean_absolute_error: 0.1275 - mean_squared_error: 0.0346
Epoch 00047: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 57us/sample - loss: 0.1281 - mean_absolute_error: 0.1281 - mean_squared_error: 0.0348 - val_loss: 0.1697 - val_mean_absolute_error: 0.1697 - val_mean_squared_error: 0.0502
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rror: 0.1697 - val_mean_squared_error: 0.0545
Epoch 48/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1274 - mean_absolute_error: 0.1274 - mean_squared_error: 0.0343
Epoch 00048: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 64us/sample - loss: 0.1273 - mean_absolute_error: 0.1273 - mean_squared_error: 0.0342 - val_loss: 0.1570 - val_mean_absolute_error: 0.1571 - val_mean_squared_error: 0.0491
Epoch 49/500
9536/10471 [=====>...] - ETA: 0s - loss: 0.1332 - mean_absolute_error: 0.1332 - mean_squared_error: 0.0368
Epoch 00049: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 58us/sample - loss: 0.1327 - mean_absolute_error: 0.1325 - mean_squared_error: 0.0365 - val_loss: 0.1402 - val_mean_absolute_error: 0.1402 - val_mean_squared_error: 0.0432
Epoch 50/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1241 - mean_absolute_error: 0.1241 - mean_squared_error: 0.0334
Epoch 00050: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 55us/sample - loss: 0.1248 - mean_absolute_error: 0.1249 - mean_squared_error: 0.0338 - val_loss: 0.1430 - val_mean_absolute_error: 0.1431 - val_mean_squared_error: 0.0437
Epoch 51/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1337 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0361
Epoch 00051: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 57us/sample - loss: 0.1335 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0361 - val_loss: 0.1804 - val_mean_absolute_error: 0.1803 - val_mean_squared_error: 0.0588
Epoch 52/500
9504/10471 [=====>...] - ETA: 0s - loss: 0.1275 - mean_absolute_error: 0.1275 - mean_squared_error: 0.0346
Epoch 00052: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 57us/sample - loss: 0.1280 - mean_absolute_error: 0.1279 - mean_squared_error: 0.0348 - val_loss: 0.1439 - val_mean_absolute_error: 0.1439 - val_mean_squared_error: 0.0438
Epoch 53/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1331 - mean_absolute_error: 0.1331 - mean_squared_error: 0.0363
Epoch 00053: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 54us/sample - loss: 0.1329 - mean_absolute_error: 0.1327 - mean_squared_error: 0.0361 - val_loss: 0.1438 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0449
Epoch 54/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1322 - mean_absolute_error: 0.1322 - mean_squared_error: 0.0360
Epoch 00054: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 54us/sample - loss: 0.1318 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0357 - val_loss: 0.1471 - val_mean_absolute_error: 0.1471 - val_mean_squared_error: 0.0460
Epoch 55/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1263 - mean_absolute_error: 0.1263 - mean_squared_error: 0.0340
Epoch 00055: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 56us/sample - loss: 0.1263 - mean_absolute_error: 0.1265 - mean_squared_error: 0.0339 - val_loss: 0.1563 - val_mean_absolute_error: 0.1564 - val_mean_squared_error: 0.0478
Epoch 56/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1302 - mean_absolute_error: 0.1302 - mean_squared_error: 0.0352
Epoch 00056: val_loss did not improve from 0.13876
```

```
10471/10471 [=====] - 1s 56us/sample - loss: 0.1292 - mean_absolute_error: 0.1292 - mean_squared_error: 0.0349 - val_loss: 0.1422 - val_mean_absolute_error: 0.1423 - val_mean_squared_error: 0.0427
Epoch 57/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1283 - mean_absolute_error: 0.1283 - mean_squared_error: 0.0342
Epoch 00057: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 55us/sample - loss: 0.1290 - mean_absolute_error: 0.1290 - mean_squared_error: 0.0344 - val_loss: 0.1668 - val_mean_absolute_error: 0.1668 - val_mean_squared_error: 0.0531
Epoch 58/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1255 - mean_absolute_error: 0.1255 - mean_squared_error: 0.0335
Epoch 00058: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 54us/sample - loss: 0.1256 - mean_absolute_error: 0.1255 - mean_squared_error: 0.0334 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0455
Epoch 59/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1232 - mean_absolute_error: 0.1232 - mean_squared_error: 0.0323
Epoch 00059: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 54us/sample - loss: 0.1233 - mean_absolute_error: 0.1233 - mean_squared_error: 0.0323 - val_loss: 0.1819 - val_mean_absolute_error: 0.1820 - val_mean_squared_error: 0.0568
Epoch 60/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1271 - mean_absolute_error: 0.1271 - mean_squared_error: 0.0342
Epoch 00060: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 54us/sample - loss: 0.1271 - mean_absolute_error: 0.1272 - mean_squared_error: 0.0342 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0445
Epoch 61/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1222 - mean_absolute_error: 0.1222 - mean_squared_error: 0.0323
Epoch 00061: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 55us/sample - loss: 0.1221 - mean_absolute_error: 0.1220 - mean_squared_error: 0.0324 - val_loss: 0.1866 - val_mean_absolute_error: 0.1866 - val_mean_squared_error: 0.0623
Epoch 62/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1293 - mean_absolute_error: 0.1293 - mean_squared_error: 0.0343
Epoch 00062: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 55us/sample - loss: 0.1295 - mean_absolute_error: 0.1295 - mean_squared_error: 0.0343 - val_loss: 0.1806 - val_mean_absolute_error: 0.1808 - val_mean_squared_error: 0.0595
Epoch 63/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1298 - mean_absolute_error: 0.1298 - mean_squared_error: 0.0345Restoring model weights from the end of the best epoch.

Epoch 00063: val_loss did not improve from 0.13876
10471/10471 [=====] - 1s 55us/sample - loss: 0.1293 - mean_absolute_error: 0.1293 - mean_squared_error: 0.0342 - val_loss: 0.1603 - val_mean_absolute_error: 0.1604 - val_mean_squared_error: 0.0489
Epoch 00063: early stopping
MAE: 0.13878913
RMSE: 0.20379624
Adding initial Dense layers with 128
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_60"
```

Layer (type)	Output Shape	Param #
input_61 (InputLayer)	[(None, 61)]	0
dense_456 (Dense)	(None, 128)	7936
dense_457 (Dense)	(None, 64)	8256
dense_458 (Dense)	(None, 1)	65

Total params: 16,257
Trainable params: 16,257
Non-trainable params: 0

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
9728/10471 [=====>...] - ETA: 0s - loss: 1.4164 - mean_absolute_error: 1.4164 - mean_squared_error: 7.8830
Epoch 00001: val_loss improved from inf to 0.53111, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 86us/sample - loss: 1.3508 - mean_absolute_error: 1.3490 - mean_squared_error: 7.3409 - val_loss: 0.5311 - val_mean_absolute_error: 0.5309 - val_mean_squared_error: 0.5495
Epoch 2/500
9536/10471 [=====>...] - ETA: 0s - loss: 0.4498 - mean_absolute_error: 0.4498 - mean_squared_error: 0.3819
Epoch 00002: val_loss did not improve from 0.53111
10471/10471 [=====] - 1s 52us/sample - loss: 0.4510 - mean_absolute_error: 0.4525 - mean_squared_error: 0.3853 - val_loss: 0.7231 - val_mean_absolute_error: 0.7229 - val_mean_squared_error: 0.7218
Epoch 3/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.4486 - mean_absolute_error: 0.4486 - mean_squared_error: 0.3486
Epoch 00003: val_loss improved from 0.53111 to 0.43862, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 53us/sample - loss: 0.4438 - mean_absolute_error: 0.4438 - mean_squared_error: 0.3404 - val_loss: 0.4386 - val_mean_absolute_error: 0.4386 - val_mean_squared_error: 0.3019
Epoch 4/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.3561 - mean_absolute_error: 0.3561 - mean_squared_error: 0.2179
Epoch 00004: val_loss did not improve from 0.43862
10471/10471 [=====] - 1s 51us/sample - loss: 0.3536 - mean_absolute_error: 0.3539 - mean_squared_error: 0.2151 - val_loss: 0.5662 - val_mean_absolute_error: 0.5662 - val_mean_squared_error: 0.4176
Epoch 5/500
9536/10471 [=====>...] - ETA: 0s - loss: 0.3699 - mean_absolute_error: 0.3699 - mean_squared_error: 0.2356
Epoch 00005: val_loss improved from 0.43862 to 0.33625, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 53us/sample - loss: 0.3609 - mean_absolute_error: 0.3606 - mean_squared_error: 0.2254 - val_loss: 0.3362 - val_mean_absolute_error: 0.3362 - val_mean_squared_error: 0.1812
Epoch 6/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.3470 - mean_absolute_error: 0.3470 - mean_squared_error: 0.1986
Epoch 00006: val_loss improved from 0.33625 to 0.31852, saving model to best_basic_mode1.hdf5

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10471/10471 [=====] - 1s 55us/sample - loss: 0.3465 - mean_absolute_error: 0.3462 - mean_squared_error: 0.1977 - val_loss: 0.3185 - val_mean_absolute_error: 0.3186 - val_mean_squared_error: 0.1677
Epoch 7/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.2716 - mean_absolute_error: 0.2716 - mean_squared_error: 0.1255
Epoch 00007: val_loss improved from 0.31852 to 0.20550, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 53us/sample - loss: 0.2693 - mean_absolute_error: 0.2693 - mean_squared_error: 0.1231 - val_loss: 0.2055 - val_mean_absolute_error: 0.2056 - val_mean_squared_error: 0.0793
Epoch 8/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.3018 - mean_absolute_error: 0.3018 - mean_squared_error: 0.1490
Epoch 00008: val_loss improved from 0.20550 to 0.20320, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 53us/sample - loss: 0.2963 - mean_absolute_error: 0.2960 - mean_squared_error: 0.1445 - val_loss: 0.2032 - val_mean_absolute_error: 0.2033 - val_mean_squared_error: 0.0728
Epoch 9/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.2358 - mean_absolute_error: 0.2358 - mean_squared_error: 0.0933
Epoch 00009: val_loss improved from 0.20320 to 0.17146, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 52us/sample - loss: 0.2349 - mean_absolute_error: 0.2351 - mean_squared_error: 0.0933 - val_loss: 0.1715 - val_mean_absolute_error: 0.1714 - val_mean_squared_error: 0.0559
Epoch 10/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.2165 - mean_absolute_error: 0.2165 - mean_squared_error: 0.0816
Epoch 00010: val_loss did not improve from 0.17146
10471/10471 [=====] - 1s 51us/sample - loss: 0.2174 - mean_absolute_error: 0.2173 - mean_squared_error: 0.0819 - val_loss: 0.4996 - val_mean_absolute_error: 0.4997 - val_mean_squared_error: 0.2966
Epoch 11/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.2223 - mean_absolute_error: 0.2223 - mean_squared_error: 0.0852
Epoch 00011: val_loss did not improve from 0.17146
10471/10471 [=====] - 1s 51us/sample - loss: 0.2218 - mean_absolute_error: 0.2220 - mean_squared_error: 0.0846 - val_loss: 0.4831 - val_mean_absolute_error: 0.4829 - val_mean_squared_error: 0.2882
Epoch 12/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1888 - mean_absolute_error: 0.1888 - mean_squared_error: 0.0658
Epoch 00012: val_loss did not improve from 0.17146
10471/10471 [=====] - 1s 51us/sample - loss: 0.1884 - mean_absolute_error: 0.1884 - mean_squared_error: 0.0654 - val_loss: 0.1947 - val_mean_absolute_error: 0.1946 - val_mean_squared_error: 0.0709
Epoch 13/500
9440/10471 [=====>...] - ETA: 0s - loss: 0.1952 - mean_absolute_error: 0.1952 - mean_squared_error: 0.0675
Epoch 00013: val_loss improved from 0.17146 to 0.15349, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 54us/sample - loss: 0.1917 - mean_absolute_error: 0.1917 - mean_squared_error: 0.0656 - val_loss: 0.1535 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0479
Epoch 14/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1687 - mean_absolute_error: 0.1687 - mean_squared_error: 0.0545
Epoch 00014: val_loss did not improve from 0.15349
10471/10471 [=====] - 1s 52us/sample - loss: 0.1691 - mean_absolute_error: 0.1691 - mean_squared_error: 0.0545
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lute_error: 0.1691 - mean_squared_error: 0.0545 - val_loss: 0.2108 - val_mean_absolute_e
rror: 0.2108 - val_mean_squared_error: 0.0775
Epoch 15/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1657 - mean_absolute_er
ror: 0.1657 - mean_squared_error: 0.0530
Epoch 00015: val_loss did not improve from 0.15349
10471/10471 [=====] - 1s 52us/sample - loss: 0.1646 - mean_abso
lute_error: 0.1646 - mean_squared_error: 0.0525 - val_loss: 0.1555 - val_mean_absolute_e
rror: 0.1555 - val_mean_squared_error: 0.0473
Epoch 16/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1775 - mean_absolute_er
ror: 0.1775 - mean_squared_error: 0.0592
Epoch 00016: val_loss improved from 0.15349 to 0.15134, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 52us/sample - loss: 0.1747 - mean_abso
lute_error: 0.1747 - mean_squared_error: 0.0578 - val_loss: 0.1513 - val_mean_absolute_e
rror: 0.1513 - val_mean_squared_error: 0.0465
Epoch 17/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1631 - mean_absolute_er
ror: 0.1631 - mean_squared_error: 0.0518
Epoch 00017: val_loss did not improve from 0.15134
10471/10471 [=====] - 1s 51us/sample - loss: 0.1615 - mean_abso
lute_error: 0.1613 - mean_squared_error: 0.0508 - val_loss: 0.2025 - val_mean_absolute_e
rror: 0.2026 - val_mean_squared_error: 0.0680
Epoch 18/500
9824/10471 [=====>...] - ETA: 0s - loss: 0.1695 - mean_absolute_er
ror: 0.1695 - mean_squared_error: 0.0537
Epoch 00018: val_loss did not improve from 0.15134
10471/10471 [=====] - 1s 50us/sample - loss: 0.1673 - mean_abso
lute_error: 0.1673 - mean_squared_error: 0.0525 - val_loss: 0.1991 - val_mean_absolute_e
rror: 0.1992 - val_mean_squared_error: 0.0639
Epoch 19/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1592 - mean_absolute_er
ror: 0.1592 - mean_squared_error: 0.0489
Epoch 00019: val_loss did not improve from 0.15134
10471/10471 [=====] - 1s 51us/sample - loss: 0.1596 - mean_abso
lute_error: 0.1595 - mean_squared_error: 0.0492 - val_loss: 0.1520 - val_mean_absolute_e
rror: 0.1520 - val_mean_squared_error: 0.0458
Epoch 20/500
9824/10471 [=====>...] - ETA: 0s - loss: 0.1570 - mean_absolute_er
ror: 0.1570 - mean_squared_error: 0.0488
Epoch 00020: val_loss did not improve from 0.15134
10471/10471 [=====] - 1s 51us/sample - loss: 0.1575 - mean_abso
lute_error: 0.1577 - mean_squared_error: 0.0491 - val_loss: 0.1734 - val_mean_absolute_e
rror: 0.1734 - val_mean_squared_error: 0.0562
Epoch 21/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1578 - mean_absolute_er
ror: 0.1578 - mean_squared_error: 0.0477
Epoch 00021: val_loss did not improve from 0.15134
10471/10471 [=====] - 1s 51us/sample - loss: 0.1557 - mean_abso
lute_error: 0.1556 - mean_squared_error: 0.0467 - val_loss: 0.2045 - val_mean_absolute_e
rror: 0.2044 - val_mean_squared_error: 0.0717
Epoch 22/500
9888/10471 [=====>...] - ETA: 0s - loss: 0.1607 - mean_absolute_er
ror: 0.1607 - mean_squared_error: 0.0503
Epoch 00022: val_loss improved from 0.15134 to 0.14872, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 52us/sample - loss: 0.1599 - mean_abso
lute_error: 0.1598 - mean_squared_error: 0.0497 - val_loss: 0.1487 - val_mean_absolute_e
rror: 0.1487 - val_mean_squared_error: 0.0469
Epoch 23/500
```

9728/10471 [=====>...] - ETA: 0s - loss: 0.1609 - mean_absolute_error: 0.1609 - mean_squared_error: 0.0500
Epoch 00023: val_loss did not improve from 0.14872
10471/10471 [=====] - 1s 51us/sample - loss: 0.1600 - mean_absolute_error: 0.1600 - mean_squared_error: 0.0492 - val_loss: 0.2541 - val_mean_absolute_error: 0.2542 - val_mean_squared_error: 0.0958
Epoch 24/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1580 - mean_absolute_error: 0.1580 - mean_squared_error: 0.0486
Epoch 00024: val_loss did not improve from 0.14872
10471/10471 [=====] - 1s 51us/sample - loss: 0.1567 - mean_absolute_error: 0.1566 - mean_squared_error: 0.0476 - val_loss: 0.1582 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0487
Epoch 25/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1593 - mean_absolute_error: 0.1593 - mean_squared_error: 0.0488
Epoch 00025: val_loss did not improve from 0.14872
10471/10471 [=====] - 1s 50us/sample - loss: 0.1596 - mean_absolute_error: 0.1596 - mean_squared_error: 0.0492 - val_loss: 0.1560 - val_mean_absolute_error: 0.1560 - val_mean_squared_error: 0.0473
Epoch 26/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1503 - mean_absolute_error: 0.1503 - mean_squared_error: 0.0451
Epoch 00026: val_loss improved from 0.14872 to 0.14533, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 52us/sample - loss: 0.1501 - mean_absolute_error: 0.1499 - mean_squared_error: 0.0446 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0457
Epoch 27/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1488 - mean_absolute_error: 0.1488 - mean_squared_error: 0.0434
Epoch 00027: val_loss did not improve from 0.14533
10471/10471 [=====] - 1s 51us/sample - loss: 0.1499 - mean_absolute_error: 0.1501 - mean_squared_error: 0.0447 - val_loss: 0.1559 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0468
Epoch 28/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1444 - mean_absolute_error: 0.1444 - mean_squared_error: 0.0427
Epoch 00028: val_loss did not improve from 0.14533
10471/10471 [=====] - 1s 51us/sample - loss: 0.1437 - mean_absolute_error: 0.1436 - mean_squared_error: 0.0423 - val_loss: 0.1926 - val_mean_absolute_error: 0.1926 - val_mean_squared_error: 0.0592
Epoch 29/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1520 - mean_absolute_error: 0.1520 - mean_squared_error: 0.0450
Epoch 00029: val_loss did not improve from 0.14533
10471/10471 [=====] - 1s 51us/sample - loss: 0.1529 - mean_absolute_error: 0.1533 - mean_squared_error: 0.0459 - val_loss: 0.2053 - val_mean_absolute_error: 0.2051 - val_mean_squared_error: 0.0741
Epoch 30/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1478 - mean_absolute_error: 0.1478 - mean_squared_error: 0.0430
Epoch 00030: val_loss did not improve from 0.14533
10471/10471 [=====] - 1s 51us/sample - loss: 0.1473 - mean_absolute_error: 0.1472 - mean_squared_error: 0.0428 - val_loss: 0.1608 - val_mean_absolute_error: 0.1608 - val_mean_squared_error: 0.0488
Epoch 31/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1491 - mean_absolute_error: 0.1491 - mean_squared_error: 0.0440
Epoch 00031: val_loss did not improve from 0.14533
10471/10471 [=====] - 1s 50us/sample - loss: 0.1490 - mean_absolute_error:

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lute_error: 0.1490 - mean_squared_error: 0.0442 - val_loss: 0.1573 - val_mean_absolute_e
rror: 0.1574 - val_mean_squared_error: 0.0480
Epoch 32/500
    9760/10471 [=====>...] - ETA: 0s - loss: 0.1498 - mean_absolute_er
ror: 0.1498 - mean_squared_error: 0.0443
Epoch 00032: val_loss did not improve from 0.14533
10471/10471 [=====] - 1s 51us/sample - loss: 0.1494 - mean_abso
lute_error: 0.1492 - mean_squared_error: 0.0438 - val_loss: 0.1679 - val_mean_absolute_e
rror: 0.1678 - val_mean_squared_error: 0.0571
Epoch 33/500
    9984/10471 [=====>..] - ETA: 0s - loss: 0.1380 - mean_absolute_er
ror: 0.1380 - mean_squared_error: 0.0395
Epoch 00033: val_loss improved from 0.14533 to 0.14516, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 51us/sample - loss: 0.1380 - mean_abso
lute_error: 0.1379 - mean_squared_error: 0.0395 - val_loss: 0.1452 - val_mean_absolute_e
rror: 0.1451 - val_mean_squared_error: 0.0442
Epoch 34/500
    9504/10471 [=====>...] - ETA: 0s - loss: 0.1417 - mean_absolute_er
ror: 0.1417 - mean_squared_error: 0.0414
Epoch 00034: val_loss did not improve from 0.14516
10471/10471 [=====] - 1s 52us/sample - loss: 0.1428 - mean_abso
lute_error: 0.1427 - mean_squared_error: 0.0417 - val_loss: 0.1579 - val_mean_absolute_e
rror: 0.1579 - val_mean_squared_error: 0.0482
Epoch 35/500
    9888/10471 [=====>..] - ETA: 0s - loss: 0.1429 - mean_absolute_er
ror: 0.1429 - mean_squared_error: 0.0413
Epoch 00035: val_loss did not improve from 0.14516
10471/10471 [=====] - 1s 50us/sample - loss: 0.1424 - mean_abso
lute_error: 0.1422 - mean_squared_error: 0.0409 - val_loss: 0.1570 - val_mean_absolute_e
rror: 0.1570 - val_mean_squared_error: 0.0510
Epoch 36/500
    9792/10471 [=====>..] - ETA: 0s - loss: 0.1409 - mean_absolute_er
ror: 0.1409 - mean_squared_error: 0.0406
Epoch 00036: val_loss did not improve from 0.14516
10471/10471 [=====] - 1s 51us/sample - loss: 0.1413 - mean_abso
lute_error: 0.1414 - mean_squared_error: 0.0409 - val_loss: 0.1552 - val_mean_absolute_e
rror: 0.1551 - val_mean_squared_error: 0.0478
Epoch 37/500
    9920/10471 [=====>..] - ETA: 0s - loss: 0.1369 - mean_absolute_er
ror: 0.1369 - mean_squared_error: 0.0394
Epoch 00037: val_loss did not improve from 0.14516
10471/10471 [=====] - 1s 50us/sample - loss: 0.1364 - mean_abso
lute_error: 0.1365 - mean_squared_error: 0.0390 - val_loss: 0.1884 - val_mean_absolute_e
rror: 0.1885 - val_mean_squared_error: 0.0597
Epoch 38/500
    9696/10471 [=====>...] - ETA: 0s - loss: 0.1414 - mean_absolute_er
ror: 0.1414 - mean_squared_error: 0.0405
Epoch 00038: val_loss did not improve from 0.14516
10471/10471 [=====] - 1s 51us/sample - loss: 0.1412 - mean_abso
lute_error: 0.1411 - mean_squared_error: 0.0405 - val_loss: 0.1456 - val_mean_absolute_e
rror: 0.1455 - val_mean_squared_error: 0.0442
Epoch 39/500
    9792/10471 [=====>..] - ETA: 0s - loss: 0.1345 - mean_absolute_er
ror: 0.1345 - mean_squared_error: 0.0381
Epoch 00039: val_loss did not improve from 0.14516
10471/10471 [=====] - 1s 51us/sample - loss: 0.1341 - mean_abso
lute_error: 0.1339 - mean_squared_error: 0.0378 - val_loss: 0.1687 - val_mean_absolute_e
rror: 0.1686 - val_mean_squared_error: 0.0548
Epoch 40/500
    9824/10471 [=====>..] - ETA: 0s - loss: 0.1407 - mean_absolute_er
```

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ror: 0.1407 - mean_squared_error: 0.0405
Epoch 00040: val_loss did not improve from 0.14516
10471/10471 [=====] - 1s 51us/sample - loss: 0.1402 - mean_absolute_error: 0.1403 - mean_squared_error: 0.0400 - val_loss: 0.1534 - val_mean_absolute_error: 0.1533 - val_mean_squared_error: 0.0472
Epoch 41/500
    9760/10471 [=====>...] - ETA: 0s - loss: 0.1332 - mean_absolute_error: 0.1332 - mean_squared_error: 0.0369
Epoch 00041: val_loss did not improve from 0.14516
10471/10471 [=====] - 1s 51us/sample - loss: 0.1334 - mean_absolute_error: 0.1332 - mean_squared_error: 0.0370 - val_loss: 0.1519 - val_mean_absolute_error: 0.1519 - val_mean_squared_error: 0.0455
Epoch 42/500
    9856/10471 [=====>..] - ETA: 0s - loss: 0.1416 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0406
Epoch 00042: val_loss did not improve from 0.14516
10471/10471 [=====] - 1s 51us/sample - loss: 0.1413 - mean_absolute_error: 0.1412 - mean_squared_error: 0.0402 - val_loss: 0.1593 - val_mean_absolute_error: 0.1592 - val_mean_squared_error: 0.0493
Epoch 43/500
    9792/10471 [=====>..] - ETA: 0s - loss: 0.1337 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0370
Epoch 00043: val_loss did not improve from 0.14516
10471/10471 [=====] - 1s 51us/sample - loss: 0.1334 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0367 - val_loss: 0.1529 - val_mean_absolute_error: 0.1528 - val_mean_squared_error: 0.0476
Epoch 44/500
    9824/10471 [=====>..] - ETA: 0s - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0393
Epoch 00044: val_loss improved from 0.14516 to 0.14291, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 52us/sample - loss: 0.1405 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0395 - val_loss: 0.1429 - val_mean_absolute_error: 0.1429 - val_mean_squared_error: 0.0437
Epoch 45/500
    9504/10471 [=====>...] - ETA: 0s - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0382
Epoch 00045: val_loss improved from 0.14291 to 0.14246, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 53us/sample - loss: 0.1402 - mean_absolute_error: 0.1402 - mean_squared_error: 0.0389 - val_loss: 0.1425 - val_mean_absolute_error: 0.1424 - val_mean_squared_error: 0.0436
Epoch 46/500
    9728/10471 [=====>...] - ETA: 0s - loss: 0.1347 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0368
Epoch 00046: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0371 - val_loss: 0.2010 - val_mean_absolute_error: 0.2011 - val_mean_squared_error: 0.0658
Epoch 47/500
    9696/10471 [=====>...] - ETA: 0s - loss: 0.1337 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0371
Epoch 00047: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1349 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0373 - val_loss: 0.1646 - val_mean_absolute_error: 0.1645 - val_mean_squared_error: 0.0546
Epoch 48/500
    9856/10471 [=====>..] - ETA: 0s - loss: 0.1402 - mean_absolute_error: 0.1402 - mean_squared_error: 0.0394
Epoch 00048: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1390 - mean_absolute_error:
```

lute_error: 0.1391 - mean_squared_error: 0.0388 - val_loss: 0.1515 - val_mean_absolute_error: 0.1515 - val_mean_squared_error: 0.0467

Epoch 49/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1336 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0365

Epoch 00049: val_loss did not improve from 0.14246

10471/10471 [=====] - 1s 51us/sample - loss: 0.1324 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0363 - val_loss: 0.1487 - val_mean_absolute_error: 0.1486 - val_mean_squared_error: 0.0447

Epoch 50/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1356 - mean_absolute_error: 0.1356 - mean_squared_error: 0.0369

Epoch 00050: val_loss did not improve from 0.14246

10471/10471 [=====] - 1s 52us/sample - loss: 0.1351 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0371 - val_loss: 0.2039 - val_mean_absolute_error: 0.2038 - val_mean_squared_error: 0.0706

Epoch 51/500
9536/10471 [=====>...] - ETA: 0s - loss: 0.1421 - mean_absolute_error: 0.1421 - mean_squared_error: 0.0399

Epoch 00051: val_loss did not improve from 0.14246

10471/10471 [=====] - 1s 52us/sample - loss: 0.1419 - mean_absolute_error: 0.1417 - mean_squared_error: 0.0398 - val_loss: 0.1485 - val_mean_absolute_error: 0.1484 - val_mean_squared_error: 0.0459

Epoch 52/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1296 - mean_absolute_error: 0.1296 - mean_squared_error: 0.0349

Epoch 00052: val_loss did not improve from 0.14246

10471/10471 [=====] - 1s 53us/sample - loss: 0.1298 - mean_absolute_error: 0.1299 - mean_squared_error: 0.0351 - val_loss: 0.1791 - val_mean_absolute_error: 0.1791 - val_mean_squared_error: 0.0587

Epoch 53/500
9600/10471 [=====>...] - ETA: 0s - loss: 0.1299 - mean_absolute_error: 0.1299 - mean_squared_error: 0.0355

Epoch 00053: val_loss did not improve from 0.14246

10471/10471 [=====] - 1s 51us/sample - loss: 0.1295 - mean_absolute_error: 0.1294 - mean_squared_error: 0.0353 - val_loss: 0.1590 - val_mean_absolute_error: 0.1590 - val_mean_squared_error: 0.0492

Epoch 54/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1360 - mean_absolute_error: 0.1360 - mean_squared_error: 0.0371

Epoch 00054: val_loss did not improve from 0.14246

10471/10471 [=====] - 1s 51us/sample - loss: 0.1355 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0372 - val_loss: 0.1506 - val_mean_absolute_error: 0.1506 - val_mean_squared_error: 0.0453

Epoch 55/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1313 - mean_absolute_error: 0.1313 - mean_squared_error: 0.0355

Epoch 00055: val_loss did not improve from 0.14246

10471/10471 [=====] - 1s 51us/sample - loss: 0.1318 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0355 - val_loss: 0.1802 - val_mean_absolute_error: 0.1801 - val_mean_squared_error: 0.0613

Epoch 56/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1280 - mean_absolute_error: 0.1280 - mean_squared_error: 0.0346

Epoch 00056: val_loss did not improve from 0.14246

10471/10471 [=====] - 1s 50us/sample - loss: 0.1277 - mean_absolute_error: 0.1278 - mean_squared_error: 0.0344 - val_loss: 0.1687 - val_mean_absolute_error: 0.1687 - val_mean_squared_error: 0.0512

Epoch 57/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1246 - mean_absolute_error: 0.1246 - mean_squared_error: 0.0333

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Epoch 00057: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1271 - mean_absolute_error: 0.1272 - mean_squared_error: 0.0341 - val_loss: 0.2126 - val_mean_absolute_error: 0.2127 - val_mean_squared_error: 0.0692
Epoch 58/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1307 - mean_absolute_error: 0.1307 - mean_squared_error: 0.0354
Epoch 00058: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1301 - mean_absolute_error: 0.1300 - mean_squared_error: 0.0349 - val_loss: 0.1490 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0459
Epoch 59/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1226 - mean_absolute_error: 0.1226 - mean_squared_error: 0.0323
Epoch 00059: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1225 - mean_absolute_error: 0.1225 - mean_squared_error: 0.0321 - val_loss: 0.1472 - val_mean_absolute_error: 0.1471 - val_mean_squared_error: 0.0450
Epoch 60/500
9792/10471 [=====>...] - ETA: 0s - loss: 0.1246 - mean_absolute_error: 0.1246 - mean_squared_error: 0.0332
Epoch 00060: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1243 - mean_absolute_error: 0.1245 - mean_squared_error: 0.0331 - val_loss: 0.1902 - val_mean_absolute_error: 0.1902 - val_mean_squared_error: 0.0616
Epoch 61/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1220 - mean_absolute_error: 0.1220 - mean_squared_error: 0.0314
Epoch 00061: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1225 - mean_absolute_error: 0.1224 - mean_squared_error: 0.0317 - val_loss: 0.1560 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0487
Epoch 62/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1227 - mean_absolute_error: 0.1227 - mean_squared_error: 0.0321
Epoch 00062: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 52us/sample - loss: 0.1235 - mean_absolute_error: 0.1236 - mean_squared_error: 0.0327 - val_loss: 0.1820 - val_mean_absolute_error: 0.1821 - val_mean_squared_error: 0.0577
Epoch 63/500
9792/10471 [=====>...] - ETA: 0s - loss: 0.1213 - mean_absolute_error: 0.1213 - mean_squared_error: 0.0314
Epoch 00063: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1209 - mean_absolute_error: 0.1211 - mean_squared_error: 0.0315 - val_loss: 0.1528 - val_mean_absolute_error: 0.1528 - val_mean_squared_error: 0.0468
Epoch 64/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1219 - mean_absolute_error: 0.1219 - mean_squared_error: 0.0315
Epoch 00064: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1226 - mean_absolute_error: 0.1228 - mean_squared_error: 0.0320 - val_loss: 0.1619 - val_mean_absolute_error: 0.1619 - val_mean_squared_error: 0.0496
Epoch 65/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1240 - mean_absolute_error: 0.1240 - mean_squared_error: 0.0321
Epoch 00065: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1268 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0330 - val_loss: 0.1583 - val_mean_absolute_error: 0.1583 - val_mean_squared_error: 0.0505
Epoch 66/500
```

```

9792/10471 [=====>..] - ETA: 0s - loss: 0.1228 - mean_absolute_error: 0.1228 - mean_squared_error: 0.0316
Epoch 00066: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1243 - mean_absolute_error: 0.1243 - mean_squared_error: 0.0324 - val_loss: 0.1673 - val_mean_absolute_error: 0.1672 - val_mean_squared_error: 0.0535
Epoch 67/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1237 - mean_absolute_error: 0.1237 - mean_squared_error: 0.0318
Epoch 00067: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1236 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0320 - val_loss: 0.1815 - val_mean_absolute_error: 0.1814 - val_mean_squared_error: 0.0609
Epoch 68/500
9600/10471 [=====>...] - ETA: 0s - loss: 0.1265 - mean_absolute_error: 0.1265 - mean_squared_error: 0.0331
Epoch 00068: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 52us/sample - loss: 0.1263 - mean_absolute_error: 0.1262 - mean_squared_error: 0.0327 - val_loss: 0.1718 - val_mean_absolute_error: 0.1718 - val_mean_squared_error: 0.0533
Epoch 69/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1248 - mean_absolute_error: 0.1248 - mean_squared_error: 0.0328
Epoch 00069: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 51us/sample - loss: 0.1251 - mean_absolute_error: 0.1250 - mean_squared_error: 0.0327 - val_loss: 0.1679 - val_mean_absolute_error: 0.1678 - val_mean_squared_error: 0.0549
Epoch 70/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1195 - mean_absolute_error: 0.1195 - mean_squared_error: 0.0305Restoring model weights from the end of the best epoch.

Epoch 00070: val_loss did not improve from 0.14246
10471/10471 [=====] - 1s 52us/sample - loss: 0.1204 - mean_absolute_error: 0.1202 - mean_squared_error: 0.0308 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0446
Epoch 00070: early stopping
MAE: 0.14241397
RMSE: 0.2087455
Adding initial Dense layers with 512
Adding Dense layer with 128
Adding Dense layer with 32
Adding last layer with 8
Outputting predictive model - Tabular
Model: "model_61"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_62 (InputLayer)	[(None, 61)]	0
dense_459 (Dense)	(None, 512)	31744
dense_460 (Dense)	(None, 128)	65664
dense_461 (Dense)	(None, 32)	4128
dense_462 (Dense)	(None, 8)	264
dense_463 (Dense)	(None, 1)	9
<hr/>		
Total params: 101,809		

```
Trainable params: 101,809  
Non-trainable params: 0
```

```
None  
[INFO] training model...  
Train on 10471 samples, validate on 1309 samples  
Epoch 1/500  
  9600/10471 [=====>...] - ETA: 0s - loss: 1.5724 - mean_absolute_error: 1.5724 - mean_squared_error: 8.3082  
Epoch 00001: val_loss improved from inf to 0.72279, saving model to best_basic_model.hdf5  
10471/10471 [=====] - 1s 97us/sample - loss: 1.5090 - mean_absolute_error: 1.5068 - mean_squared_error: 7.6849 - val_loss: 0.7228 - val_mean_absolute_error: 0.7228 - val_mean_squared_error: 0.8413  
Epoch 2/500  
  9984/10471 [=====>..] - ETA: 0s - loss: 0.6206 - mean_absolute_error: 0.6206 - mean_squared_error: 0.6541  
Epoch 00002: val_loss improved from 0.72279 to 0.62113, saving model to best_basic_model.hdf5  
10471/10471 [=====] - 1s 63us/sample - loss: 0.6183 - mean_absolute_error: 0.6177 - mean_squared_error: 0.6482 - val_loss: 0.6211 - val_mean_absolute_error: 0.6212 - val_mean_squared_error: 0.6107  
Epoch 3/500  
  10208/10471 [=====>.] - ETA: 0s - loss: 0.5802 - mean_absolute_error: 0.5802 - mean_squared_error: 0.5624  
Epoch 00003: val_loss improved from 0.62113 to 0.36903, saving model to best_basic_model.hdf5  
10471/10471 [=====] - 1s 61us/sample - loss: 0.5787 - mean_absolute_error: 0.5791 - mean_squared_error: 0.5590 - val_loss: 0.3690 - val_mean_absolute_error: 0.3688 - val_mean_squared_error: 0.2396  
Epoch 4/500  
  10304/10471 [=====>.] - ETA: 0s - loss: 0.5019 - mean_absolute_error: 0.5019 - mean_squared_error: 0.4215  
Epoch 00004: val_loss improved from 0.36903 to 0.32184, saving model to best_basic_model.hdf5  
10471/10471 [=====] - 1s 61us/sample - loss: 0.4980 - mean_absolute_error: 0.4972 - mean_squared_error: 0.4156 - val_loss: 0.3218 - val_mean_absolute_error: 0.3218 - val_mean_squared_error: 0.1772  
Epoch 5/500  
  10112/10471 [=====>..] - ETA: 0s - loss: 0.3178 - mean_absolute_error: 0.3178 - mean_squared_error: 0.1717  
Epoch 00005: val_loss improved from 0.32184 to 0.30886, saving model to best_basic_model.hdf5  
10471/10471 [=====] - 1s 62us/sample - loss: 0.3143 - mean_absolute_error: 0.3141 - mean_squared_error: 0.1683 - val_loss: 0.3089 - val_mean_absolute_error: 0.3090 - val_mean_squared_error: 0.1433  
Epoch 6/500  
  10112/10471 [=====>..] - ETA: 0s - loss: 0.2092 - mean_absolute_error: 0.2092 - mean_squared_error: 0.0755  
Epoch 00006: val_loss improved from 0.30886 to 0.21260, saving model to best_basic_model.hdf5  
10471/10471 [=====] - 1s 61us/sample - loss: 0.2091 - mean_absolute_error: 0.2090 - mean_squared_error: 0.0752 - val_loss: 0.2126 - val_mean_absolute_error: 0.2125 - val_mean_squared_error: 0.0790  
Epoch 7/500  
  10144/10471 [=====>.] - ETA: 0s - loss: 0.1842 - mean_absolute_error: 0.1842 - mean_squared_error: 0.0610  
Epoch 00007: val_loss improved from 0.21260 to 0.15356, saving model to best_basic_model.hdf5  
10471/10471 [=====] - 1s 61us/sample - loss: 0.1840 - mean_absolute_error: 0.1843 - mean_squared_error: 0.0610 - val_loss: 0.1536 - val_mean_absolute_error: 0.1536 - val_mean_squared_error: 0.0610
```

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rror: 0.1536 - val_mean_squared_error: 0.0485
Epoch 8/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1717 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0550
Epoch 00008: val_loss did not improve from 0.15356
10471/10471 [=====] - 1s 61us/sample - loss: 0.1707 - mean_absolute_error: 0.1707 - mean_squared_error: 0.0545 - val_loss: 0.1543 - val_mean_absolute_error: 0.1543 - val_mean_squared_error: 0.0468
Epoch 9/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1599 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0488
Epoch 00009: val_loss did not improve from 0.15356
10471/10471 [=====] - 1s 60us/sample - loss: 0.1601 - mean_absolute_error: 0.1601 - mean_squared_error: 0.0488 - val_loss: 0.1656 - val_mean_absolute_error: 0.1656 - val_mean_squared_error: 0.0547
Epoch 10/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1648 - mean_absolute_error: 0.1648 - mean_squared_error: 0.0513
Epoch 00010: val_loss did not improve from 0.15356
10471/10471 [=====] - 1s 60us/sample - loss: 0.1654 - mean_absolute_error: 0.1654 - mean_squared_error: 0.0513 - val_loss: 0.1799 - val_mean_absolute_error: 0.1799 - val_mean_squared_error: 0.0593
Epoch 11/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1552 - mean_absolute_error: 0.1552 - mean_squared_error: 0.0472
Epoch 00011: val_loss improved from 0.15356 to 0.14512, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 60us/sample - loss: 0.1548 - mean_absolute_error: 0.1548 - mean_squared_error: 0.0468 - val_loss: 0.1451 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0438
Epoch 12/500
9600/10471 [=====>..] - ETA: 0s - loss: 0.1539 - mean_absolute_error: 0.1539 - mean_squared_error: 0.0462
Epoch 00012: val_loss did not improve from 0.14512
10471/10471 [=====] - 1s 57us/sample - loss: 0.1546 - mean_absolute_error: 0.1545 - mean_squared_error: 0.0465 - val_loss: 0.1502 - val_mean_absolute_error: 0.1503 - val_mean_squared_error: 0.0457
Epoch 13/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1531 - mean_absolute_error: 0.1531 - mean_squared_error: 0.0462
Epoch 00013: val_loss did not improve from 0.14512
10471/10471 [=====] - 1s 60us/sample - loss: 0.1537 - mean_absolute_error: 0.1540 - mean_squared_error: 0.0466 - val_loss: 0.2469 - val_mean_absolute_error: 0.2470 - val_mean_squared_error: 0.0917
Epoch 14/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1526 - mean_absolute_error: 0.1526 - mean_squared_error: 0.0452
Epoch 00014: val_loss did not improve from 0.14512
10471/10471 [=====] - 1s 59us/sample - loss: 0.1525 - mean_absolute_error: 0.1525 - mean_squared_error: 0.0452 - val_loss: 0.1522 - val_mean_absolute_error: 0.1522 - val_mean_squared_error: 0.0469
Epoch 15/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1440 - mean_absolute_error: 0.1440 - mean_squared_error: 0.0421
Epoch 00015: val_loss did not improve from 0.14512
10471/10471 [=====] - 1s 59us/sample - loss: 0.1439 - mean_absolute_error: 0.1438 - mean_squared_error: 0.0421 - val_loss: 0.1472 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0449
Epoch 16/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1403 - mean_absolute_error: 0.1403 - mean_squared_error: 0.0405
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Epoch 00016: val_loss did not improve from 0.14512
10471/10471 [=====] - 1s 59us/sample - loss: 0.1407 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0407 - val_loss: 0.1562 - val_mean_absolute_error: 0.1561 - val_mean_squared_error: 0.0476
Epoch 17/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0396
Epoch 00017: val_loss did not improve from 0.14512
10471/10471 [=====] - 1s 58us/sample - loss: 0.1380 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0395 - val_loss: 0.1527 - val_mean_absolute_error: 0.1527 - val_mean_squared_error: 0.0468
Epoch 18/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1446 - mean_absolute_error: 0.1446 - mean_squared_error: 0.0425
Epoch 00018: val_loss did not improve from 0.14512
10471/10471 [=====] - 1s 58us/sample - loss: 0.1447 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0426 - val_loss: 0.1730 - val_mean_absolute_error: 0.1729 - val_mean_squared_error: 0.0555
Epoch 19/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1372 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0389
Epoch 00019: val_loss improved from 0.14512 to 0.14282, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 60us/sample - loss: 0.1371 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0389 - val_loss: 0.1428 - val_mean_absolute_error: 0.1428 - val_mean_squared_error: 0.0439
Epoch 20/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1334 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0376
Epoch 00020: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 59us/sample - loss: 0.1336 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0375 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0458
Epoch 21/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1336 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0373
Epoch 00021: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 59us/sample - loss: 0.1340 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0375 - val_loss: 0.2175 - val_mean_absolute_error: 0.2175 - val_mean_squared_error: 0.0771
Epoch 22/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1408 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0403
Epoch 00022: val_loss did not improve from 0.14282
10471/10471 [=====] - 1s 57us/sample - loss: 0.1421 - mean_absolute_error: 0.1422 - mean_squared_error: 0.0407 - val_loss: 0.1660 - val_mean_absolute_error: 0.1660 - val_mean_squared_error: 0.0518
Epoch 23/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1364 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0379
Epoch 00023: val_loss improved from 0.14282 to 0.14070, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 60us/sample - loss: 0.1364 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0379 - val_loss: 0.1407 - val_mean_absolute_error: 0.1407 - val_mean_squared_error: 0.0419
Epoch 24/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0382
Epoch 00024: val_loss did not improve from 0.14070
10471/10471 [=====] - 1s 59us/sample - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0383 - val_loss: 0.1936 - val_mean_absolute_error: 0.1936 - val_mean_squared_error: 0.0555
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rror: 0.1934 - val_mean_squared_error: 0.0670
Epoch 25/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1284 - mean_absolute_error: 0.1284 - mean_squared_error: 0.0351
Epoch 00025: val_loss did not improve from 0.14070
10471/10471 [=====] - 1s 58us/sample - loss: 0.1283 - mean_absolute_error: 0.1281 - mean_squared_error: 0.0350 - val_loss: 0.1796 - val_mean_absolute_error: 0.1797 - val_mean_squared_error: 0.0578
Epoch 26/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1295 - mean_absolute_error: 0.1295 - mean_squared_error: 0.0355
Epoch 00026: val_loss did not improve from 0.14070
10471/10471 [=====] - 1s 60us/sample - loss: 0.1293 - mean_absolute_error: 0.1293 - mean_squared_error: 0.0354 - val_loss: 0.1626 - val_mean_absolute_error: 0.1626 - val_mean_squared_error: 0.0498
Epoch 27/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1273 - mean_absolute_error: 0.1273 - mean_squared_error: 0.0347
Epoch 00027: val_loss improved from 0.14070 to 0.14058, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 60us/sample - loss: 0.1271 - mean_absolute_error: 0.1271 - mean_squared_error: 0.0346 - val_loss: 0.1406 - val_mean_absolute_error: 0.1406 - val_mean_squared_error: 0.0429
Epoch 28/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1330 - mean_absolute_error: 0.1330 - mean_squared_error: 0.0363
Epoch 00028: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1329 - mean_absolute_error: 0.1328 - mean_squared_error: 0.0361 - val_loss: 0.1836 - val_mean_absolute_error: 0.1836 - val_mean_squared_error: 0.0573
Epoch 29/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1288 - mean_absolute_error: 0.1288 - mean_squared_error: 0.0342
Epoch 00029: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 59us/sample - loss: 0.1288 - mean_absolute_error: 0.1291 - mean_squared_error: 0.0345 - val_loss: 0.1468 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0455
Epoch 30/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1199 - mean_absolute_error: 0.1199 - mean_squared_error: 0.0315
Epoch 00030: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1197 - mean_absolute_error: 0.1196 - mean_squared_error: 0.0313 - val_loss: 0.1459 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0450
Epoch 31/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1274 - mean_absolute_error: 0.1274 - mean_squared_error: 0.0343
Epoch 00031: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1268 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0340 - val_loss: 0.1428 - val_mean_absolute_error: 0.1428 - val_mean_squared_error: 0.0431
Epoch 32/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1186 - mean_absolute_error: 0.1186 - mean_squared_error: 0.0304
Epoch 00032: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1186 - mean_absolute_error: 0.1186 - mean_squared_error: 0.0304 - val_loss: 0.1490 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0458
Epoch 33/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1150 - mean_absolute_error: 0.1150 - mean_squared_error: 0.0294
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Epoch 00033: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1149 - mean_absolute_error: 0.1147 - mean_squared_error: 0.0293 - val_loss: 0.2017 - val_mean_absolute_error: 0.2017 - val_mean_squared_error: 0.0680
Epoch 34/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1175 - mean_absolute_error: 0.1175 - mean_squared_error: 0.0300
Epoch 00034: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1175 - mean_absolute_error: 0.1178 - mean_squared_error: 0.0304 - val_loss: 0.1816 - val_mean_absolute_error: 0.1817 - val_mean_squared_error: 0.0573
Epoch 35/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1245 - mean_absolute_error: 0.1245 - mean_squared_error: 0.0318
Epoch 00035: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 57us/sample - loss: 0.1235 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0313 - val_loss: 0.1822 - val_mean_absolute_error: 0.1823 - val_mean_squared_error: 0.0582
Epoch 36/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1115 - mean_absolute_error: 0.1115 - mean_squared_error: 0.0276
Epoch 00036: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1115 - mean_absolute_error: 0.1116 - mean_squared_error: 0.0276 - val_loss: 0.1419 - val_mean_absolute_error: 0.1419 - val_mean_squared_error: 0.0424
Epoch 37/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1170 - mean_absolute_error: 0.1170 - mean_squared_error: 0.0294
Epoch 00037: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 61us/sample - loss: 0.1170 - mean_absolute_error: 0.1172 - mean_squared_error: 0.0295 - val_loss: 0.1524 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0466
Epoch 38/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1195 - mean_absolute_error: 0.1195 - mean_squared_error: 0.0300
Epoch 00038: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 59us/sample - loss: 0.1194 - mean_absolute_error: 0.1194 - mean_squared_error: 0.0299 - val_loss: 0.1549 - val_mean_absolute_error: 0.1549 - val_mean_squared_error: 0.0473
Epoch 39/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1181 - mean_absolute_error: 0.1181 - mean_squared_error: 0.0290
Epoch 00039: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1191 - mean_absolute_error: 0.1191 - mean_squared_error: 0.0298 - val_loss: 0.1482 - val_mean_absolute_error: 0.1482 - val_mean_squared_error: 0.0459
Epoch 40/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1154 - mean_absolute_error: 0.1154 - mean_squared_error: 0.0283
Epoch 00040: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 57us/sample - loss: 0.1156 - mean_absolute_error: 0.1154 - mean_squared_error: 0.0281 - val_loss: 0.1610 - val_mean_absolute_error: 0.1609 - val_mean_squared_error: 0.0517
Epoch 41/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1164 - mean_absolute_error: 0.1164 - mean_squared_error: 0.0282
Epoch 00041: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1164 - mean_absolute_error: 0.1164 - mean_squared_error: 0.0281 - val_loss: 0.1468 - val_mean_absolute_error: 0.1468 - val_mean_squared_error: 0.0447
Epoch 42/500
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10400/10471 [=====>.] - ETA: 0s - loss: 0.1054 - mean_absolute_error: 0.1054 - mean_squared_error: 0.0249
Epoch 00042: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1053 - mean_absolute_error: 0.1052 - mean_squared_error: 0.0249 - val_loss: 0.1634 - val_mean_absolute_error: 0.1634 - val_mean_squared_error: 0.0495
Epoch 43/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1098 - mean_absolute_error: 0.1098 - mean_squared_error: 0.0262
Epoch 00043: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 59us/sample - loss: 0.1097 - mean_absolute_error: 0.1097 - mean_squared_error: 0.0261 - val_loss: 0.1686 - val_mean_absolute_error: 0.1686 - val_mean_squared_error: 0.0522
Epoch 44/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1097 - mean_absolute_error: 0.1097 - mean_squared_error: 0.0261
Epoch 00044: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 59us/sample - loss: 0.1094 - mean_absolute_error: 0.1096 - mean_squared_error: 0.0259 - val_loss: 0.1898 - val_mean_absolute_error: 0.1897 - val_mean_squared_error: 0.0629
Epoch 45/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1067 - mean_absolute_error: 0.1067 - mean_squared_error: 0.0248
Epoch 00045: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1063 - mean_absolute_error: 0.1062 - mean_squared_error: 0.0246 - val_loss: 0.1434 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0437
Epoch 46/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1054 - mean_absolute_error: 0.1054 - mean_squared_error: 0.0245
Epoch 00046: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 58us/sample - loss: 0.1054 - mean_absolute_error: 0.1054 - mean_squared_error: 0.0245 - val_loss: 0.1472 - val_mean_absolute_error: 0.1471 - val_mean_squared_error: 0.0455
Epoch 47/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1061 - mean_absolute_error: 0.1061 - mean_squared_error: 0.0247
Epoch 00047: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 59us/sample - loss: 0.1062 - mean_absolute_error: 0.1064 - mean_squared_error: 0.0247 - val_loss: 0.1765 - val_mean_absolute_error: 0.1766 - val_mean_squared_error: 0.0571
Epoch 48/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1051 - mean_absolute_error: 0.1051 - mean_squared_error: 0.0241
Epoch 00048: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 60us/sample - loss: 0.1050 - mean_absolute_error: 0.1051 - mean_squared_error: 0.0241 - val_loss: 0.1537 - val_mean_absolute_error: 0.1536 - val_mean_squared_error: 0.0468
Epoch 49/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1025 - mean_absolute_error: 0.1025 - mean_squared_error: 0.0234
Epoch 00049: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 59us/sample - loss: 0.1028 - mean_absolute_error: 0.1028 - mean_squared_error: 0.0234 - val_loss: 0.1818 - val_mean_absolute_error: 0.1817 - val_mean_squared_error: 0.0618
Epoch 50/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1014 - mean_absolute_error: 0.1014 - mean_squared_error: 0.0226
Epoch 00050: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 60us/sample - loss: 0.1010 - mean_absolute_error: 0.1009 - mean_squared_error: 0.0224 - val_loss: 0.1522 - val_mean_absolute_error: 0.1522 - val_mean_squared_error: 0.0618
```

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rror: 0.1521 - val_mean_squared_error: 0.0475
Epoch 51/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1062 - mean_absolute_error: 0.1062 - mean_squared_error: 0.0239
Epoch 00051: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 59us/sample - loss: 0.1056 - mean_absolute_error: 0.1056 - mean_squared_error: 0.0237 - val_loss: 0.1496 - val_mean_absolute_error: 0.1496 - val_mean_squared_error: 0.0470
Epoch 52/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.0978 - mean_absolute_error: 0.0978 - mean_squared_error: 0.0217Restoring model weights from the end of the best epoch.
```

```
Epoch 00052: val_loss did not improve from 0.14058
10471/10471 [=====] - 1s 59us/sample - loss: 0.0979 - mean_absolute_error: 0.0979 - mean_squared_error: 0.0217 - val_loss: 0.1788 - val_mean_absolute_error: 0.1787 - val_mean_squared_error: 0.0585
Epoch 00052: early stopping
MAE: 0.14057612
RMSE: 0.20718671
Adding initial Dense layers with 1024
Adding Dense layer with 512
Adding last layer with 256
Outputting predictive model - Tabular
Model: "model_62"
```

Layer (type)	Output Shape	Param #
<hr/>		
input_63 (InputLayer)	[(None, 61)]	0
dense_464 (Dense)	(None, 1024)	63488
dense_465 (Dense)	(None, 512)	524800
dense_466 (Dense)	(None, 256)	131328
dense_467 (Dense)	(None, 1)	257
<hr/>		
Total params: 719,873		
Trainable params: 719,873		
Non-trainable params: 0		

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
9824/10471 [=====>..] - ETA: 0s - loss: 1.2494 - mean_absolute_error: 1.2494 - mean_squared_error: 4.6588
Epoch 00001: val_loss improved from inf to 0.58213, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 94us/sample - loss: 1.2252 - mean_absolute_error: 1.2248 - mean_squared_error: 4.4347 - val_loss: 0.5821 - val_mean_absolute_error: 0.5821 - val_mean_squared_error: 0.5886
Epoch 2/500
9568/10471 [=====>..] - ETA: 0s - loss: 0.8924 - mean_absolute_error: 0.8924 - mean_squared_error: 1.2877
Epoch 00002: val_loss did not improve from 0.58213
10471/10471 [=====] - 1s 57us/sample - loss: 0.9060 - mean_absolute_error: 0.9066 - mean_squared_error: 1.3142 - val_loss: 0.6045 - val_mean_absolute_error: 0.6048 - val_mean_squared_error: 0.6142
Epoch 3/500
```

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10464/10471 [=====>.] - ETA: 0s - loss: 0.8290 - mean_absolute_error: 0.8290 - mean_squared_error: 1.1743
Epoch 00003: val_loss did not improve from 0.58213
10471/10471 [=====] - 1s 58us/sample - loss: 0.8288 - mean_absolute_error: 0.8281 - mean_squared_error: 1.1720 - val_loss: 0.7471 - val_mean_absolute_error: 0.7473 - val_mean_squared_error: 0.8049
Epoch 4/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.6608 - mean_absolute_error: 0.6608 - mean_squared_error: 0.6997
Epoch 00004: val_loss improved from 0.58213 to 0.37708, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.6605 - mean_absolute_error: 0.6597 - mean_squared_error: 0.6981 - val_loss: 0.3771 - val_mean_absolute_error: 0.3772 - val_mean_squared_error: 0.2329
Epoch 5/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.5498 - mean_absolute_error: 0.5498 - mean_squared_error: 0.4932
Epoch 00005: val_loss did not improve from 0.37708
10471/10471 [=====] - 1s 57us/sample - loss: 0.5530 - mean_absolute_error: 0.5528 - mean_squared_error: 0.5000 - val_loss: 0.5260 - val_mean_absolute_error: 0.5262 - val_mean_squared_error: 0.3879
Epoch 6/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.3919 - mean_absolute_error: 0.3919 - mean_squared_error: 0.2470
Epoch 00006: val_loss did not improve from 0.37708
10471/10471 [=====] - 1s 59us/sample - loss: 0.3916 - mean_absolute_error: 0.3920 - mean_squared_error: 0.2468 - val_loss: 0.5015 - val_mean_absolute_error: 0.5016 - val_mean_squared_error: 0.3453
Epoch 7/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.3759 - mean_absolute_error: 0.3759 - mean_squared_error: 0.2347
Epoch 00007: val_loss did not improve from 0.37708
10471/10471 [=====] - 1s 56us/sample - loss: 0.3771 - mean_absolute_error: 0.3768 - mean_squared_error: 0.2344 - val_loss: 0.6562 - val_mean_absolute_error: 0.6564 - val_mean_squared_error: 0.5445
Epoch 8/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.3171 - mean_absolute_error: 0.3171 - mean_squared_error: 0.1605
Epoch 00008: val_loss did not improve from 0.37708
10471/10471 [=====] - 1s 57us/sample - loss: 0.3136 - mean_absolute_error: 0.3138 - mean_squared_error: 0.1579 - val_loss: 0.4000 - val_mean_absolute_error: 0.4001 - val_mean_squared_error: 0.2167
Epoch 9/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.2506 - mean_absolute_error: 0.2506 - mean_squared_error: 0.1046
Epoch 00009: val_loss improved from 0.37708 to 0.23981, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 60us/sample - loss: 0.2648 - mean_absolute_error: 0.2652 - mean_squared_error: 0.1186 - val_loss: 0.2398 - val_mean_absolute_error: 0.2398 - val_mean_squared_error: 0.0955
Epoch 10/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2498 - mean_absolute_error: 0.2498 - mean_squared_error: 0.1030
Epoch 00010: val_loss improved from 0.23981 to 0.21368, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 62us/sample - loss: 0.2501 - mean_absolute_error: 0.2500 - mean_squared_error: 0.1032 - val_loss: 0.2137 - val_mean_absolute_error: 0.2138 - val_mean_squared_error: 0.0802
Epoch 11/500
9504/10471 [=====>...] - ETA: 0s - loss: 0.2043 - mean_absolute_error: 0.2043 - mean_squared_error: 0.0716
```

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Epoch 00011: val_loss improved from 0.21368 to 0.16771, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 60us/sample - loss: 0.2036 - mean_absolute_error: 0.2034 - mean_squared_error: 0.0710 - val_loss: 0.1677 - val_mean_absolute_error: 0.1677 - val_mean_squared_error: 0.0540
Epoch 12/500
9536/10471 [=====>...] - ETA: 0s - loss: 0.1734 - mean_absolute_error: 0.1734 - mean_squared_error: 0.0543
Epoch 00012: val_loss did not improve from 0.16771
10471/10471 [=====] - 1s 58us/sample - loss: 0.1723 - mean_absolute_error: 0.1723 - mean_squared_error: 0.0537 - val_loss: 0.1691 - val_mean_absolute_error: 0.1690 - val_mean_squared_error: 0.0554
Epoch 13/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1651 - mean_absolute_error: 0.1651 - mean_squared_error: 0.0505
Epoch 00013: val_loss improved from 0.16771 to 0.15687, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 63us/sample - loss: 0.1653 - mean_absolute_error: 0.1656 - mean_squared_error: 0.0508 - val_loss: 0.1569 - val_mean_absolute_error: 0.1570 - val_mean_squared_error: 0.0476
Epoch 14/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1493 - mean_absolute_error: 0.1493 - mean_squared_error: 0.0435
Epoch 00014: val_loss improved from 0.15687 to 0.14429, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.1497 - mean_absolute_error: 0.1495 - mean_squared_error: 0.0435 - val_loss: 0.1443 - val_mean_absolute_error: 0.1443 - val_mean_squared_error: 0.0439
Epoch 15/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1432 - mean_absolute_error: 0.1432 - mean_squared_error: 0.0415
Epoch 00015: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 57us/sample - loss: 0.1425 - mean_absolute_error: 0.1426 - mean_squared_error: 0.0412 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0446
Epoch 16/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1470 - mean_absolute_error: 0.1470 - mean_squared_error: 0.0420
Epoch 00016: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 58us/sample - loss: 0.1469 - mean_absolute_error: 0.1467 - mean_squared_error: 0.0419 - val_loss: 0.1644 - val_mean_absolute_error: 0.1644 - val_mean_squared_error: 0.0513
Epoch 17/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1392 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0386
Epoch 00017: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 57us/sample - loss: 0.1399 - mean_absolute_error: 0.1399 - mean_squared_error: 0.0389 - val_loss: 0.1638 - val_mean_absolute_error: 0.1638 - val_mean_squared_error: 0.0502
Epoch 18/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1351 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0369
Epoch 00018: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 56us/sample - loss: 0.1354 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0370 - val_loss: 0.1485 - val_mean_absolute_error: 0.1486 - val_mean_squared_error: 0.0452
Epoch 19/500
9600/10471 [=====>...] - ETA: 0s - loss: 0.1310 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0356
Epoch 00019: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 57us/sample - loss: 0.1322 - mean_absolute_error:
```

lute_error: 0.1321 - mean_squared_error: 0.0358 - val_loss: 0.1481 - val_mean_absolute_error: 0.1481 - val_mean_squared_error: 0.0435

Epoch 20/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1317 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0350

Epoch 00020: val_loss did not improve from 0.14429

10471/10471 [=====] - 1s 57us/sample - loss: 0.1318 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0352 - val_loss: 0.1962 - val_mean_absolute_error: 0.1962 - val_mean_squared_error: 0.0632

Epoch 21/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1316 - mean_absolute_error: 0.1316 - mean_squared_error: 0.0346

Epoch 00021: val_loss did not improve from 0.14429

10471/10471 [=====] - 1s 57us/sample - loss: 0.1321 - mean_absolute_error: 0.1320 - mean_squared_error: 0.0348 - val_loss: 0.1608 - val_mean_absolute_error: 0.1609 - val_mean_squared_error: 0.0501

Epoch 22/500
9536/10471 [=====>...] - ETA: 0s - loss: 0.1327 - mean_absolute_error: 0.1327 - mean_squared_error: 0.0350

Epoch 00022: val_loss did not improve from 0.14429

10471/10471 [=====] - 1s 57us/sample - loss: 0.1335 - mean_absolute_error: 0.1335 - mean_squared_error: 0.0352 - val_loss: 0.2017 - val_mean_absolute_error: 0.2018 - val_mean_squared_error: 0.0656

Epoch 23/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1242 - mean_absolute_error: 0.1242 - mean_squared_error: 0.0318

Epoch 00023: val_loss did not improve from 0.14429

10471/10471 [=====] - 1s 61us/sample - loss: 0.1241 - mean_absolute_error: 0.1240 - mean_squared_error: 0.0314 - val_loss: 0.1918 - val_mean_absolute_error: 0.1918 - val_mean_squared_error: 0.0617

Epoch 24/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1255 - mean_absolute_error: 0.1255 - mean_squared_error: 0.0313

Epoch 00024: val_loss did not improve from 0.14429

10471/10471 [=====] - 1s 60us/sample - loss: 0.1255 - mean_absolute_error: 0.1255 - mean_squared_error: 0.0314 - val_loss: 0.1937 - val_mean_absolute_error: 0.1939 - val_mean_squared_error: 0.0657

Epoch 25/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1239 - mean_absolute_error: 0.1239 - mean_squared_error: 0.0309

Epoch 00025: val_loss did not improve from 0.14429

10471/10471 [=====] - 1s 60us/sample - loss: 0.1237 - mean_absolute_error: 0.1238 - mean_squared_error: 0.0308 - val_loss: 0.1915 - val_mean_absolute_error: 0.1916 - val_mean_squared_error: 0.0616

Epoch 26/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1251 - mean_absolute_error: 0.1251 - mean_squared_error: 0.0310

Epoch 00026: val_loss did not improve from 0.14429

10471/10471 [=====] - 1s 60us/sample - loss: 0.1249 - mean_absolute_error: 0.1249 - mean_squared_error: 0.0309 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0449

Epoch 27/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1152 - mean_absolute_error: 0.1152 - mean_squared_error: 0.0272

Epoch 00027: val_loss did not improve from 0.14429

10471/10471 [=====] - 1s 60us/sample - loss: 0.1152 - mean_absolute_error: 0.1153 - mean_squared_error: 0.0273 - val_loss: 0.1783 - val_mean_absolute_error: 0.1782 - val_mean_squared_error: 0.0589

Epoch 28/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1240 - mean_absolute_error: 0.1240 - mean_squared_error: 0.0301

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Epoch 00028: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 62us/sample - loss: 0.1229 - mean_absolute_error: 0.1229 - mean_squared_error: 0.0298 - val_loss: 0.2115 - val_mean_absolute_error: 0.2116 - val_mean_squared_error: 0.0732
Epoch 29/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1089 - mean_absolute_error: 0.1089 - mean_squared_error: 0.0249
Epoch 00029: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 60us/sample - loss: 0.1089 - mean_absolute_error: 0.1091 - mean_squared_error: 0.0249 - val_loss: 0.1818 - val_mean_absolute_error: 0.1819 - val_mean_squared_error: 0.0586
Epoch 30/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1138 - mean_absolute_error: 0.1138 - mean_squared_error: 0.0263
Epoch 00030: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 61us/sample - loss: 0.1137 - mean_absolute_error: 0.1138 - mean_squared_error: 0.0265 - val_loss: 0.1819 - val_mean_absolute_error: 0.1818 - val_mean_squared_error: 0.0597
Epoch 31/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1061 - mean_absolute_error: 0.1061 - mean_squared_error: 0.0234
Epoch 00031: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 60us/sample - loss: 0.1061 - mean_absolute_error: 0.1061 - mean_squared_error: 0.0234 - val_loss: 0.1548 - val_mean_absolute_error: 0.1547 - val_mean_squared_error: 0.0480
Epoch 32/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.1062 - mean_absolute_error: 0.1062 - mean_squared_error: 0.0231
Epoch 00032: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 58us/sample - loss: 0.1062 - mean_absolute_error: 0.1062 - mean_squared_error: 0.0231 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0467
Epoch 33/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1044 - mean_absolute_error: 0.1044 - mean_squared_error: 0.0228
Epoch 00033: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 59us/sample - loss: 0.1044 - mean_absolute_error: 0.1045 - mean_squared_error: 0.0228 - val_loss: 0.1672 - val_mean_absolute_error: 0.1672 - val_mean_squared_error: 0.0526
Epoch 34/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.1070 - mean_absolute_error: 0.1070 - mean_squared_error: 0.0229
Epoch 00034: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 59us/sample - loss: 0.1070 - mean_absolute_error: 0.1071 - mean_squared_error: 0.0230 - val_loss: 0.1871 - val_mean_absolute_error: 0.1870 - val_mean_squared_error: 0.0630
Epoch 35/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1041 - mean_absolute_error: 0.1041 - mean_squared_error: 0.0218
Epoch 00035: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 59us/sample - loss: 0.1040 - mean_absolute_error: 0.1040 - mean_squared_error: 0.0217 - val_loss: 0.1528 - val_mean_absolute_error: 0.1528 - val_mean_squared_error: 0.0476
Epoch 36/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.0987 - mean_absolute_error: 0.0987 - mean_squared_error: 0.0200
Epoch 00036: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 61us/sample - loss: 0.0993 - mean_absolute_error: 0.0993 - mean_squared_error: 0.0202 - val_loss: 0.1587 - val_mean_absolute_error: 0.1587 - val_mean_squared_error: 0.0493
Epoch 37/500
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9888/10471 [=====>..] - ETA: 0s - loss: 0.0984 - mean_absolute_error: 0.0984 - mean_squared_error: 0.0195
Epoch 00037: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 61us/sample - loss: 0.0986 - mean_absolute_error: 0.0986 - mean_squared_error: 0.0197 - val_loss: 0.1546 - val_mean_absolute_error: 0.1546 - val_mean_squared_error: 0.0505
Epoch 38/500
9600/10471 [=====>...] - ETA: 0s - loss: 0.0970 - mean_absolute_error: 0.0970 - mean_squared_error: 0.0193
Epoch 00038: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 58us/sample - loss: 0.0966 - mean_absolute_error: 0.0968 - mean_squared_error: 0.0192 - val_loss: 0.1573 - val_mean_absolute_error: 0.1572 - val_mean_squared_error: 0.0517
Epoch 39/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.0968 - mean_absolute_error: 0.0968 - mean_squared_error: 0.0193Restoring model weights from the end of the best epoch.

Epoch 00039: val_loss did not improve from 0.14429
10471/10471 [=====] - 1s 59us/sample - loss: 0.0967 - mean_absolute_error: 0.0967 - mean_squared_error: 0.0193 - val_loss: 0.1870 - val_mean_absolute_error: 0.1870 - val_mean_squared_error: 0.0635
Epoch 00039: early stopping
MAE: 0.14427637
RMSE: 0.20961398
Adding initial Dense layers with 256
Adding Dense layer with 256
Adding last layer with 256
Outputting predictive model - Tabular
Model: "model_63"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_64 (InputLayer)	[(None, 61)]	0
dense_468 (Dense)	(None, 256)	15872
dense_469 (Dense)	(None, 256)	65792
dense_470 (Dense)	(None, 256)	65792
dense_471 (Dense)	(None, 1)	257
<hr/>		
Total params: 147,713		
Trainable params: 147,713		
Non-trainable params: 0		

```

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
9664/10471 [=====>...] - ETA: 0s - loss: 1.3180 - mean_absolute_error: 1.3180 - mean_squared_error: 5.8890
Epoch 00001: val_loss improved from inf to 0.74004, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 96us/sample - loss: 1.2598 - mean_absolute_error: 1.2577 - mean_squared_error: 5.4690 - val_loss: 0.7400 - val_mean_absolute_error: 0.7400 - val_mean_squared_error: 0.8513
Epoch 2/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.6543 - mean_absolute_error: 0.6543 - mean_squared_error: 0.7151

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Epoch 00002: val_loss did not improve from 0.74004
10471/10471 [=====] - 1s 56us/sample - loss: 0.6595 - mean_absolute_error: 0.6594 - mean_squared_error: 0.7236 - val_loss: 1.2141 - val_mean_absolute_error: 1.2146 - val_mean_squared_error: 1.9016
Epoch 3/500
 9600/10471 [=====>...] - ETA: 0s - loss: 0.6291 - mean_absolute_error: 0.6291 - mean_squared_error: 0.6433
Epoch 00003: val_loss improved from 0.74004 to 0.43075, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.6247 - mean_absolute_error: 0.6248 - mean_squared_error: 0.6328 - val_loss: 0.4308 - val_mean_absolute_error: 0.4307 - val_mean_squared_error: 0.3063
Epoch 4/500
 9824/10471 [=====>..] - ETA: 0s - loss: 0.4682 - mean_absolute_error: 0.4682 - mean_squared_error: 0.3605
Epoch 00004: val_loss improved from 0.43075 to 0.42722, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.4673 - mean_absolute_error: 0.4673 - mean_squared_error: 0.3572 - val_loss: 0.4272 - val_mean_absolute_error: 0.4272 - val_mean_squared_error: 0.2711
Epoch 5/500
 9664/10471 [=====>...] - ETA: 0s - loss: 0.3738 - mean_absolute_error: 0.3738 - mean_squared_error: 0.2240
Epoch 00005: val_loss improved from 0.42722 to 0.33347, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 59us/sample - loss: 0.3744 - mean_absolute_error: 0.3756 - mean_squared_error: 0.2258 - val_loss: 0.3335 - val_mean_absolute_error: 0.3335 - val_mean_squared_error: 0.1746
Epoch 6/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2718 - mean_absolute_error: 0.2718 - mean_squared_error: 0.1221
Epoch 00006: val_loss improved from 0.33347 to 0.20125, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.2711 - mean_absolute_error: 0.2707 - mean_squared_error: 0.1213 - val_loss: 0.2012 - val_mean_absolute_error: 0.2012 - val_mean_squared_error: 0.0736
Epoch 7/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1905 - mean_absolute_error: 0.1905 - mean_squared_error: 0.0647
Epoch 00007: val_loss did not improve from 0.20125
10471/10471 [=====] - 1s 58us/sample - loss: 0.1906 - mean_absolute_error: 0.1909 - mean_squared_error: 0.0649 - val_loss: 0.2145 - val_mean_absolute_error: 0.2146 - val_mean_squared_error: 0.0747
Epoch 8/500
 9600/10471 [=====>...] - ETA: 0s - loss: 0.1783 - mean_absolute_error: 0.1783 - mean_squared_error: 0.0583
Epoch 00008: val_loss improved from 0.20125 to 0.16367, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 59us/sample - loss: 0.1768 - mean_absolute_error: 0.1767 - mean_squared_error: 0.0576 - val_loss: 0.1637 - val_mean_absolute_error: 0.1637 - val_mean_squared_error: 0.0523
Epoch 9/500
 9792/10471 [=====>..] - ETA: 0s - loss: 0.1668 - mean_absolute_error: 0.1668 - mean_squared_error: 0.0522
Epoch 00009: val_loss improved from 0.16367 to 0.15933, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.1657 - mean_absolute_error: 0.1657 - mean_squared_error: 0.0514 - val_loss: 0.1593 - val_mean_absolute_error: 0.1593 - val_mean_squared_error: 0.0530
Epoch 10/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1614 - mean_absolute_error:
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ror: 0.1614 - mean_squared_error: 0.0490
Epoch 00010: val_loss did not improve from 0.15933
10471/10471 [=====] - 1s 59us/sample - loss: 0.1612 - mean_absolute_error: 0.1612 - mean_squared_error: 0.0489 - val_loss: 0.2000 - val_mean_absolute_error: 0.2000 - val_mean_squared_error: 0.0703
Epoch 11/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1701 - mean_absolute_error: 0.1701 - mean_squared_error: 0.0527
Epoch 00011: val_loss did not improve from 0.15933
10471/10471 [=====] - 1s 56us/sample - loss: 0.1695 - mean_absolute_error: 0.1696 - mean_squared_error: 0.0529 - val_loss: 0.1690 - val_mean_absolute_error: 0.1690 - val_mean_squared_error: 0.0562
Epoch 12/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1488 - mean_absolute_error: 0.1488 - mean_squared_error: 0.0439
Epoch 00012: val_loss did not improve from 0.15933
10471/10471 [=====] - 1s 56us/sample - loss: 0.1497 - mean_absolute_error: 0.1497 - mean_squared_error: 0.0443 - val_loss: 0.2085 - val_mean_absolute_error: 0.2085 - val_mean_squared_error: 0.0732
Epoch 13/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1518 - mean_absolute_error: 0.1518 - mean_squared_error: 0.0441
Epoch 00013: val_loss did not improve from 0.15933
10471/10471 [=====] - 1s 56us/sample - loss: 0.1525 - mean_absolute_error: 0.1528 - mean_squared_error: 0.0445 - val_loss: 0.1719 - val_mean_absolute_error: 0.1719 - val_mean_squared_error: 0.0551
Epoch 14/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1487 - mean_absolute_error: 0.1487 - mean_squared_error: 0.0422
Epoch 00014: val_loss did not improve from 0.15933
10471/10471 [=====] - 1s 55us/sample - loss: 0.1485 - mean_absolute_error: 0.1486 - mean_squared_error: 0.0422 - val_loss: 0.1685 - val_mean_absolute_error: 0.1684 - val_mean_squared_error: 0.0554
Epoch 15/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1522 - mean_absolute_error: 0.1522 - mean_squared_error: 0.0448
Epoch 00015: val_loss did not improve from 0.15933
10471/10471 [=====] - 1s 56us/sample - loss: 0.1506 - mean_absolute_error: 0.1506 - mean_squared_error: 0.0440 - val_loss: 0.1686 - val_mean_absolute_error: 0.1685 - val_mean_squared_error: 0.0581
Epoch 16/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1453 - mean_absolute_error: 0.1453 - mean_squared_error: 0.0409
Epoch 00016: val_loss improved from 0.15933 to 0.14945, saving model to best_basic_mode.1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1452 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0411 - val_loss: 0.1494 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0477
Epoch 17/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1483 - mean_absolute_error: 0.1483 - mean_squared_error: 0.0416
Epoch 00017: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 56us/sample - loss: 0.1477 - mean_absolute_error: 0.1478 - mean_squared_error: 0.0413 - val_loss: 0.1606 - val_mean_absolute_error: 0.1606 - val_mean_squared_error: 0.0518
Epoch 18/500
9632/10471 [=====>..] - ETA: 0s - loss: 0.1406 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0376
Epoch 00018: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 57us/sample - loss: 0.1408 - mean_absolute_error: 0.1407 - mean_squared_error: 0.0382 - val_loss: 0.1587 - val_mean_absolute_error: 0.1587 - val_mean_squared_error: 0.0551
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rror: 0.1587 - val_mean_squared_error: 0.0517
Epoch 19/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1304 - mean_absolute_error: 0.1304 - mean_squared_error: 0.0345
Epoch 00019: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 56us/sample - loss: 0.1309 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0347 - val_loss: 0.1541 - val_mean_absolute_error: 0.1541 - val_mean_squared_error: 0.0499
Epoch 20/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1364 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0364
Epoch 00020: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 56us/sample - loss: 0.1374 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0365 - val_loss: 0.1976 - val_mean_absolute_error: 0.1977 - val_mean_squared_error: 0.0658
Epoch 21/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1366 - mean_absolute_error: 0.1366 - mean_squared_error: 0.0360
Epoch 00021: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 54us/sample - loss: 0.1368 - mean_absolute_error: 0.1369 - mean_squared_error: 0.0361 - val_loss: 0.1804 - val_mean_absolute_error: 0.1804 - val_mean_squared_error: 0.0595
Epoch 22/500
9760/10471 [=====>..] - ETA: 0s - loss: 0.1278 - mean_absolute_error: 0.1278 - mean_squared_error: 0.0323
Epoch 00022: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 56us/sample - loss: 0.1289 - mean_absolute_error: 0.1289 - mean_squared_error: 0.0330 - val_loss: 0.1554 - val_mean_absolute_error: 0.1554 - val_mean_squared_error: 0.0487
Epoch 23/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1323 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0351
Epoch 00023: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 56us/sample - loss: 0.1327 - mean_absolute_error: 0.1330 - mean_squared_error: 0.0352 - val_loss: 0.1687 - val_mean_absolute_error: 0.1688 - val_mean_squared_error: 0.0547
Epoch 24/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1315 - mean_absolute_error: 0.1315 - mean_squared_error: 0.0340
Epoch 00024: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 55us/sample - loss: 0.1313 - mean_absolute_error: 0.1311 - mean_squared_error: 0.0337 - val_loss: 0.1705 - val_mean_absolute_error: 0.1704 - val_mean_squared_error: 0.0561
Epoch 25/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1284 - mean_absolute_error: 0.1284 - mean_squared_error: 0.0327
Epoch 00025: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 55us/sample - loss: 0.1280 - mean_absolute_error: 0.1279 - mean_squared_error: 0.0324 - val_loss: 0.1592 - val_mean_absolute_error: 0.1593 - val_mean_squared_error: 0.0514
Epoch 26/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1198 - mean_absolute_error: 0.1198 - mean_squared_error: 0.0297
Epoch 00026: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 54us/sample - loss: 0.1198 - mean_absolute_error: 0.1197 - mean_squared_error: 0.0296 - val_loss: 0.1663 - val_mean_absolute_error: 0.1663 - val_mean_squared_error: 0.0536
Epoch 27/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1239 - mean_absolute_error: 0.1239 - mean_squared_error: 0.0304
Epoch 00027: val_loss did not improve from 0.14945
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10471/10471 [=====] - 1s 55us/sample - loss: 0.1240 - mean_absolute_error: 0.1240 - mean_squared_error: 0.0303 - val_loss: 0.1582 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0519
Epoch 28/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1200 - mean_absolute_error: 0.1200 - mean_squared_error: 0.0291
Epoch 00028: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 56us/sample - loss: 0.1198 - mean_absolute_error: 0.1198 - mean_squared_error: 0.0290 - val_loss: 0.2148 - val_mean_absolute_error: 0.2149 - val_mean_squared_error: 0.0744
Epoch 29/500
9504/10471 [=====>..] - ETA: 0s - loss: 0.1146 - mean_absolute_error: 0.1146 - mean_squared_error: 0.0266
Epoch 00029: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 58us/sample - loss: 0.1162 - mean_absolute_error: 0.1162 - mean_squared_error: 0.0271 - val_loss: 0.1663 - val_mean_absolute_error: 0.1663 - val_mean_squared_error: 0.0532
Epoch 30/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1206 - mean_absolute_error: 0.1206 - mean_squared_error: 0.0284
Epoch 00030: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 56us/sample - loss: 0.1212 - mean_absolute_error: 0.1212 - mean_squared_error: 0.0286 - val_loss: 0.2526 - val_mean_absolute_error: 0.2524 - val_mean_squared_error: 0.0978
Epoch 31/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1230 - mean_absolute_error: 0.1230 - mean_squared_error: 0.0294
Epoch 00031: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 54us/sample - loss: 0.1224 - mean_absolute_error: 0.1223 - mean_squared_error: 0.0291 - val_loss: 0.1568 - val_mean_absolute_error: 0.1568 - val_mean_squared_error: 0.0497
Epoch 32/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1131 - mean_absolute_error: 0.1131 - mean_squared_error: 0.0258
Epoch 00032: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 55us/sample - loss: 0.1129 - mean_absolute_error: 0.1130 - mean_squared_error: 0.0261 - val_loss: 0.1602 - val_mean_absolute_error: 0.1602 - val_mean_squared_error: 0.0516
Epoch 33/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1130 - mean_absolute_error: 0.1130 - mean_squared_error: 0.0258
Epoch 00033: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 57us/sample - loss: 0.1120 - mean_absolute_error: 0.1119 - mean_squared_error: 0.0252 - val_loss: 0.1781 - val_mean_absolute_error: 0.1781 - val_mean_squared_error: 0.0594
Epoch 34/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.1141 - mean_absolute_error: 0.1141 - mean_squared_error: 0.0260
Epoch 00034: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 57us/sample - loss: 0.1145 - mean_absolute_error: 0.1143 - mean_squared_error: 0.0259 - val_loss: 0.1602 - val_mean_absolute_error: 0.1602 - val_mean_squared_error: 0.0513
Epoch 35/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.1134 - mean_absolute_error: 0.1134 - mean_squared_error: 0.0255
Epoch 00035: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 56us/sample - loss: 0.1130 - mean_absolute_error: 0.1130 - mean_squared_error: 0.0253 - val_loss: 0.1576 - val_mean_absolute_error: 0.1576 - val_mean_squared_error: 0.0500
Epoch 36/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1086 - mean_absolute_error:
```

```

ror: 0.1086 - mean_squared_error: 0.0236
Epoch 00036: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 55us/sample - loss: 0.1089 - mean_absolute_error: 0.1091 - mean_squared_error: 0.0236 - val_loss: 0.1646 - val_mean_absolute_error: 0.1646 - val_mean_squared_error: 0.0534
Epoch 37/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1096 - mean_absolute_error: 0.1096 - mean_squared_error: 0.0243
Epoch 00037: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 55us/sample - loss: 0.1093 - mean_absolute_error: 0.1093 - mean_squared_error: 0.0240 - val_loss: 0.2014 - val_mean_absolute_error: 0.2015 - val_mean_squared_error: 0.0705
Epoch 38/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1053 - mean_absolute_error: 0.1053 - mean_squared_error: 0.0228
Epoch 00038: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 55us/sample - loss: 0.1050 - mean_absolute_error: 0.1051 - mean_squared_error: 0.0226 - val_loss: 0.1649 - val_mean_absolute_error: 0.1649 - val_mean_squared_error: 0.0523
Epoch 39/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1020 - mean_absolute_error: 0.1020 - mean_squared_error: 0.0214
Epoch 00039: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 56us/sample - loss: 0.1028 - mean_absolute_error: 0.1029 - mean_squared_error: 0.0216 - val_loss: 0.1656 - val_mean_absolute_error: 0.1655 - val_mean_squared_error: 0.0541
Epoch 40/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1000 - mean_absolute_error: 0.1000 - mean_squared_error: 0.0204
Epoch 00040: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 56us/sample - loss: 0.1013 - mean_absolute_error: 0.1015 - mean_squared_error: 0.0209 - val_loss: 0.1606 - val_mean_absolute_error: 0.1606 - val_mean_squared_error: 0.0524
Epoch 41/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1032 - mean_absolute_error: 0.1032 - mean_squared_error: 0.0218Restoring model weights from the end of the best epoch.

Epoch 00041: val_loss did not improve from 0.14945
10471/10471 [=====] - 1s 55us/sample - loss: 0.1035 - mean_absolute_error: 0.1034 - mean_squared_error: 0.0216 - val_loss: 0.1621 - val_mean_absolute_error: 0.1620 - val_mean_squared_error: 0.0533
Epoch 00041: early stopping
MAE: 0.14940287
RMSE: 0.21833038
Adding initial Dense layers with 128
Adding Dense layer with 128
Adding last layer with 128
Outputting predictive model - Tabular
Model: "model_64"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_65 (InputLayer)	[(None, 61)]	0
dense_472 (Dense)	(None, 128)	7936
dense_473 (Dense)	(None, 128)	16512
dense_474 (Dense)	(None, 128)	16512

dense_475 (Dense)	(None, 1)	129
=====		
Total params: 41,089		
Trainable params: 41,089		
Non-trainable params: 0		
<hr/>		
None		
[INFO] training model...		
Train on 10471 samples, validate on 1309 samples		
Epoch 1/500		
10176/10471 [=====>.] - ETA: 0s - loss: 1.2805 - mean_absolute_error: 1.2805 - mean_squared_error: 5.4274		
Epoch 00001: val_loss improved from inf to 0.92206, saving model to best_basic_model.hdf5		
10471/10471 [=====] - 1s 91us/sample - loss: 1.2600 - mean_absolute_error: 1.2592 - mean_squared_error: 5.2807 - val_loss: 0.9221 - val_mean_absolute_error: 0.9220 - val_mean_squared_error: 1.1456		
Epoch 2/500		
9952/10471 [=====>..] - ETA: 0s - loss: 0.6499 - mean_absolute_error: 0.6499 - mean_squared_error: 0.6954		
Epoch 00002: val_loss did not improve from 0.92206		
10471/10471 [=====] - 1s 55us/sample - loss: 0.6410 - mean_absolute_error: 0.6403 - mean_squared_error: 0.6778 - val_loss: 1.1119 - val_mean_absolute_error: 1.1120 - val_mean_squared_error: 1.4337		
Epoch 3/500		
10240/10471 [=====>.] - ETA: 0s - loss: 0.5556 - mean_absolute_error: 0.5556 - mean_squared_error: 0.4972		
Epoch 00003: val_loss improved from 0.92206 to 0.43504, saving model to best_basic_mode1.hdf5		
10471/10471 [=====] - 1s 55us/sample - loss: 0.5533 - mean_absolute_error: 0.5532 - mean_squared_error: 0.4935 - val_loss: 0.4350 - val_mean_absolute_error: 0.4349 - val_mean_squared_error: 0.2918		
Epoch 4/500		
10112/10471 [=====>..] - ETA: 0s - loss: 0.3898 - mean_absolute_error: 0.3898 - mean_squared_error: 0.2465		
Epoch 00004: val_loss did not improve from 0.43504		
10471/10471 [=====] - 1s 55us/sample - loss: 0.3865 - mean_absolute_error: 0.3858 - mean_squared_error: 0.2422 - val_loss: 0.5492 - val_mean_absolute_error: 0.5493 - val_mean_squared_error: 0.3842		
Epoch 5/500		
10272/10471 [=====>.] - ETA: 0s - loss: 0.3590 - mean_absolute_error: 0.3590 - mean_squared_error: 0.2066		
Epoch 00005: val_loss improved from 0.43504 to 0.21406, saving model to best_basic_mode1.hdf5		
10471/10471 [=====] - 1s 55us/sample - loss: 0.3561 - mean_absolute_error: 0.3557 - mean_squared_error: 0.2037 - val_loss: 0.2141 - val_mean_absolute_error: 0.2139 - val_mean_squared_error: 0.0830		
Epoch 6/500		
9952/10471 [=====>..] - ETA: 0s - loss: 0.2404 - mean_absolute_error: 0.2404 - mean_squared_error: 0.0955		
Epoch 00006: val_loss improved from 0.21406 to 0.21018, saving model to best_basic_mode1.hdf5		
10471/10471 [=====] - 1s 57us/sample - loss: 0.2405 - mean_absolute_error: 0.2404 - mean_squared_error: 0.0953 - val_loss: 0.2102 - val_mean_absolute_error: 0.2101 - val_mean_squared_error: 0.0748		
Epoch 7/500		
10176/10471 [=====>.] - ETA: 0s - loss: 0.2014 - mean_absolute_error: 0.2014 - mean_squared_error: 0.0701		
Epoch 00007: val_loss improved from 0.21018 to 0.18070, saving model to best_basic_mode1.hdf5		
10471/10471 [=====] - 1s 56us/sample - loss: 0.2020 - mean_absolute_error: 0.2020 - mean_squared_error: 0.0701		

```
lute_error: 0.2025 - mean_squared_error: 0.0715 - val_loss: 0.1807 - val_mean_absolute_e
rror: 0.1807 - val_mean_squared_error: 0.0614
Epoch 8/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1863 - mean_absolute_er
ror: 0.1863 - mean_squared_error: 0.0620
Epoch 00008: val_loss did not improve from 0.18070
10471/10471 [=====] - 1s 54us/sample - loss: 0.1867 - mean_abso
lute_error: 0.1866 - mean_squared_error: 0.0622 - val_loss: 0.2369 - val_mean_absolute_e
rror: 0.2369 - val_mean_squared_error: 0.0882
Epoch 9/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1793 - mean_absolute_er
ror: 0.1793 - mean_squared_error: 0.0590
Epoch 00009: val_loss improved from 0.18070 to 0.17864, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 55us/sample - loss: 0.1791 - mean_abso
lute_error: 0.1791 - mean_squared_error: 0.0589 - val_loss: 0.1786 - val_mean_absolute_e
rror: 0.1787 - val_mean_squared_error: 0.0554
Epoch 10/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1622 - mean_absolute_er
ror: 0.1622 - mean_squared_error: 0.0505
Epoch 00010: val_loss did not improve from 0.17864
10471/10471 [=====] - 1s 56us/sample - loss: 0.1615 - mean_abso
lute_error: 0.1614 - mean_squared_error: 0.0502 - val_loss: 0.2742 - val_mean_absolute_e
rror: 0.2742 - val_mean_squared_error: 0.1047
Epoch 11/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1570 - mean_absolute_er
ror: 0.1570 - mean_squared_error: 0.0482
Epoch 00011: val_loss did not improve from 0.17864
10471/10471 [=====] - 1s 54us/sample - loss: 0.1576 - mean_abso
lute_error: 0.1576 - mean_squared_error: 0.0484 - val_loss: 0.1977 - val_mean_absolute_e
rror: 0.1977 - val_mean_squared_error: 0.0687
Epoch 12/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1551 - mean_absolute_er
ror: 0.1551 - mean_squared_error: 0.0468
Epoch 00012: val_loss did not improve from 0.17864
10471/10471 [=====] - 1s 55us/sample - loss: 0.1547 - mean_abso
lute_error: 0.1548 - mean_squared_error: 0.0469 - val_loss: 0.1967 - val_mean_absolute_e
rror: 0.1966 - val_mean_squared_error: 0.0698
Epoch 13/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1571 - mean_absolute_er
ror: 0.1571 - mean_squared_error: 0.0478
Epoch 00013: val_loss improved from 0.17864 to 0.15425, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.1573 - mean_abso
lute_error: 0.1571 - mean_squared_error: 0.0478 - val_loss: 0.1543 - val_mean_absolute_e
rror: 0.1542 - val_mean_squared_error: 0.0475
Epoch 14/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1590 - mean_absolute_er
ror: 0.1590 - mean_squared_error: 0.0485
Epoch 00014: val_loss did not improve from 0.15425
10471/10471 [=====] - 1s 56us/sample - loss: 0.1595 - mean_abso
lute_error: 0.1595 - mean_squared_error: 0.0487 - val_loss: 0.2249 - val_mean_absolute_e
rror: 0.2249 - val_mean_squared_error: 0.0786
Epoch 15/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1640 - mean_absolute_er
ror: 0.1640 - mean_squared_error: 0.0505
Epoch 00015: val_loss did not improve from 0.15425
10471/10471 [=====] - 1s 54us/sample - loss: 0.1628 - mean_abso
lute_error: 0.1626 - mean_squared_error: 0.0498 - val_loss: 0.1553 - val_mean_absolute_e
rror: 0.1552 - val_mean_squared_error: 0.0491
Epoch 16/500
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10112/10471 [=====>..] - ETA: 0s - loss: 0.1622 - mean_absolute_error: 0.1622 - mean_squared_error: 0.0496
Epoch 00016: val_loss did not improve from 0.15425
10471/10471 [=====] - 1s 55us/sample - loss: 0.1615 - mean_absolute_error: 0.1614 - mean_squared_error: 0.0493 - val_loss: 0.1543 - val_mean_absolute_error: 0.1543 - val_mean_squared_error: 0.0470
Epoch 17/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1428 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0414
Epoch 00017: val_loss did not improve from 0.15425
10471/10471 [=====] - 1s 56us/sample - loss: 0.1433 - mean_absolute_error: 0.1432 - mean_squared_error: 0.0415 - val_loss: 0.1581 - val_mean_absolute_error: 0.1581 - val_mean_squared_error: 0.0495
Epoch 18/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1472 - mean_absolute_error: 0.1472 - mean_squared_error: 0.0428
Epoch 00018: val_loss did not improve from 0.15425
10471/10471 [=====] - 1s 54us/sample - loss: 0.1468 - mean_absolute_error: 0.1469 - mean_squared_error: 0.0427 - val_loss: 0.1760 - val_mean_absolute_error: 0.1760 - val_mean_squared_error: 0.0557
Epoch 19/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1437 - mean_absolute_error: 0.1437 - mean_squared_error: 0.0412
Epoch 00019: val_loss improved from 0.15425 to 0.15187, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1440 - mean_absolute_error: 0.1439 - mean_squared_error: 0.0412 - val_loss: 0.1519 - val_mean_absolute_error: 0.1519 - val_mean_squared_error: 0.0459
Epoch 20/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1467 - mean_absolute_error: 0.1467 - mean_squared_error: 0.0427
Epoch 00020: val_loss did not improve from 0.15187
10471/10471 [=====] - 1s 58us/sample - loss: 0.1459 - mean_absolute_error: 0.1459 - mean_squared_error: 0.0421 - val_loss: 0.1580 - val_mean_absolute_error: 0.1580 - val_mean_squared_error: 0.0482
Epoch 21/500
9536/10471 [=====>..] - ETA: 0s - loss: 0.1371 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0384
Epoch 00021: val_loss did not improve from 0.15187
10471/10471 [=====] - 1s 58us/sample - loss: 0.1367 - mean_absolute_error: 0.1367 - mean_squared_error: 0.0380 - val_loss: 0.1561 - val_mean_absolute_error: 0.1561 - val_mean_squared_error: 0.0480
Epoch 22/500
9600/10471 [=====>..] - ETA: 0s - loss: 0.1393 - mean_absolute_error: 0.1393 - mean_squared_error: 0.0401
Epoch 00022: val_loss did not improve from 0.15187
10471/10471 [=====] - 1s 57us/sample - loss: 0.1387 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0396 - val_loss: 0.1578 - val_mean_absolute_error: 0.1578 - val_mean_squared_error: 0.0483
Epoch 23/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1409 - mean_absolute_error: 0.1409 - mean_squared_error: 0.0402
Epoch 00023: val_loss did not improve from 0.15187
10471/10471 [=====] - 1s 55us/sample - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0403 - val_loss: 0.1536 - val_mean_absolute_error: 0.1535 - val_mean_squared_error: 0.0476
Epoch 24/500
9696/10471 [=====>..] - ETA: 0s - loss: 0.1333 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0362
Epoch 00024: val_loss did not improve from 0.15187
10471/10471 [=====] - 1s 57us/sample - loss: 0.1345 - mean_absolute_error: 0.1345 - mean_squared_error: 0.0362
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lute_error: 0.1344 - mean_squared_error: 0.0368 - val_loss: 0.1611 - val_mean_absolute_error: 0.1612 - val_mean_squared_error: 0.0504

Epoch 25/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1378 - mean_absolute_error: 0.1378 - mean_squared_error: 0.0382

Epoch 00025: val_loss did not improve from 0.15187

10471/10471 [=====] - 1s 56us/sample - loss: 0.1376 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0382 - val_loss: 0.2039 - val_mean_absolute_error: 0.2039 - val_mean_squared_error: 0.0656

Epoch 26/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1368 - mean_absolute_error: 0.1368 - mean_squared_error: 0.0385

Epoch 00026: val_loss did not improve from 0.15187

10471/10471 [=====] - 1s 57us/sample - loss: 0.1374 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0385 - val_loss: 0.2549 - val_mean_absolute_error: 0.2549 - val_mean_squared_error: 0.0926

Epoch 27/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1390 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0388

Epoch 00027: val_loss did not improve from 0.15187

10471/10471 [=====] - 1s 57us/sample - loss: 0.1379 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0385 - val_loss: 0.1542 - val_mean_absolute_error: 0.1541 - val_mean_squared_error: 0.0475

Epoch 28/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1368 - mean_absolute_error: 0.1368 - mean_squared_error: 0.0379

Epoch 00028: val_loss did not improve from 0.15187

10471/10471 [=====] - 1s 57us/sample - loss: 0.1367 - mean_absolute_error: 0.1367 - mean_squared_error: 0.0377 - val_loss: 0.1530 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0479

Epoch 29/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1345 - mean_absolute_error: 0.1345 - mean_squared_error: 0.0361

Epoch 00029: val_loss did not improve from 0.15187

10471/10471 [=====] - 1s 55us/sample - loss: 0.1343 - mean_absolute_error: 0.1344 - mean_squared_error: 0.0361 - val_loss: 0.1547 - val_mean_absolute_error: 0.1546 - val_mean_squared_error: 0.0467

Epoch 30/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1274 - mean_absolute_error: 0.1274 - mean_squared_error: 0.0338

Epoch 00030: val_loss did not improve from 0.15187

10471/10471 [=====] - 1s 55us/sample - loss: 0.1269 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0336 - val_loss: 0.1637 - val_mean_absolute_error: 0.1636 - val_mean_squared_error: 0.0524

Epoch 31/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1289 - mean_absolute_error: 0.1289 - mean_squared_error: 0.0348

Epoch 00031: val_loss did not improve from 0.15187

10471/10471 [=====] - 1s 55us/sample - loss: 0.1285 - mean_absolute_error: 0.1285 - mean_squared_error: 0.0345 - val_loss: 0.1614 - val_mean_absolute_error: 0.1614 - val_mean_squared_error: 0.0493

Epoch 32/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1279 - mean_absolute_error: 0.1279 - mean_squared_error: 0.0339

Epoch 00032: val_loss did not improve from 0.15187

10471/10471 [=====] - 1s 55us/sample - loss: 0.1277 - mean_absolute_error: 0.1277 - mean_squared_error: 0.0338 - val_loss: 0.1933 - val_mean_absolute_error: 0.1933 - val_mean_squared_error: 0.0623

Epoch 33/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0361

```
Epoch 00033: val_loss did not improve from 0.15187
10471/10471 [=====] - 1s 57us/sample - loss: 0.1353 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0363 - val_loss: 0.2347 - val_mean_absolute_error: 0.2346 - val_mean_squared_error: 0.0875
Epoch 34/500
    9728/10471 [=====>...] - ETA: 0s - loss: 0.1295 - mean_absolute_error: 0.1295 - mean_squared_error: 0.0343
Epoch 00034: val_loss improved from 0.15187 to 0.14740, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 59us/sample - loss: 0.1292 - mean_absolute_error: 0.1292 - mean_squared_error: 0.0341 - val_loss: 0.1474 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0454
Epoch 35/500
    9600/10471 [=====>...] - ETA: 0s - loss: 0.1237 - mean_absolute_error: 0.1237 - mean_squared_error: 0.0321
Epoch 00035: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 57us/sample - loss: 0.1243 - mean_absolute_error: 0.1242 - mean_squared_error: 0.0322 - val_loss: 0.1640 - val_mean_absolute_error: 0.1638 - val_mean_squared_error: 0.0525
Epoch 36/500
    9920/10471 [=====>..] - ETA: 0s - loss: 0.1258 - mean_absolute_error: 0.1258 - mean_squared_error: 0.0324
Epoch 00036: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 56us/sample - loss: 0.1254 - mean_absolute_error: 0.1254 - mean_squared_error: 0.0325 - val_loss: 0.1625 - val_mean_absolute_error: 0.1624 - val_mean_squared_error: 0.0515
Epoch 37/500
    9632/10471 [=====>...] - ETA: 0s - loss: 0.1246 - mean_absolute_error: 0.1246 - mean_squared_error: 0.0316
Epoch 00037: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 57us/sample - loss: 0.1268 - mean_absolute_error: 0.1267 - mean_squared_error: 0.0325 - val_loss: 0.3021 - val_mean_absolute_error: 0.3021 - val_mean_squared_error: 0.1261
Epoch 38/500
    9600/10471 [=====>...] - ETA: 0s - loss: 0.1210 - mean_absolute_error: 0.1210 - mean_squared_error: 0.0304
Epoch 00038: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 57us/sample - loss: 0.1207 - mean_absolute_error: 0.1207 - mean_squared_error: 0.0303 - val_loss: 0.1742 - val_mean_absolute_error: 0.1741 - val_mean_squared_error: 0.0553
Epoch 39/500
    10112/10471 [=====>..] - ETA: 0s - loss: 0.1283 - mean_absolute_error: 0.1283 - mean_squared_error: 0.0328
Epoch 00039: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 55us/sample - loss: 0.1288 - mean_absolute_error: 0.1289 - mean_squared_error: 0.0330 - val_loss: 0.1761 - val_mean_absolute_error: 0.1761 - val_mean_squared_error: 0.0586
Epoch 40/500
    10048/10471 [=====>..] - ETA: 0s - loss: 0.1273 - mean_absolute_error: 0.1273 - mean_squared_error: 0.0330
Epoch 00040: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 56us/sample - loss: 0.1265 - mean_absolute_error: 0.1265 - mean_squared_error: 0.0326 - val_loss: 0.1569 - val_mean_absolute_error: 0.1568 - val_mean_squared_error: 0.0475
Epoch 41/500
    9984/10471 [=====>..] - ETA: 0s - loss: 0.1287 - mean_absolute_error: 0.1287 - mean_squared_error: 0.0330
Epoch 00041: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 55us/sample - loss: 0.1293 - mean_absolute_error: 0.1293 - mean_squared_error: 0.0333 - val_loss: 0.1766 - val_mean_absolute_error: 0.1765 - val_mean_squared_error: 0.0570
```

Epoch 42/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1201 - mean_absolute_error: 0.1201 - mean_squared_error: 0.0302
Epoch 00042: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 58us/sample - loss: 0.1206 - mean_absolute_error: 0.1206 - mean_squared_error: 0.0303 - val_loss: 0.1550 - val_mean_absolute_error: 0.1550 - val_mean_squared_error: 0.0482
Epoch 43/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1255 - mean_absolute_error: 0.1255 - mean_squared_error: 0.0318
Epoch 00043: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 55us/sample - loss: 0.1252 - mean_absolute_error: 0.1254 - mean_squared_error: 0.0320 - val_loss: 0.1822 - val_mean_absolute_error: 0.1822 - val_mean_squared_error: 0.0588
Epoch 44/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1184 - mean_absolute_error: 0.1184 - mean_squared_error: 0.0297
Epoch 00044: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 56us/sample - loss: 0.1183 - mean_absolute_error: 0.1181 - mean_squared_error: 0.0296 - val_loss: 0.1563 - val_mean_absolute_error: 0.1562 - val_mean_squared_error: 0.0487
Epoch 45/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1202 - mean_absolute_error: 0.1202 - mean_squared_error: 0.0303
Epoch 00045: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 55us/sample - loss: 0.1197 - mean_absolute_error: 0.1196 - mean_squared_error: 0.0300 - val_loss: 0.1609 - val_mean_absolute_error: 0.1608 - val_mean_squared_error: 0.0516
Epoch 46/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1159 - mean_absolute_error: 0.1159 - mean_squared_error: 0.0283
Epoch 00046: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 54us/sample - loss: 0.1158 - mean_absolute_error: 0.1159 - mean_squared_error: 0.0284 - val_loss: 0.1729 - val_mean_absolute_error: 0.1728 - val_mean_squared_error: 0.0575
Epoch 47/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1168 - mean_absolute_error: 0.1168 - mean_squared_error: 0.0281
Epoch 00047: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 54us/sample - loss: 0.1169 - mean_absolute_error: 0.1168 - mean_squared_error: 0.0283 - val_loss: 0.1518 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0483
Epoch 48/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1132 - mean_absolute_error: 0.1132 - mean_squared_error: 0.0274
Epoch 00048: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 54us/sample - loss: 0.1133 - mean_absolute_error: 0.1132 - mean_squared_error: 0.0274 - val_loss: 0.1845 - val_mean_absolute_error: 0.1844 - val_mean_squared_error: 0.0618
Epoch 49/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1141 - mean_absolute_error: 0.1141 - mean_squared_error: 0.0276
Epoch 00049: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 54us/sample - loss: 0.1138 - mean_absolute_error: 0.1137 - mean_squared_error: 0.0274 - val_loss: 0.1515 - val_mean_absolute_error: 0.1514 - val_mean_squared_error: 0.0476
Epoch 50/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1186 - mean_absolute_error: 0.1186 - mean_squared_error: 0.0291
Epoch 00050: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 55us/sample - loss: 0.1192 - mean_absolute_error: 0.1192 - mean_squared_error: 0.0302

lute_error: 0.1192 - mean_squared_error: 0.0291 - val_loss: 0.2128 - val_mean_absolute_error: 0.2128 - val_mean_squared_error: 0.0766

Epoch 51/500

10144/10471 [=====>.] - ETA: 0s - loss: 0.1201 - mean_absolute_error: 0.1201 - mean_squared_error: 0.0289

Epoch 00051: val_loss did not improve from 0.14740

10471/10471 [=====] - 1s 55us/sample - loss: 0.1207 - mean_absolute_error: 0.1207 - mean_squared_error: 0.0292 - val_loss: 0.2467 - val_mean_absolute_error: 0.2467 - val_mean_squared_error: 0.0949

Epoch 52/500

9632/10471 [=====>...] - ETA: 0s - loss: 0.1247 - mean_absolute_error: 0.1247 - mean_squared_error: 0.0309

Epoch 00052: val_loss did not improve from 0.14740

10471/10471 [=====] - 1s 57us/sample - loss: 0.1246 - mean_absolute_error: 0.1246 - mean_squared_error: 0.0307 - val_loss: 0.1762 - val_mean_absolute_error: 0.1762 - val_mean_squared_error: 0.0580

Epoch 53/500

9760/10471 [=====>...] - ETA: 0s - loss: 0.1161 - mean_absolute_error: 0.1161 - mean_squared_error: 0.0272

Epoch 00053: val_loss did not improve from 0.14740

10471/10471 [=====] - 1s 57us/sample - loss: 0.1165 - mean_absolute_error: 0.1165 - mean_squared_error: 0.0273 - val_loss: 0.1610 - val_mean_absolute_error: 0.1610 - val_mean_squared_error: 0.0499

Epoch 54/500

10016/10471 [=====>..] - ETA: 0s - loss: 0.1126 - mean_absolute_error: 0.1126 - mean_squared_error: 0.0269

Epoch 00054: val_loss did not improve from 0.14740

10471/10471 [=====] - 1s 55us/sample - loss: 0.1127 - mean_absolute_error: 0.1126 - mean_squared_error: 0.0268 - val_loss: 0.1563 - val_mean_absolute_error: 0.1563 - val_mean_squared_error: 0.0505

Epoch 55/500

10048/10471 [=====>..] - ETA: 0s - loss: 0.1091 - mean_absolute_error: 0.1091 - mean_squared_error: 0.0254

Epoch 00055: val_loss did not improve from 0.14740

10471/10471 [=====] - 1s 56us/sample - loss: 0.1095 - mean_absolute_error: 0.1095 - mean_squared_error: 0.0255 - val_loss: 0.1494 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0463

Epoch 56/500

9952/10471 [=====>..] - ETA: 0s - loss: 0.1101 - mean_absolute_error: 0.1101 - mean_squared_error: 0.0254

Epoch 00056: val_loss did not improve from 0.14740

10471/10471 [=====] - 1s 56us/sample - loss: 0.1098 - mean_absolute_error: 0.1097 - mean_squared_error: 0.0254 - val_loss: 0.1703 - val_mean_absolute_error: 0.1703 - val_mean_squared_error: 0.0567

Epoch 57/500

9856/10471 [=====>..] - ETA: 0s - loss: 0.1146 - mean_absolute_error: 0.1146 - mean_squared_error: 0.0268

Epoch 00057: val_loss did not improve from 0.14740

10471/10471 [=====] - 1s 56us/sample - loss: 0.1135 - mean_absolute_error: 0.1134 - mean_squared_error: 0.0265 - val_loss: 0.1730 - val_mean_absolute_error: 0.1730 - val_mean_squared_error: 0.0573

Epoch 58/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.1113 - mean_absolute_error: 0.1113 - mean_squared_error: 0.0257

Epoch 00058: val_loss did not improve from 0.14740

10471/10471 [=====] - 1s 54us/sample - loss: 0.1112 - mean_absolute_error: 0.1111 - mean_squared_error: 0.0256 - val_loss: 0.1693 - val_mean_absolute_error: 0.1693 - val_mean_squared_error: 0.0555

Epoch 59/500

10080/10471 [=====>..] - ETA: 0s - loss: 0.1067 - mean_absolute_error: 0.1067 - mean_squared_error: 0.0240Restoring model weights from the end of the best

epoch.

```
Epoch 00059: val_loss did not improve from 0.14740
10471/10471 [=====] - 1s 54us/sample - loss: 0.1084 - mean_absolute_error: 0.1087 - mean_squared_error: 0.0246 - val_loss: 0.2898 - val_mean_absolute_error: 0.2898 - val_mean_squared_error: 0.1156
Epoch 00059: early stopping
MAE: 0.14732608
RMSE: 0.21299909
Adding initial Dense layers with 64
Adding Dense layer with 64
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_65"
```

Layer (type)	Output Shape	Param #
<hr/>		
input_66 (InputLayer)	[(None, 61)]	0
dense_476 (Dense)	(None, 64)	3968
dense_477 (Dense)	(None, 64)	4160
dense_478 (Dense)	(None, 64)	4160
dense_479 (Dense)	(None, 1)	65
<hr/>		
Total params: 12,353		
Trainable params: 12,353		
Non-trainable params: 0		

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10304/10471 [=====>.] - ETA: 0s - loss: 1.5407 - mean_absolute_error: 1.5407 - mean_squared_error: 9.3497
Epoch 00001: val_loss improved from inf to 1.05827, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 122us/sample - loss: 1.5264 - mean_absolute_error: 1.5246 - mean_squared_error: 9.1911 - val_loss: 1.0583 - val_mean_absolute_error: 1.0582 - val_mean_squared_error: 1.3942
Epoch 2/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.5746 - mean_absolute_error: 0.5746 - mean_squared_error: 0.5419
Epoch 00002: val_loss improved from 1.05827 to 0.67509, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.5753 - mean_absolute_error: 0.5757 - mean_squared_error: 0.5437 - val_loss: 0.6751 - val_mean_absolute_error: 0.6751 - val_mean_squared_error: 0.6395
Epoch 3/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.4299 - mean_absolute_error: 0.4299 - mean_squared_error: 0.3021
Epoch 00003: val_loss improved from 0.67509 to 0.27359, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.4253 - mean_absolute_error: 0.4251 - mean_squared_error: 0.2963 - val_loss: 0.2736 - val_mean_absolute_error: 0.2736 - val_mean_squared_error: 0.1297
Epoch 4/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.3300 - mean_absolute_error: 0.3300 - mean_squared_error: 0.1759
```

Epoch 00004: val_loss improved from 0.27359 to 0.23616, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.3263 - mean_absolute_error: 0.3262 - mean_squared_error: 0.1725 - val_loss: 0.2362 - val_mean_absolute_error: 0.2361 - val_mean_squared_error: 0.0965
Epoch 5/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.2547 - mean_absolute_error: 0.2547 - mean_squared_error: 0.1091
Epoch 00005: val_loss did not improve from 0.23616
10471/10471 [=====] - 1s 56us/sample - loss: 0.2634 - mean_absolute_error: 0.2644 - mean_squared_error: 0.1179 - val_loss: 0.2514 - val_mean_absolute_error: 0.2514 - val_mean_squared_error: 0.1035
Epoch 6/500
9536/10471 [=====>...] - ETA: 0s - loss: 0.2104 - mean_absolute_error: 0.2104 - mean_squared_error: 0.0771
Epoch 00006: val_loss did not improve from 0.23616
10471/10471 [=====] - 1s 58us/sample - loss: 0.2167 - mean_absolute_error: 0.2172 - mean_squared_error: 0.0816 - val_loss: 0.5741 - val_mean_absolute_error: 0.5743 - val_mean_squared_error: 0.3955
Epoch 7/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2103 - mean_absolute_error: 0.2103 - mean_squared_error: 0.0767
Epoch 00007: val_loss improved from 0.23616 to 0.19170, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 55us/sample - loss: 0.2095 - mean_absolute_error: 0.2095 - mean_squared_error: 0.0762 - val_loss: 0.1917 - val_mean_absolute_error: 0.1916 - val_mean_squared_error: 0.0676
Epoch 8/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1979 - mean_absolute_error: 0.1979 - mean_squared_error: 0.0680
Epoch 00008: val_loss did not improve from 0.19170
10471/10471 [=====] - 1s 56us/sample - loss: 0.1971 - mean_absolute_error: 0.1971 - mean_squared_error: 0.0674 - val_loss: 0.2369 - val_mean_absolute_error: 0.2368 - val_mean_squared_error: 0.0926
Epoch 9/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1898 - mean_absolute_error: 0.1898 - mean_squared_error: 0.0644
Epoch 00009: val_loss did not improve from 0.19170
10471/10471 [=====] - 1s 54us/sample - loss: 0.1889 - mean_absolute_error: 0.1886 - mean_squared_error: 0.0640 - val_loss: 0.2455 - val_mean_absolute_error: 0.2457 - val_mean_squared_error: 0.0894
Epoch 10/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1762 - mean_absolute_error: 0.1762 - mean_squared_error: 0.0575
Epoch 00010: val_loss did not improve from 0.19170
10471/10471 [=====] - 1s 57us/sample - loss: 0.1767 - mean_absolute_error: 0.1770 - mean_squared_error: 0.0580 - val_loss: 0.2337 - val_mean_absolute_error: 0.2338 - val_mean_squared_error: 0.0802
Epoch 11/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1828 - mean_absolute_error: 0.1828 - mean_squared_error: 0.0608
Epoch 00011: val_loss improved from 0.19170 to 0.17517, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.1818 - mean_absolute_error: 0.1819 - mean_squared_error: 0.0602 - val_loss: 0.1752 - val_mean_absolute_error: 0.1752 - val_mean_squared_error: 0.0531
Epoch 12/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1703 - mean_absolute_error: 0.1703 - mean_squared_error: 0.0543
Epoch 00012: val_loss did not improve from 0.17517
10471/10471 [=====] - 1s 55us/sample - loss: 0.1705 - mean_absolute_error: 0.1705 - mean_squared_error: 0.0543

```
lute_error: 0.1704 - mean_squared_error: 0.0543 - val_loss: 0.1847 - val_mean_absolute_e
rror: 0.1847 - val_mean_squared_error: 0.0630
Epoch 13/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1598 - mean_absolute_er
ror: 0.1598 - mean_squared_error: 0.0496
Epoch 00013: val_loss improved from 0.17517 to 0.14865, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.1598 - mean_abso
lute_error: 0.1598 - mean_squared_error: 0.0496 - val_loss: 0.1486 - val_mean_absolute_e
rror: 0.1486 - val_mean_squared_error: 0.0458
Epoch 14/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1608 - mean_absolute_er
ror: 0.1608 - mean_squared_error: 0.0495
Epoch 00014: val_loss did not improve from 0.14865
10471/10471 [=====] - 1s 57us/sample - loss: 0.1594 - mean_abso
lute_error: 0.1592 - mean_squared_error: 0.0489 - val_loss: 0.1608 - val_mean_absolute_e
rror: 0.1608 - val_mean_squared_error: 0.0524
Epoch 15/500
9600/10471 [=====>...] - ETA: 0s - loss: 0.1596 - mean_absolute_er
ror: 0.1596 - mean_squared_error: 0.0493
Epoch 00015: val_loss did not improve from 0.14865
10471/10471 [=====] - 1s 57us/sample - loss: 0.1583 - mean_abso
lute_error: 0.1583 - mean_squared_error: 0.0487 - val_loss: 0.1978 - val_mean_absolute_e
rror: 0.1979 - val_mean_squared_error: 0.0635
Epoch 16/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1599 - mean_absolute_er
ror: 0.1599 - mean_squared_error: 0.0496
Epoch 00016: val_loss improved from 0.14865 to 0.14794, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 55us/sample - loss: 0.1598 - mean_abso
lute_error: 0.1596 - mean_squared_error: 0.0498 - val_loss: 0.1479 - val_mean_absolute_e
rror: 0.1480 - val_mean_squared_error: 0.0462
Epoch 17/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1566 - mean_absolute_er
ror: 0.1566 - mean_squared_error: 0.0478
Epoch 00017: val_loss did not improve from 0.14794
10471/10471 [=====] - 1s 56us/sample - loss: 0.1565 - mean_abso
lute_error: 0.1563 - mean_squared_error: 0.0479 - val_loss: 0.1515 - val_mean_absolute_e
rror: 0.1516 - val_mean_squared_error: 0.0457
Epoch 18/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1512 - mean_absolute_er
ror: 0.1512 - mean_squared_error: 0.0457
Epoch 00018: val_loss improved from 0.14794 to 0.14287, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1510 - mean_abso
lute_error: 0.1508 - mean_squared_error: 0.0457 - val_loss: 0.1429 - val_mean_absolute_e
rror: 0.1429 - val_mean_squared_error: 0.0444
Epoch 19/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1450 - mean_absolute_er
ror: 0.1450 - mean_squared_error: 0.0433
Epoch 00019: val_loss did not improve from 0.14287
10471/10471 [=====] - 1s 55us/sample - loss: 0.1450 - mean_abso
lute_error: 0.1448 - mean_squared_error: 0.0434 - val_loss: 0.1430 - val_mean_absolute_e
rror: 0.1430 - val_mean_squared_error: 0.0443
Epoch 20/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1497 - mean_absolute_er
ror: 0.1497 - mean_squared_error: 0.0454
Epoch 00020: val_loss did not improve from 0.14287
10471/10471 [=====] - 1s 54us/sample - loss: 0.1497 - mean_abso
lute_error: 0.1496 - mean_squared_error: 0.0452 - val_loss: 0.1486 - val_mean_absolute_e
rror: 0.1486 - val_mean_squared_error: 0.0470
```

Epoch 21/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1496 - mean_absolute_error: 0.1496 - mean_squared_error: 0.0454
Epoch 00021: val_loss did not improve from 0.14287
10471/10471 [=====] - 1s 54us/sample - loss: 0.1497 - mean_absolute_error: 0.1496 - mean_squared_error: 0.0453 - val_loss: 0.1698 - val_mean_absolute_error: 0.1699 - val_mean_squared_error: 0.0529
Epoch 22/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1474 - mean_absolute_error: 0.1474 - mean_squared_error: 0.0446
Epoch 00022: val_loss improved from 0.14287 to 0.14192, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1476 - mean_absolute_error: 0.1477 - mean_squared_error: 0.0447 - val_loss: 0.1419 - val_mean_absolute_error: 0.1419 - val_mean_squared_error: 0.0436
Epoch 23/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1490 - mean_absolute_error: 0.1490 - mean_squared_error: 0.0452
Epoch 00023: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 55us/sample - loss: 0.1479 - mean_absolute_error: 0.1481 - mean_squared_error: 0.0447 - val_loss: 0.1473 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0449
Epoch 24/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1428 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0420
Epoch 00024: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 54us/sample - loss: 0.1430 - mean_absolute_error: 0.1429 - mean_squared_error: 0.0423 - val_loss: 0.2900 - val_mean_absolute_error: 0.2898 - val_mean_squared_error: 0.1182
Epoch 25/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1516 - mean_absolute_error: 0.1516 - mean_squared_error: 0.0463
Epoch 00025: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 55us/sample - loss: 0.1512 - mean_absolute_error: 0.1512 - mean_squared_error: 0.0460 - val_loss: 0.1680 - val_mean_absolute_error: 0.1679 - val_mean_squared_error: 0.0546
Epoch 26/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1485 - mean_absolute_error: 0.1485 - mean_squared_error: 0.0440
Epoch 00026: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 57us/sample - loss: 0.1496 - mean_absolute_error: 0.1496 - mean_squared_error: 0.0446 - val_loss: 0.1443 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0435
Epoch 27/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1454 - mean_absolute_error: 0.1454 - mean_squared_error: 0.0428
Epoch 00027: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 56us/sample - loss: 0.1474 - mean_absolute_error: 0.1474 - mean_squared_error: 0.0437 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0441
Epoch 28/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1482 - mean_absolute_error: 0.1482 - mean_squared_error: 0.0444
Epoch 00028: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 57us/sample - loss: 0.1477 - mean_absolute_error: 0.1480 - mean_squared_error: 0.0441 - val_loss: 0.1507 - val_mean_absolute_error: 0.1507 - val_mean_squared_error: 0.0475
Epoch 29/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0409
Epoch 00029: val_loss did not improve from 0.14192

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10471/10471 [=====] - 1s 55us/sample - loss: 0.1380 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0405 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0455
Epoch 30/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1443 - mean_absolute_error: 0.1443 - mean_squared_error: 0.0424
Epoch 00030: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 56us/sample - loss: 0.1438 - mean_absolute_error: 0.1439 - mean_squared_error: 0.0422 - val_loss: 0.1451 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0440
Epoch 31/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1406 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0412
Epoch 00031: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 55us/sample - loss: 0.1408 - mean_absolute_error: 0.1409 - mean_squared_error: 0.0414 - val_loss: 0.1454 - val_mean_absolute_error: 0.1455 - val_mean_squared_error: 0.0438
Epoch 32/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1460 - mean_absolute_error: 0.1460 - mean_squared_error: 0.0435
Epoch 00032: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 54us/sample - loss: 0.1458 - mean_absolute_error: 0.1457 - mean_squared_error: 0.0433 - val_loss: 0.1446 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0439
Epoch 33/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1391 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0403
Epoch 00033: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 55us/sample - loss: 0.1384 - mean_absolute_error: 0.1385 - mean_squared_error: 0.0400 - val_loss: 0.1718 - val_mean_absolute_error: 0.1718 - val_mean_squared_error: 0.0532
Epoch 34/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0398
Epoch 00034: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 57us/sample - loss: 0.1394 - mean_absolute_error: 0.1393 - mean_squared_error: 0.0405 - val_loss: 0.1480 - val_mean_absolute_error: 0.1480 - val_mean_squared_error: 0.0465
Epoch 35/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1408 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0414
Epoch 00035: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 54us/sample - loss: 0.1404 - mean_absolute_error: 0.1403 - mean_squared_error: 0.0411 - val_loss: 0.1516 - val_mean_absolute_error: 0.1516 - val_mean_squared_error: 0.0466
Epoch 36/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1403 - mean_absolute_error: 0.1403 - mean_squared_error: 0.0410
Epoch 00036: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 55us/sample - loss: 0.1411 - mean_absolute_error: 0.1411 - mean_squared_error: 0.0413 - val_loss: 0.1786 - val_mean_absolute_error: 0.1787 - val_mean_squared_error: 0.0568
Epoch 37/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1363 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0392
Epoch 00037: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 55us/sample - loss: 0.1375 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0396 - val_loss: 0.2267 - val_mean_absolute_error: 0.2267 - val_mean_squared_error: 0.0839
Epoch 38/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1409 - mean_absolute_error:
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ror: 0.1409 - mean_squared_error: 0.0415
Epoch 00038: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 57us/sample - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0407 - val_loss: 0.1830 - val_mean_absolute_error: 0.1829 - val_mean_squared_error: 0.0612
Epoch 39/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1335 - mean_absolute_error: 0.1335 - mean_squared_error: 0.0382
Epoch 00039: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 54us/sample - loss: 0.1334 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0381 - val_loss: 0.1523 - val_mean_absolute_error: 0.1522 - val_mean_squared_error: 0.0480
Epoch 40/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1361 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0394
Epoch 00040: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 54us/sample - loss: 0.1358 - mean_absolute_error: 0.1360 - mean_squared_error: 0.0393 - val_loss: 0.1548 - val_mean_absolute_error: 0.1549 - val_mean_squared_error: 0.0473
Epoch 41/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0388
Epoch 00041: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 56us/sample - loss: 0.1349 - mean_absolute_error: 0.1348 - mean_squared_error: 0.0389 - val_loss: 0.1580 - val_mean_absolute_error: 0.1580 - val_mean_squared_error: 0.0496
Epoch 42/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1342 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0382
Epoch 00042: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 54us/sample - loss: 0.1345 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0387 - val_loss: 0.1559 - val_mean_absolute_error: 0.1560 - val_mean_squared_error: 0.0470
Epoch 43/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1379 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0396
Epoch 00043: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 56us/sample - loss: 0.1375 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0395 - val_loss: 0.1449 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0439
Epoch 44/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1341 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0377
Epoch 00044: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 56us/sample - loss: 0.1336 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0378 - val_loss: 0.1543 - val_mean_absolute_error: 0.1543 - val_mean_squared_error: 0.0461
Epoch 45/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.1302 - mean_absolute_error: 0.1302 - mean_squared_error: 0.0366
Epoch 00045: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 56us/sample - loss: 0.1312 - mean_absolute_error: 0.1312 - mean_squared_error: 0.0370 - val_loss: 0.1599 - val_mean_absolute_error: 0.1600 - val_mean_squared_error: 0.0483
Epoch 46/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1339 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0379
Epoch 00046: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 54us/sample - loss: 0.1339 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0379 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0444
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Epoch 47/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1322 - mean_absolute_error: 0.1322 - mean_squared_error: 0.0370Restoring model weights from the end of the best epoch.

Epoch 00047: val_loss did not improve from 0.14192
10471/10471 [=====] - 1s 54us/sample - loss: 0.1321 - mean_absolute_error: 0.1321 - mean_squared_error: 0.0367 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0459
Epoch 00047: early stopping
MAE: 0.14192912
RMSE: 0.20880961
Adding initial Dense layers with 265
Adding Dense layer with 128
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_66"



| Layer (type)          | Output Shape | Param # |
|-----------------------|--------------|---------|
| input_67 (InputLayer) | [(None, 61)] | 0       |
| dense_480 (Dense)     | (None, 265)  | 16430   |
| dense_481 (Dense)     | (None, 128)  | 34048   |
| dense_482 (Dense)     | (None, 64)   | 8256    |
| dense_483 (Dense)     | (None, 1)    | 65      |


Total params: 58,799
Trainable params: 58,799
Non-trainable params: 0

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10432/10471 [=====>.] - ETA: 0s - loss: 1.4433 - mean_absolute_error: 1.4433 - mean_squared_error: 7.3301
Epoch 00001: val_loss improved from inf to 0.47706, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 1.4398 - mean_absolute_error: 1.4377 - mean_squared_error: 7.2884 - val_loss: 0.4771 - val_mean_absolute_error: 0.4770 - val_mean_squared_error: 0.4592
Epoch 2/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.6897 - mean_absolute_error: 0.6897 - mean_squared_error: 0.8040
Epoch 00002: val_loss improved from 0.47706 to 0.47066, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.6838 - mean_absolute_error: 0.6831 - mean_squared_error: 0.7909 - val_loss: 0.4707 - val_mean_absolute_error: 0.4705 - val_mean_squared_error: 0.4132
Epoch 3/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.5045 - mean_absolute_error: 0.5045 - mean_squared_error: 0.4192
Epoch 00003: val_loss improved from 0.47066 to 0.36471, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 55us/sample - loss: 0.5056 - mean_absolute_error: 0.5050 - mean_squared_error: 0.4197 - val_loss: 0.3647 - val_mean_absolute_error: 0.3648 - val_mean_squared_error: 0.2444

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Epoch 4/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.5112 - mean_absolute_error: 0.5112 - mean_squared_error: 0.4343
Epoch 00004: val_loss did not improve from 0.36471
10471/10471 [=====] - 1s 57us/sample - loss: 0.4985 - mean_absolute_error: 0.4984 - mean_squared_error: 0.4160 - val_loss: 0.9178 - val_mean_absolute_error: 0.9178 - val_mean_squared_error: 0.9624
Epoch 5/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.4121 - mean_absolute_error: 0.4121 - mean_squared_error: 0.2964
Epoch 00005: val_loss did not improve from 0.36471
10471/10471 [=====] - 1s 55us/sample - loss: 0.4072 - mean_absolute_error: 0.4072 - mean_squared_error: 0.2898 - val_loss: 0.4205 - val_mean_absolute_error: 0.4207 - val_mean_squared_error: 0.2697
Epoch 6/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3164 - mean_absolute_error: 0.3164 - mean_squared_error: 0.1663
Epoch 00006: val_loss improved from 0.36471 to 0.24888, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 54us/sample - loss: 0.3163 - mean_absolute_error: 0.3161 - mean_squared_error: 0.1660 - val_loss: 0.2489 - val_mean_absolute_error: 0.2489 - val_mean_squared_error: 0.1071
Epoch 7/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.2963 - mean_absolute_error: 0.2963 - mean_squared_error: 0.1414
Epoch 00007: val_loss improved from 0.24888 to 0.22133, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.2988 - mean_absolute_error: 0.2990 - mean_squared_error: 0.1436 - val_loss: 0.2213 - val_mean_absolute_error: 0.2214 - val_mean_squared_error: 0.0839
Epoch 8/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2370 - mean_absolute_error: 0.2370 - mean_squared_error: 0.0945
Epoch 00008: val_loss did not improve from 0.22133
10471/10471 [=====] - 1s 54us/sample - loss: 0.2377 - mean_absolute_error: 0.2378 - mean_squared_error: 0.0946 - val_loss: 0.5253 - val_mean_absolute_error: 0.5255 - val_mean_squared_error: 0.3298
Epoch 9/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1987 - mean_absolute_error: 0.1987 - mean_squared_error: 0.0723
Epoch 00009: val_loss improved from 0.22133 to 0.20816, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.1969 - mean_absolute_error: 0.1972 - mean_squared_error: 0.0714 - val_loss: 0.2082 - val_mean_absolute_error: 0.2083 - val_mean_squared_error: 0.0684
Epoch 10/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1724 - mean_absolute_error: 0.1724 - mean_squared_error: 0.0554
Epoch 00010: val_loss did not improve from 0.20816
10471/10471 [=====] - 1s 55us/sample - loss: 0.1743 - mean_absolute_error: 0.1745 - mean_squared_error: 0.0564 - val_loss: 0.2746 - val_mean_absolute_error: 0.2745 - val_mean_squared_error: 0.1130
Epoch 11/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1681 - mean_absolute_error: 0.1681 - mean_squared_error: 0.0530
Epoch 00011: val_loss improved from 0.20816 to 0.17987, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 55us/sample - loss: 0.1682 - mean_absolute_error: 0.1681 - mean_squared_error: 0.0529 - val_loss: 0.1799 - val_mean_absolute_error: 0.1798 - val_mean_squared_error: 0.0599
Epoch 12/500

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10208/10471 [=====>.] - ETA: 0s - loss: 0.1672 - mean_absolute_error: 0.1672 - mean_squared_error: 0.0524
Epoch 00012: val_loss did not improve from 0.17987
10471/10471 [=====] - 1s 54us/sample - loss: 0.1669 - mean_absolute_error: 0.1672 - mean_squared_error: 0.0525 - val_loss: 0.2493 - val_mean_absolute_error: 0.2494 - val_mean_squared_error: 0.0914
Epoch 13/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1599 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0494
Epoch 00013: val_loss did not improve from 0.17987
10471/10471 [=====] - 1s 53us/sample - loss: 0.1597 - mean_absolute_error: 0.1597 - mean_squared_error: 0.0494 - val_loss: 0.2188 - val_mean_absolute_error: 0.2189 - val_mean_squared_error: 0.0750
Epoch 14/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1593 - mean_absolute_error: 0.1593 - mean_squared_error: 0.0484
Epoch 00014: val_loss did not improve from 0.17987
10471/10471 [=====] - 1s 54us/sample - loss: 0.1594 - mean_absolute_error: 0.1597 - mean_squared_error: 0.0488 - val_loss: 0.2134 - val_mean_absolute_error: 0.2134 - val_mean_squared_error: 0.0725
Epoch 15/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1544 - mean_absolute_error: 0.1544 - mean_squared_error: 0.0461
Epoch 00015: val_loss improved from 0.17987 to 0.17932, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1547 - mean_absolute_error: 0.1545 - mean_squared_error: 0.0463 - val_loss: 0.1793 - val_mean_absolute_error: 0.1792 - val_mean_squared_error: 0.0604
Epoch 16/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1482 - mean_absolute_error: 0.1482 - mean_squared_error: 0.0431
Epoch 00016: val_loss improved from 0.17932 to 0.16674, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.1477 - mean_absolute_error: 0.1475 - mean_squared_error: 0.0427 - val_loss: 0.1667 - val_mean_absolute_error: 0.1668 - val_mean_squared_error: 0.0526
Epoch 17/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1377 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0396
Epoch 00017: val_loss did not improve from 0.16674
10471/10471 [=====] - 1s 55us/sample - loss: 0.1382 - mean_absolute_error: 0.1382 - mean_squared_error: 0.0396 - val_loss: 0.1680 - val_mean_absolute_error: 0.1679 - val_mean_squared_error: 0.0539
Epoch 18/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1403 - mean_absolute_error: 0.1403 - mean_squared_error: 0.0399
Epoch 00018: val_loss improved from 0.16674 to 0.15369, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 55us/sample - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0399 - val_loss: 0.1537 - val_mean_absolute_error: 0.1537 - val_mean_squared_error: 0.0468
Epoch 19/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1381 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0387
Epoch 00019: val_loss did not improve from 0.15369
10471/10471 [=====] - 1s 55us/sample - loss: 0.1377 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0385 - val_loss: 0.1724 - val_mean_absolute_error: 0.1724 - val_mean_squared_error: 0.0555
Epoch 20/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1342 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0371
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Epoch 00020: val_loss did not improve from 0.15369
10471/10471 [=====] - 1s 55us/sample - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0369 - val_loss: 0.1563 - val_mean_absolute_error: 0.1563 - val_mean_squared_error: 0.0498
Epoch 21/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1311 - mean_absolute_error: 0.1311 - mean_squared_error: 0.0360
Epoch 00021: val_loss improved from 0.15369 to 0.15027, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1309 - mean_absolute_error: 0.1308 - mean_squared_error: 0.0357 - val_loss: 0.1503 - val_mean_absolute_error: 0.1503 - val_mean_squared_error: 0.0456
Epoch 22/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1297 - mean_absolute_error: 0.1297 - mean_squared_error: 0.0354
Epoch 00022: val_loss improved from 0.15027 to 0.14998, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1297 - mean_absolute_error: 0.1297 - mean_squared_error: 0.0353 - val_loss: 0.1500 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0454
Epoch 23/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1259 - mean_absolute_error: 0.1259 - mean_squared_error: 0.0335
Epoch 00023: val_loss did not improve from 0.14998
10471/10471 [=====] - 1s 55us/sample - loss: 0.1268 - mean_absolute_error: 0.1269 - mean_squared_error: 0.0340 - val_loss: 0.1661 - val_mean_absolute_error: 0.1661 - val_mean_squared_error: 0.0525
Epoch 24/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1277 - mean_absolute_error: 0.1277 - mean_squared_error: 0.0342
Epoch 00024: val_loss improved from 0.14998 to 0.14783, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1270 - mean_absolute_error: 0.1270 - mean_squared_error: 0.0338 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0457
Epoch 25/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1238 - mean_absolute_error: 0.1238 - mean_squared_error: 0.0330
Epoch 00025: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 54us/sample - loss: 0.1237 - mean_absolute_error: 0.1236 - mean_squared_error: 0.0329 - val_loss: 0.1582 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0483
Epoch 26/500
9536/10471 [=====>...] - ETA: 0s - loss: 0.1198 - mean_absolute_error: 0.1198 - mean_squared_error: 0.0313
Epoch 00026: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 57us/sample - loss: 0.1235 - mean_absolute_error: 0.1236 - mean_squared_error: 0.0325 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0454
Epoch 27/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1300 - mean_absolute_error: 0.1300 - mean_squared_error: 0.0340
Epoch 00027: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 54us/sample - loss: 0.1300 - mean_absolute_error: 0.1300 - mean_squared_error: 0.0344 - val_loss: 0.1508 - val_mean_absolute_error: 0.1508 - val_mean_squared_error: 0.0477
Epoch 28/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1206 - mean_absolute_error: 0.1206 - mean_squared_error: 0.0306
Epoch 00028: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 54us/sample - loss: 0.1211 - mean_absolute_error: 0.1211 - mean_squared_error: 0.0311
```

lute_error: 0.1212 - mean_squared_error: 0.0308 - val_loss: 0.1706 - val_mean_absolute_error: 0.1705 - val_mean_squared_error: 0.0555

Epoch 29/500

10240/10471 [=====>.] - ETA: 0s - loss: 0.1201 - mean_absolute_error: 0.1201 - mean_squared_error: 0.0304

Epoch 00029: val_loss did not improve from 0.14783

10471/10471 [=====] - 1s 54us/sample - loss: 0.1200 - mean_absolute_error: 0.1198 - mean_squared_error: 0.0302 - val_loss: 0.1559 - val_mean_absolute_error: 0.1560 - val_mean_squared_error: 0.0491

Epoch 30/500

10400/10471 [=====>.] - ETA: 0s - loss: 0.1212 - mean_absolute_error: 0.1212 - mean_squared_error: 0.0306

Epoch 00030: val_loss did not improve from 0.14783

10471/10471 [=====] - 1s 54us/sample - loss: 0.1213 - mean_absolute_error: 0.1212 - mean_squared_error: 0.0306 - val_loss: 0.1618 - val_mean_absolute_error: 0.1619 - val_mean_squared_error: 0.0506

Epoch 31/500

10208/10471 [=====>.] - ETA: 0s - loss: 0.1209 - mean_absolute_error: 0.1209 - mean_squared_error: 0.0306

Epoch 00031: val_loss did not improve from 0.14783

10471/10471 [=====] - 1s 54us/sample - loss: 0.1206 - mean_absolute_error: 0.1204 - mean_squared_error: 0.0303 - val_loss: 0.1525 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0471

Epoch 32/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.1199 - mean_absolute_error: 0.1199 - mean_squared_error: 0.0299

Epoch 00032: val_loss did not improve from 0.14783

10471/10471 [=====] - 1s 54us/sample - loss: 0.1203 - mean_absolute_error: 0.1202 - mean_squared_error: 0.0301 - val_loss: 0.1506 - val_mean_absolute_error: 0.1506 - val_mean_squared_error: 0.0461

Epoch 33/500

10400/10471 [=====>.] - ETA: 0s - loss: 0.1161 - mean_absolute_error: 0.1161 - mean_squared_error: 0.0289

Epoch 00033: val_loss did not improve from 0.14783

10471/10471 [=====] - 1s 53us/sample - loss: 0.1161 - mean_absolute_error: 0.1162 - mean_squared_error: 0.0288 - val_loss: 0.1525 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0487

Epoch 34/500

10400/10471 [=====>.] - ETA: 0s - loss: 0.1153 - mean_absolute_error: 0.1153 - mean_squared_error: 0.0279

Epoch 00034: val_loss did not improve from 0.14783

10471/10471 [=====] - 1s 54us/sample - loss: 0.1154 - mean_absolute_error: 0.1153 - mean_squared_error: 0.0279 - val_loss: 0.1760 - val_mean_absolute_error: 0.1759 - val_mean_squared_error: 0.0590

Epoch 35/500

10432/10471 [=====>.] - ETA: 0s - loss: 0.1164 - mean_absolute_error: 0.1164 - mean_squared_error: 0.0283

Epoch 00035: val_loss did not improve from 0.14783

10471/10471 [=====] - 1s 53us/sample - loss: 0.1162 - mean_absolute_error: 0.1161 - mean_squared_error: 0.0282 - val_loss: 0.1549 - val_mean_absolute_error: 0.1549 - val_mean_squared_error: 0.0493

Epoch 36/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.1102 - mean_absolute_error: 0.1102 - mean_squared_error: 0.0261

Epoch 00036: val_loss did not improve from 0.14783

10471/10471 [=====] - 1s 54us/sample - loss: 0.1100 - mean_absolute_error: 0.1099 - mean_squared_error: 0.0259 - val_loss: 0.1542 - val_mean_absolute_error: 0.1542 - val_mean_squared_error: 0.0477

Epoch 37/500

9984/10471 [=====>..] - ETA: 0s - loss: 0.1145 - mean_absolute_error: 0.1145 - mean_squared_error: 0.0275

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Epoch 00037: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 56us/sample - loss: 0.1146 - mean_absolute_error: 0.1146 - mean_squared_error: 0.0275 - val_loss: 0.1605 - val_mean_absolute_error: 0.1606 - val_mean_squared_error: 0.0510
Epoch 38/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1121 - mean_absolute_error: 0.1121 - mean_squared_error: 0.0264
Epoch 00038: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 56us/sample - loss: 0.1122 - mean_absolute_error: 0.1122 - mean_squared_error: 0.0263 - val_loss: 0.1957 - val_mean_absolute_error: 0.1956 - val_mean_squared_error: 0.0679
Epoch 39/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1075 - mean_absolute_error: 0.1075 - mean_squared_error: 0.0249
Epoch 00039: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 56us/sample - loss: 0.1076 - mean_absolute_error: 0.1076 - mean_squared_error: 0.0247 - val_loss: 0.1553 - val_mean_absolute_error: 0.1553 - val_mean_squared_error: 0.0490
Epoch 40/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1051 - mean_absolute_error: 0.1051 - mean_squared_error: 0.0239
Epoch 00040: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 57us/sample - loss: 0.1063 - mean_absolute_error: 0.1063 - mean_squared_error: 0.0245 - val_loss: 0.1939 - val_mean_absolute_error: 0.1938 - val_mean_squared_error: 0.0662
Epoch 41/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1134 - mean_absolute_error: 0.1134 - mean_squared_error: 0.0264
Epoch 00041: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 56us/sample - loss: 0.1128 - mean_absolute_error: 0.1128 - mean_squared_error: 0.0262 - val_loss: 0.1538 - val_mean_absolute_error: 0.1538 - val_mean_squared_error: 0.0489
Epoch 42/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1036 - mean_absolute_error: 0.1036 - mean_squared_error: 0.0234
Epoch 00042: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 54us/sample - loss: 0.1037 - mean_absolute_error: 0.1035 - mean_squared_error: 0.0234 - val_loss: 0.2012 - val_mean_absolute_error: 0.2013 - val_mean_squared_error: 0.0684
Epoch 43/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1074 - mean_absolute_error: 0.1074 - mean_squared_error: 0.0241
Epoch 00043: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 55us/sample - loss: 0.1071 - mean_absolute_error: 0.1072 - mean_squared_error: 0.0240 - val_loss: 0.1513 - val_mean_absolute_error: 0.1513 - val_mean_squared_error: 0.0479
Epoch 44/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1060 - mean_absolute_error: 0.1060 - mean_squared_error: 0.0237
Epoch 00044: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 56us/sample - loss: 0.1058 - mean_absolute_error: 0.1058 - mean_squared_error: 0.0235 - val_loss: 0.1708 - val_mean_absolute_error: 0.1708 - val_mean_squared_error: 0.0561
Epoch 45/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1061 - mean_absolute_error: 0.1061 - mean_squared_error: 0.0231
Epoch 00045: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 54us/sample - loss: 0.1062 - mean_absolute_error: 0.1062 - mean_squared_error: 0.0231 - val_loss: 0.1689 - val_mean_absolute_error: 0.1689 - val_mean_squared_error: 0.0563
Epoch 46/500
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9952/10471 [=====>..] - ETA: 0s - loss: 0.1039 - mean_absolute_error: 0.1039 - mean_squared_error: 0.0226
Epoch 00046: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 56us/sample - loss: 0.1034 - mean_absolute_error: 0.1033 - mean_squared_error: 0.0225 - val_loss: 0.1564 - val_mean_absolute_error: 0.1564 - val_mean_squared_error: 0.0506
Epoch 47/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1069 - mean_absolute_error: 0.1069 - mean_squared_error: 0.0238
Epoch 00047: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 54us/sample - loss: 0.1067 - mean_absolute_error: 0.1068 - mean_squared_error: 0.0237 - val_loss: 0.1563 - val_mean_absolute_error: 0.1563 - val_mean_squared_error: 0.0495
Epoch 48/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1005 - mean_absolute_error: 0.1005 - mean_squared_error: 0.0213
Epoch 00048: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 55us/sample - loss: 0.1009 - mean_absolute_error: 0.1010 - mean_squared_error: 0.0215 - val_loss: 0.1594 - val_mean_absolute_error: 0.1594 - val_mean_squared_error: 0.0518
Epoch 49/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.0973 - mean_absolute_error: 0.0973 - mean_squared_error: 0.0200Restoring model weights from the end of the best epoch.

Epoch 00049: val_loss did not improve from 0.14783
10471/10471 [=====] - 1s 55us/sample - loss: 0.0971 - mean_absolute_error: 0.0971 - mean_squared_error: 0.0201 - val_loss: 0.1547 - val_mean_absolute_error: 0.1547 - val_mean_squared_error: 0.0494
Epoch 00049: early stopping
MAE: 0.14781338
RMSE: 0.21389014
Adding initial Dense layers with 1024
Adding Dense layer with 1024
Adding last layer with 1024
Outputting predictive model - Tabular
Model: "model_67"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_68 (InputLayer)	[(None, 61)]	0
dense_484 (Dense)	(None, 1024)	63488
dense_485 (Dense)	(None, 1024)	1049600
dense_486 (Dense)	(None, 1024)	1049600
dense_487 (Dense)	(None, 1)	1025
<hr/>		

```

Total params: 2,163,713
Trainable params: 2,163,713
Non-trainable params: 0

```

```

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10112/10471 [=====>..] - ETA: 0s - loss: 1.2734 - mean_absolute_error: 1.2734 - mean_squared_error: 4.3411
Epoch 00001: val_loss improved from inf to 1.03156, saving model to best_basic_model.hdf

```

5
10471/10471 [=====] - 1s 110us/sample - loss: 1.2508 - mean_absolute_error: 1.2495 - mean_squared_error: 4.2069 - val_loss: 1.0316 - val_mean_absolute_error: 1.0318 - val_mean_squared_error: 1.4810
Epoch 2/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.7985 - mean_absolute_error: 0.7985 - mean_squared_error: 1.0310
Epoch 00002: val_loss improved from 1.03156 to 0.59318, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.8193 - mean_absolute_error: 0.8214 - mean_squared_error: 1.0934 - val_loss: 0.5932 - val_mean_absolute_error: 0.5933 - val_mean_squared_error: 0.6344
Epoch 3/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.7539 - mean_absolute_error: 0.7539 - mean_squared_error: 0.9243
Epoch 00003: val_loss did not improve from 0.59318
10471/10471 [=====] - 1s 70us/sample - loss: 0.7541 - mean_absolute_error: 0.7541 - mean_squared_error: 0.9212 - val_loss: 0.8114 - val_mean_absolute_error: 0.8112 - val_mean_squared_error: 0.8932
Epoch 4/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.7437 - mean_absolute_error: 0.7437 - mean_squared_error: 0.9047
Epoch 00004: val_loss did not improve from 0.59318
10471/10471 [=====] - 1s 70us/sample - loss: 0.7435 - mean_absolute_error: 0.7427 - mean_squared_error: 0.9014 - val_loss: 0.7247 - val_mean_absolute_error: 0.7253 - val_mean_squared_error: 0.8510
Epoch 5/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.5821 - mean_absolute_error: 0.5821 - mean_squared_error: 0.5722
Epoch 00005: val_loss improved from 0.59318 to 0.42662, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 76us/sample - loss: 0.5734 - mean_absolute_error: 0.5727 - mean_squared_error: 0.5576 - val_loss: 0.4266 - val_mean_absolute_error: 0.4265 - val_mean_squared_error: 0.2771
Epoch 6/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.4261 - mean_absolute_error: 0.4261 - mean_squared_error: 0.2992
Epoch 00006: val_loss improved from 0.42662 to 0.26795, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 76us/sample - loss: 0.4208 - mean_absolute_error: 0.4206 - mean_squared_error: 0.2919 - val_loss: 0.2680 - val_mean_absolute_error: 0.2679 - val_mean_squared_error: 0.1327
Epoch 7/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.3725 - mean_absolute_error: 0.3725 - mean_squared_error: 0.2211
Epoch 00007: val_loss did not improve from 0.26795
10471/10471 [=====] - 1s 71us/sample - loss: 0.3753 - mean_absolute_error: 0.3751 - mean_squared_error: 0.2240 - val_loss: 0.2928 - val_mean_absolute_error: 0.2928 - val_mean_squared_error: 0.1529
Epoch 8/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.3477 - mean_absolute_error: 0.3477 - mean_squared_error: 0.1983
Epoch 00008: val_loss did not improve from 0.26795
10471/10471 [=====] - 1s 71us/sample - loss: 0.3444 - mean_absolute_error: 0.3441 - mean_squared_error: 0.1946 - val_loss: 0.3335 - val_mean_absolute_error: 0.3335 - val_mean_squared_error: 0.1698
Epoch 9/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.2894 - mean_absolute_error: 0.2894 - mean_squared_error: 0.1348
Epoch 00009: val_loss improved from 0.26795 to 0.23926, saving model to best_basic_mode1.hdf5

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10471/10471 [=====] - 1s 76us/sample - loss: 0.2899 - mean_absolute_error: 0.2906 - mean_squared_error: 0.1357 - val_loss: 0.2393 - val_mean_absolute_error: 0.2393 - val_mean_squared_error: 0.1004
Epoch 10/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.2675 - mean_absolute_error: 0.2675 - mean_squared_error: 0.1182
Epoch 00010: val_loss improved from 0.23926 to 0.22786, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 76us/sample - loss: 0.2639 - mean_absolute_error: 0.2638 - mean_squared_error: 0.1154 - val_loss: 0.2279 - val_mean_absolute_error: 0.2279 - val_mean_squared_error: 0.0912
Epoch 11/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.2364 - mean_absolute_error: 0.2364 - mean_squared_error: 0.0940
Epoch 00011: val_loss improved from 0.22786 to 0.21373, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 75us/sample - loss: 0.2364 - mean_absolute_error: 0.2366 - mean_squared_error: 0.0940 - val_loss: 0.2137 - val_mean_absolute_error: 0.2137 - val_mean_squared_error: 0.0828
Epoch 12/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2117 - mean_absolute_error: 0.2117 - mean_squared_error: 0.0750
Epoch 00012: val_loss improved from 0.21373 to 0.19080, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.2120 - mean_absolute_error: 0.2122 - mean_squared_error: 0.0753 - val_loss: 0.1908 - val_mean_absolute_error: 0.1908 - val_mean_squared_error: 0.0665
Epoch 13/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1976 - mean_absolute_error: 0.1976 - mean_squared_error: 0.0677
Epoch 00013: val_loss did not improve from 0.19080
10471/10471 [=====] - 1s 73us/sample - loss: 0.1956 - mean_absolute_error: 0.1956 - mean_squared_error: 0.0666 - val_loss: 0.1947 - val_mean_absolute_error: 0.1948 - val_mean_squared_error: 0.0688
Epoch 14/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1903 - mean_absolute_error: 0.1903 - mean_squared_error: 0.0618
Epoch 00014: val_loss did not improve from 0.19080
10471/10471 [=====] - 1s 71us/sample - loss: 0.1896 - mean_absolute_error: 0.1896 - mean_squared_error: 0.0615 - val_loss: 0.2244 - val_mean_absolute_error: 0.2244 - val_mean_squared_error: 0.0824
Epoch 15/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1811 - mean_absolute_error: 0.1811 - mean_squared_error: 0.0574
Epoch 00015: val_loss did not improve from 0.19080
10471/10471 [=====] - 1s 71us/sample - loss: 0.1796 - mean_absolute_error: 0.1796 - mean_squared_error: 0.0567 - val_loss: 0.1995 - val_mean_absolute_error: 0.1995 - val_mean_squared_error: 0.0721
Epoch 16/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1762 - mean_absolute_error: 0.1762 - mean_squared_error: 0.0550
Epoch 00016: val_loss did not improve from 0.19080
10471/10471 [=====] - 1s 72us/sample - loss: 0.1756 - mean_absolute_error: 0.1758 - mean_squared_error: 0.0549 - val_loss: 0.2219 - val_mean_absolute_error: 0.2219 - val_mean_squared_error: 0.0785
Epoch 17/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1582 - mean_absolute_error: 0.1582 - mean_squared_error: 0.0461
Epoch 00017: val_loss improved from 0.19080 to 0.15836, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 75us/sample - loss: 0.1571 - mean_absolute_error:
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lute_error: 0.1572 - mean_squared_error: 0.0457 - val_loss: 0.1584 - val_mean_absolute_error: 0.1583 - val_mean_squared_error: 0.0492
Epoch 18/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1502 - mean_absolute_error: 0.1502 - mean_squared_error: 0.0426
Epoch 00018: val_loss did not improve from 0.15836
10471/10471 [=====] - 1s 70us/sample - loss: 0.1504 - mean_absolute_error: 0.1506 - mean_squared_error: 0.0429 - val_loss: 0.1703 - val_mean_absolute_error: 0.1703 - val_mean_squared_error: 0.0547
Epoch 19/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0379
Epoch 00019: val_loss did not improve from 0.15836
10471/10471 [=====] - 1s 73us/sample - loss: 0.1400 - mean_absolute_error: 0.1399 - mean_squared_error: 0.0374 - val_loss: 0.1603 - val_mean_absolute_error: 0.1604 - val_mean_squared_error: 0.0501
Epoch 20/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1351 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0355
Epoch 00020: val_loss did not improve from 0.15836
10471/10471 [=====] - 1s 71us/sample - loss: 0.1352 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0354 - val_loss: 0.1772 - val_mean_absolute_error: 0.1773 - val_mean_squared_error: 0.0572
Epoch 21/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1325 - mean_absolute_error: 0.1325 - mean_squared_error: 0.0344
Epoch 00021: val_loss improved from 0.15836 to 0.15497, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 76us/sample - loss: 0.1322 - mean_absolute_error: 0.1321 - mean_squared_error: 0.0342 - val_loss: 0.1550 - val_mean_absolute_error: 0.1550 - val_mean_squared_error: 0.0485
Epoch 22/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1275 - mean_absolute_error: 0.1275 - mean_squared_error: 0.0324
Epoch 00022: val_loss did not improve from 0.15497
10471/10471 [=====] - 1s 72us/sample - loss: 0.1268 - mean_absolute_error: 0.1269 - mean_squared_error: 0.0321 - val_loss: 0.1921 - val_mean_absolute_error: 0.1921 - val_mean_squared_error: 0.0622
Epoch 23/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1249 - mean_absolute_error: 0.1249 - mean_squared_error: 0.0317
Epoch 00023: val_loss did not improve from 0.15497
10471/10471 [=====] - 1s 72us/sample - loss: 0.1247 - mean_absolute_error: 0.1247 - mean_squared_error: 0.0315 - val_loss: 0.2156 - val_mean_absolute_error: 0.2155 - val_mean_squared_error: 0.0777
Epoch 24/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1233 - mean_absolute_error: 0.1233 - mean_squared_error: 0.0308
Epoch 00024: val_loss did not improve from 0.15497
10471/10471 [=====] - 1s 70us/sample - loss: 0.1227 - mean_absolute_error: 0.1225 - mean_squared_error: 0.0304 - val_loss: 0.1558 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0493
Epoch 25/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1192 - mean_absolute_error: 0.1192 - mean_squared_error: 0.0282
Epoch 00025: val_loss improved from 0.15497 to 0.15331, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1191 - mean_absolute_error: 0.1189 - mean_squared_error: 0.0285 - val_loss: 0.1533 - val_mean_absolute_error: 0.1533 - val_mean_squared_error: 0.0471
Epoch 26/500

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10144/10471 [=====>.] - ETA: 0s - loss: 0.1096 - mean_absolute_error: 0.1096 - mean_squared_error: 0.0253
Epoch 00026: val_loss did not improve from 0.15331
10471/10471 [=====] - 1s 71us/sample - loss: 0.1099 - mean_absolute_error: 0.1099 - mean_squared_error: 0.0253 - val_loss: 0.1603 - val_mean_absolute_error: 0.1603 - val_mean_squared_error: 0.0504
Epoch 27/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1100 - mean_absolute_error: 0.1100 - mean_squared_error: 0.0253
Epoch 00027: val_loss did not improve from 0.15331
10471/10471 [=====] - 1s 71us/sample - loss: 0.1104 - mean_absolute_error: 0.1104 - mean_squared_error: 0.0254 - val_loss: 0.1658 - val_mean_absolute_error: 0.1658 - val_mean_squared_error: 0.0519
Epoch 28/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1053 - mean_absolute_error: 0.1053 - mean_squared_error: 0.0236
Epoch 00028: val_loss did not improve from 0.15331
10471/10471 [=====] - 1s 71us/sample - loss: 0.1057 - mean_absolute_error: 0.1057 - mean_squared_error: 0.0236 - val_loss: 0.1795 - val_mean_absolute_error: 0.1794 - val_mean_squared_error: 0.0570
Epoch 29/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1098 - mean_absolute_error: 0.1098 - mean_squared_error: 0.0248
Epoch 00029: val_loss improved from 0.15331 to 0.14791, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1095 - mean_absolute_error: 0.1095 - mean_squared_error: 0.0246 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0447
Epoch 30/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1026 - mean_absolute_error: 0.1026 - mean_squared_error: 0.0222
Epoch 00030: val_loss did not improve from 0.14791
10471/10471 [=====] - 1s 73us/sample - loss: 0.1028 - mean_absolute_error: 0.1029 - mean_squared_error: 0.0224 - val_loss: 0.1652 - val_mean_absolute_error: 0.1651 - val_mean_squared_error: 0.0532
Epoch 31/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1025 - mean_absolute_error: 0.1025 - mean_squared_error: 0.0219
Epoch 00031: val_loss did not improve from 0.14791
10471/10471 [=====] - 1s 72us/sample - loss: 0.1026 - mean_absolute_error: 0.1026 - mean_squared_error: 0.0218 - val_loss: 0.1559 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0484
Epoch 32/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.0984 - mean_absolute_error: 0.0984 - mean_squared_error: 0.0204
Epoch 00032: val_loss did not improve from 0.14791
10471/10471 [=====] - 1s 75us/sample - loss: 0.0982 - mean_absolute_error: 0.0980 - mean_squared_error: 0.0203 - val_loss: 0.1630 - val_mean_absolute_error: 0.1630 - val_mean_squared_error: 0.0511
Epoch 33/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1026 - mean_absolute_error: 0.1026 - mean_squared_error: 0.0216
Epoch 00033: val_loss did not improve from 0.14791
10471/10471 [=====] - 1s 74us/sample - loss: 0.1028 - mean_absolute_error: 0.1027 - mean_squared_error: 0.0216 - val_loss: 0.1588 - val_mean_absolute_error: 0.1587 - val_mean_squared_error: 0.0501
Epoch 34/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0946 - mean_absolute_error: 0.0946 - mean_squared_error: 0.0193
Epoch 00034: val_loss did not improve from 0.14791
10471/10471 [=====] - 1s 74us/sample - loss: 0.0947 - mean_absolute_error: 0.0947 - mean_squared_error: 0.0193
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lute_error: 0.0948 - mean_squared_error: 0.0195 - val_loss: 0.1535 - val_mean_absolute_e
rror: 0.1535 - val_mean_squared_error: 0.0477
Epoch 35/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.0892 - mean_absolute_er
ror: 0.0892 - mean_squared_error: 0.0176
Epoch 00035: val_loss did not improve from 0.14791
10471/10471 [=====] - 1s 74us/sample - loss: 0.0894 - mean_abso
lute_error: 0.0895 - mean_squared_error: 0.0176 - val_loss: 0.1553 - val_mean_absolute_e
rror: 0.1553 - val_mean_squared_error: 0.0487
Epoch 36/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.0910 - mean_absolute_er
ror: 0.0910 - mean_squared_error: 0.0176
Epoch 00036: val_loss did not improve from 0.14791
10471/10471 [=====] - 1s 74us/sample - loss: 0.0909 - mean_abso
lute_error: 0.0910 - mean_squared_error: 0.0176 - val_loss: 0.1489 - val_mean_absolute_e
rror: 0.1489 - val_mean_squared_error: 0.0457
Epoch 37/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.0869 - mean_absolute_er
ror: 0.0869 - mean_squared_error: 0.0162
Epoch 00037: val_loss improved from 0.14791 to 0.14656, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 79us/sample - loss: 0.0869 - mean_abso
lute_error: 0.0869 - mean_squared_error: 0.0162 - val_loss: 0.1466 - val_mean_absolute_e
rror: 0.1465 - val_mean_squared_error: 0.0439
Epoch 38/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.0834 - mean_absolute_er
ror: 0.0834 - mean_squared_error: 0.0152
Epoch 00038: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 71us/sample - loss: 0.0832 - mean_abso
lute_error: 0.0831 - mean_squared_error: 0.0150 - val_loss: 0.1567 - val_mean_absolute_e
rror: 0.1567 - val_mean_squared_error: 0.0496
Epoch 39/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.0818 - mean_absolute_er
ror: 0.0818 - mean_squared_error: 0.0146
Epoch 00039: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 75us/sample - loss: 0.0818 - mean_abso
lute_error: 0.0817 - mean_squared_error: 0.0146 - val_loss: 0.1500 - val_mean_absolute_e
rror: 0.1499 - val_mean_squared_error: 0.0463
Epoch 40/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.0841 - mean_absolute_er
ror: 0.0841 - mean_squared_error: 0.0152
Epoch 00040: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 79us/sample - loss: 0.0844 - mean_abso
lute_error: 0.0843 - mean_squared_error: 0.0151 - val_loss: 0.1543 - val_mean_absolute_e
rror: 0.1543 - val_mean_squared_error: 0.0477
Epoch 41/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.0834 - mean_absolute_er
ror: 0.0834 - mean_squared_error: 0.0145
Epoch 00041: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 74us/sample - loss: 0.0834 - mean_abso
lute_error: 0.0833 - mean_squared_error: 0.0144 - val_loss: 0.1536 - val_mean_absolute_e
rror: 0.1536 - val_mean_squared_error: 0.0475
Epoch 42/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.0784 - mean_absolute_er
ror: 0.0784 - mean_squared_error: 0.0134
Epoch 00042: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 69us/sample - loss: 0.0784 - mean_abso
lute_error: 0.0784 - mean_squared_error: 0.0134 - val_loss: 0.1554 - val_mean_absolute_e
rror: 0.1553 - val_mean_squared_error: 0.0485
Epoch 43/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.0760 - mean_absolute_er
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ror: 0.0760 - mean_squared_error: 0.0126
Epoch 00043: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 66us/sample - loss: 0.0762 - mean_absolute_error: 0.0764 - mean_squared_error: 0.0127 - val_loss: 0.1512 - val_mean_absolute_error: 0.1512 - val_mean_squared_error: 0.0472
Epoch 44/500
    9856/10471 [=====>..] - ETA: 0s - loss: 0.0779 - mean_absolute_error: 0.0779 - mean_squared_error: 0.0128
Epoch 00044: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 67us/sample - loss: 0.0775 - mean_absolute_error: 0.0775 - mean_squared_error: 0.0127 - val_loss: 0.1629 - val_mean_absolute_error: 0.1629 - val_mean_squared_error: 0.0511
Epoch 45/500
    9728/10471 [=====>...] - ETA: 0s - loss: 0.0773 - mean_absolute_error: 0.0773 - mean_squared_error: 0.0126
Epoch 00045: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 68us/sample - loss: 0.0774 - mean_absolute_error: 0.0774 - mean_squared_error: 0.0125 - val_loss: 0.1549 - val_mean_absolute_error: 0.1549 - val_mean_squared_error: 0.0486
Epoch 46/500
    9952/10471 [=====>..] - ETA: 0s - loss: 0.0742 - mean_absolute_error: 0.0742 - mean_squared_error: 0.0118
Epoch 00046: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 66us/sample - loss: 0.0748 - mean_absolute_error: 0.0747 - mean_squared_error: 0.0118 - val_loss: 0.1575 - val_mean_absolute_error: 0.1574 - val_mean_squared_error: 0.0486
Epoch 47/500
    10080/10471 [=====>..] - ETA: 0s - loss: 0.0686 - mean_absolute_error: 0.0686 - mean_squared_error: 0.0104
Epoch 00047: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 71us/sample - loss: 0.0686 - mean_absolute_error: 0.0686 - mean_squared_error: 0.0105 - val_loss: 0.1510 - val_mean_absolute_error: 0.1510 - val_mean_squared_error: 0.0462
Epoch 48/500
    10400/10471 [=====>.] - ETA: 0s - loss: 0.0683 - mean_absolute_error: 0.0683 - mean_squared_error: 0.0103
Epoch 00048: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 68us/sample - loss: 0.0682 - mean_absolute_error: 0.0682 - mean_squared_error: 0.0103 - val_loss: 0.1513 - val_mean_absolute_error: 0.1513 - val_mean_squared_error: 0.0461
Epoch 49/500
    9856/10471 [=====>..] - ETA: 0s - loss: 0.0680 - mean_absolute_error: 0.0680 - mean_squared_error: 0.0103
Epoch 00049: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 67us/sample - loss: 0.0689 - mean_absolute_error: 0.0690 - mean_squared_error: 0.0104 - val_loss: 0.1550 - val_mean_absolute_error: 0.1550 - val_mean_squared_error: 0.0479
Epoch 50/500
    9920/10471 [=====>..] - ETA: 0s - loss: 0.0748 - mean_absolute_error: 0.0748 - mean_squared_error: 0.0114
Epoch 00050: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 67us/sample - loss: 0.0744 - mean_absolute_error: 0.0745 - mean_squared_error: 0.0113 - val_loss: 0.1627 - val_mean_absolute_error: 0.1627 - val_mean_squared_error: 0.0513
Epoch 51/500
    9696/10471 [=====>...] - ETA: 0s - loss: 0.0672 - mean_absolute_error: 0.0672 - mean_squared_error: 0.0097
Epoch 00051: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 67us/sample - loss: 0.0669 - mean_absolute_error: 0.0668 - mean_squared_error: 0.0097 - val_loss: 0.1539 - val_mean_absolute_error: 0.1539 - val_mean_squared_error: 0.0477
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Epoch 52/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.0649 - mean_absolute_error: 0.0649 - mean_squared_error: 0.0091
Epoch 00052: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 67us/sample - loss: 0.0649 - mean_absolute_error: 0.0649 - mean_squared_error: 0.0090 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0466
Epoch 53/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.0641 - mean_absolute_error: 0.0641 - mean_squared_error: 0.0089
Epoch 00053: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 67us/sample - loss: 0.0644 - mean_absolute_error: 0.0643 - mean_squared_error: 0.0089 - val_loss: 0.1793 - val_mean_absolute_error: 0.1793 - val_mean_squared_error: 0.0593
Epoch 54/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.0643 - mean_absolute_error: 0.0643 - mean_squared_error: 0.0088
Epoch 00054: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 66us/sample - loss: 0.0642 - mean_absolute_error: 0.0643 - mean_squared_error: 0.0088 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0450
Epoch 55/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.0625 - mean_absolute_error: 0.0625 - mean_squared_error: 0.0085
Epoch 00055: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 67us/sample - loss: 0.0620 - mean_absolute_error: 0.0620 - mean_squared_error: 0.0083 - val_loss: 0.1495 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0458
Epoch 56/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.0617 - mean_absolute_error: 0.0617 - mean_squared_error: 0.0082
Epoch 00056: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 66us/sample - loss: 0.0615 - mean_absolute_error: 0.0617 - mean_squared_error: 0.0081 - val_loss: 0.1523 - val_mean_absolute_error: 0.1522 - val_mean_squared_error: 0.0479
Epoch 57/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.0566 - mean_absolute_error: 0.0566 - mean_squared_error: 0.0071
Epoch 00057: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 67us/sample - loss: 0.0571 - mean_absolute_error: 0.0572 - mean_squared_error: 0.0073 - val_loss: 0.1551 - val_mean_absolute_error: 0.1550 - val_mean_squared_error: 0.0476
Epoch 58/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.0583 - mean_absolute_error: 0.0583 - mean_squared_error: 0.0073
Epoch 00058: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 66us/sample - loss: 0.0581 - mean_absolute_error: 0.0581 - mean_squared_error: 0.0072 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0456
Epoch 59/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.0557 - mean_absolute_error: 0.0557 - mean_squared_error: 0.0068
Epoch 00059: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 67us/sample - loss: 0.0555 - mean_absolute_error: 0.0555 - mean_squared_error: 0.0068 - val_loss: 0.1501 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0467
Epoch 60/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.0555 - mean_absolute_error: 0.0555 - mean_squared_error: 0.0067
Epoch 00060: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 66us/sample - loss: 0.0554 - mean_absolute_error:

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lute_error: 0.0554 - mean_squared_error: 0.0067 - val_loss: 0.1487 - val_mean_absolute_e
rror: 0.1487 - val_mean_squared_error: 0.0456
Epoch 61/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.0564 - mean_absolute_er
ror: 0.0564 - mean_squared_error: 0.0067
Epoch 00061: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 66us/sample - loss: 0.0563 - mean_abso
lute_error: 0.0565 - mean_squared_error: 0.0068 - val_loss: 0.1569 - val_mean_absolute_e
rror: 0.1569 - val_mean_squared_error: 0.0483
Epoch 62/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.0547 - mean_absolute_er
ror: 0.0547 - mean_squared_error: 0.0064Restoring model weights from the end of the best
epoch.

Epoch 00062: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 67us/sample - loss: 0.0545 - mean_abso
lute_error: 0.0545 - mean_squared_error: 0.0063 - val_loss: 0.1515 - val_mean_absolute_e
rror: 0.1514 - val_mean_squared_error: 0.0467
Epoch 00062: early stopping
MAE: 0.14651673
RMSE: 0.20955764
Adding initial Dense layers with 512
Adding Dense layer with 512
Adding last layer with 512
Outputting predictive model - Tabular
Model: "model_68"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_69 (InputLayer)	[None, 61]	0
dense_488 (Dense)	(None, 512)	31744
dense_489 (Dense)	(None, 512)	262656
dense_490 (Dense)	(None, 512)	262656
dense_491 (Dense)	(None, 1)	513
<hr/>		
Total params: 557,569		
Trainable params: 557,569		
Non-trainable params: 0		

```

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10400/10471 [=====>..] - ETA: 0s - loss: 1.2554 - mean_absolute_er
ror: 1.2554 - mean_squared_error: 4.5502
Epoch 00001: val_loss improved from inf to 1.05397, saving model to best_basic_model.hdf
5
10471/10471 [=====] - 1s 95us/sample - loss: 1.2519 - mean_abso
lute_error: 1.2514 - mean_squared_error: 4.5176 - val_loss: 1.0540 - val_mean_absolute_e
rror: 1.0541 - val_mean_squared_error: 1.5142
Epoch 2/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.7038 - mean_absolute_er
ror: 0.7038 - mean_squared_error: 0.7946
Epoch 00002: val_loss improved from 1.05397 to 0.72209, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.6939 - mean_abso
lute_error: 0.6937 - mean_squared_error: 0.7772 - val_loss: 0.7221 - val_mean_absolute_e

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rror: 0.7221 - val_mean_squared_error: 0.7694
Epoch 3/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.6528 - mean_absolute_error: 0.6528 - mean_squared_error: 0.6855
Epoch 00003: val_loss did not improve from 0.72209
10471/10471 [=====] - 1s 55us/sample - loss: 0.6616 - mean_absolute_error: 0.6630 - mean_squared_error: 0.7067 - val_loss: 0.8584 - val_mean_absolute_error: 0.8587 - val_mean_squared_error: 1.1311
Epoch 4/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.6144 - mean_absolute_error: 0.6144 - mean_squared_error: 0.5924
Epoch 00004: val_loss did not improve from 0.72209
10471/10471 [=====] - 1s 55us/sample - loss: 0.6162 - mean_absolute_error: 0.6177 - mean_squared_error: 0.5971 - val_loss: 1.0316 - val_mean_absolute_error: 1.0320 - val_mean_squared_error: 1.4427
Epoch 5/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.4588 - mean_absolute_error: 0.4588 - mean_squared_error: 0.3361
Epoch 00005: val_loss improved from 0.72209 to 0.46514, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.4571 - mean_absolute_error: 0.4569 - mean_squared_error: 0.3337 - val_loss: 0.4651 - val_mean_absolute_error: 0.4651 - val_mean_squared_error: 0.3051
Epoch 6/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.4277 - mean_absolute_error: 0.4277 - mean_squared_error: 0.3067
Epoch 00006: val_loss improved from 0.46514 to 0.36059, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.4282 - mean_absolute_error: 0.4282 - mean_squared_error: 0.3069 - val_loss: 0.3606 - val_mean_absolute_error: 0.3606 - val_mean_squared_error: 0.1878
Epoch 7/500
9664/10471 [=====>..] - ETA: 0s - loss: 0.3179 - mean_absolute_error: 0.3179 - mean_squared_error: 0.1688
Epoch 00007: val_loss improved from 0.36059 to 0.32206, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 59us/sample - loss: 0.3170 - mean_absolute_error: 0.3172 - mean_squared_error: 0.1675 - val_loss: 0.3221 - val_mean_absolute_error: 0.3221 - val_mean_squared_error: 0.1657
Epoch 8/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.2430 - mean_absolute_error: 0.2430 - mean_squared_error: 0.1035
Epoch 00008: val_loss improved from 0.32206 to 0.30330, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.2428 - mean_absolute_error: 0.2428 - mean_squared_error: 0.1033 - val_loss: 0.3033 - val_mean_absolute_error: 0.3034 - val_mean_squared_error: 0.1464
Epoch 9/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.1878 - mean_absolute_error: 0.1878 - mean_squared_error: 0.0627
Epoch 00009: val_loss improved from 0.30330 to 0.19671, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 60us/sample - loss: 0.1871 - mean_absolute_error: 0.1868 - mean_squared_error: 0.0625 - val_loss: 0.1967 - val_mean_absolute_error: 0.1968 - val_mean_squared_error: 0.0667
Epoch 10/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1739 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0553
Epoch 00010: val_loss improved from 0.19671 to 0.17942, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.1735 - mean_absolute_error:
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lute_error: 0.1735 - mean_squared_error: 0.0552 - val_loss: 0.1794 - val_mean_absolute_e
rror: 0.1795 - val_mean_squared_error: 0.0595
Epoch 11/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1586 - mean_absolute_er
ror: 0.1586 - mean_squared_error: 0.0471
Epoch 00011: val_loss improved from 0.17942 to 0.16412, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.1583 - mean_abso
lute_error: 0.1584 - mean_squared_error: 0.0475 - val_loss: 0.1641 - val_mean_absolute_e
rror: 0.1641 - val_mean_squared_error: 0.0548
Epoch 12/500
9408/10471 [=====>....] - ETA: 0s - loss: 0.1558 - mean_absolute_er
ror: 0.1558 - mean_squared_error: 0.0467
Epoch 00012: val_loss did not improve from 0.16412
10471/10471 [=====] - 1s 53us/sample - loss: 0.1561 - mean_abso
lute_error: 0.1560 - mean_squared_error: 0.0467 - val_loss: 0.1805 - val_mean_absolute_e
rror: 0.1806 - val_mean_squared_error: 0.0598
Epoch 13/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1514 - mean_absolute_er
ror: 0.1514 - mean_squared_error: 0.0439
Epoch 00013: val_loss improved from 0.16412 to 0.16362, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1515 - mean_abso
lute_error: 0.1516 - mean_squared_error: 0.0440 - val_loss: 0.1636 - val_mean_absolute_e
rror: 0.1636 - val_mean_squared_error: 0.0502
Epoch 14/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1529 - mean_absolute_er
ror: 0.1529 - mean_squared_error: 0.0439
Epoch 00014: val_loss improved from 0.16362 to 0.15566, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 54us/sample - loss: 0.1525 - mean_abso
lute_error: 0.1525 - mean_squared_error: 0.0435 - val_loss: 0.1557 - val_mean_absolute_e
rror: 0.1556 - val_mean_squared_error: 0.0498
Epoch 15/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1429 - mean_absolute_er
ror: 0.1429 - mean_squared_error: 0.0392
Epoch 00015: val_loss did not improve from 0.15566
10471/10471 [=====] - 1s 52us/sample - loss: 0.1424 - mean_abso
lute_error: 0.1425 - mean_squared_error: 0.0389 - val_loss: 0.1993 - val_mean_absolute_e
rror: 0.1994 - val_mean_squared_error: 0.0679
Epoch 16/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1345 - mean_absolute_er
ror: 0.1345 - mean_squared_error: 0.0358
Epoch 00016: val_loss did not improve from 0.15566
10471/10471 [=====] - 1s 52us/sample - loss: 0.1337 - mean_abso
lute_error: 0.1336 - mean_squared_error: 0.0354 - val_loss: 0.1604 - val_mean_absolute_e
rror: 0.1604 - val_mean_squared_error: 0.0506
Epoch 17/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1447 - mean_absolute_er
ror: 0.1447 - mean_squared_error: 0.0394
Epoch 00017: val_loss did not improve from 0.15566
10471/10471 [=====] - 1s 53us/sample - loss: 0.1447 - mean_abso
lute_error: 0.1448 - mean_squared_error: 0.0394 - val_loss: 0.1725 - val_mean_absolute_e
rror: 0.1725 - val_mean_squared_error: 0.0578
Epoch 18/500
9440/10471 [=====>...] - ETA: 0s - loss: 0.1303 - mean_absolute_er
ror: 0.1303 - mean_squared_error: 0.0334
Epoch 00018: val_loss did not improve from 0.15566
10471/10471 [=====] - 1s 53us/sample - loss: 0.1299 - mean_abso
lute_error: 0.1299 - mean_squared_error: 0.0332 - val_loss: 0.1593 - val_mean_absolute_e
rror: 0.1594 - val_mean_squared_error: 0.0507
```

```
Epoch 19/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1310 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0330
Epoch 00019: val_loss did not improve from 0.15566
10471/10471 [=====] - 1s 52us/sample - loss: 0.1321 - mean_absolute_error: 0.1320 - mean_squared_error: 0.0338 - val_loss: 0.1583 - val_mean_absolute_error: 0.1583 - val_mean_squared_error: 0.0490
Epoch 20/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1275 - mean_absolute_error: 0.1275 - mean_squared_error: 0.0318
Epoch 00020: val_loss did not improve from 0.15566
10471/10471 [=====] - 1s 52us/sample - loss: 0.1270 - mean_absolute_error: 0.1270 - mean_squared_error: 0.0316 - val_loss: 0.1789 - val_mean_absolute_error: 0.1789 - val_mean_squared_error: 0.0609
Epoch 21/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1302 - mean_absolute_error: 0.1302 - mean_squared_error: 0.0324
Epoch 00021: val_loss improved from 0.15566 to 0.15347, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 53us/sample - loss: 0.1295 - mean_absolute_error: 0.1295 - mean_squared_error: 0.0325 - val_loss: 0.1535 - val_mean_absolute_error: 0.1535 - val_mean_squared_error: 0.0472
Epoch 22/500
9472/10471 [=====>...] - ETA: 0s - loss: 0.1206 - mean_absolute_error: 0.1206 - mean_squared_error: 0.0286
Epoch 00022: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 53us/sample - loss: 0.1224 - mean_absolute_error: 0.1223 - mean_squared_error: 0.0292 - val_loss: 0.1599 - val_mean_absolute_error: 0.1600 - val_mean_squared_error: 0.0512
Epoch 23/500
9440/10471 [=====>...] - ETA: 0s - loss: 0.1255 - mean_absolute_error: 0.1255 - mean_squared_error: 0.0301
Epoch 00023: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 53us/sample - loss: 0.1261 - mean_absolute_error: 0.1260 - mean_squared_error: 0.0303 - val_loss: 0.1555 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0491
Epoch 24/500
9824/10471 [=====>...] - ETA: 0s - loss: 0.1220 - mean_absolute_error: 0.1220 - mean_squared_error: 0.0289
Epoch 00024: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 56us/sample - loss: 0.1235 - mean_absolute_error: 0.1238 - mean_squared_error: 0.0295 - val_loss: 0.1818 - val_mean_absolute_error: 0.1819 - val_mean_squared_error: 0.0598
Epoch 25/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1191 - mean_absolute_error: 0.1191 - mean_squared_error: 0.0272
Epoch 00025: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 52us/sample - loss: 0.1195 - mean_absolute_error: 0.1194 - mean_squared_error: 0.0277 - val_loss: 0.1726 - val_mean_absolute_error: 0.1726 - val_mean_squared_error: 0.0574
Epoch 26/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1137 - mean_absolute_error: 0.1137 - mean_squared_error: 0.0256
Epoch 00026: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 51us/sample - loss: 0.1146 - mean_absolute_error: 0.1147 - mean_squared_error: 0.0258 - val_loss: 0.2091 - val_mean_absolute_error: 0.2092 - val_mean_squared_error: 0.0743
Epoch 27/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1209 - mean_absolute_error: 0.1209 - mean_squared_error: 0.0275
Epoch 00027: val_loss did not improve from 0.15347
```

```
10471/10471 [=====] - 1s 52us/sample - loss: 0.1201 - mean_absolute_error: 0.1201 - mean_squared_error: 0.0273 - val_loss: 0.1553 - val_mean_absolute_error: 0.1554 - val_mean_squared_error: 0.0486
Epoch 28/500
    9760/10471 [=====>...] - ETA: 0s - loss: 0.1097 - mean_absolute_error: 0.1097 - mean_squared_error: 0.0233
Epoch 00028: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 51us/sample - loss: 0.1092 - mean_absolute_error: 0.1091 - mean_squared_error: 0.0233 - val_loss: 0.1564 - val_mean_absolute_error: 0.1564 - val_mean_squared_error: 0.0502
Epoch 29/500
    9536/10471 [=====>...] - ETA: 0s - loss: 0.1214 - mean_absolute_error: 0.1214 - mean_squared_error: 0.0274
Epoch 00029: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 52us/sample - loss: 0.1201 - mean_absolute_error: 0.1199 - mean_squared_error: 0.0269 - val_loss: 0.1653 - val_mean_absolute_error: 0.1654 - val_mean_squared_error: 0.0513
Epoch 30/500
    9536/10471 [=====>...] - ETA: 0s - loss: 0.1067 - mean_absolute_error: 0.1067 - mean_squared_error: 0.0221
Epoch 00030: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 53us/sample - loss: 0.1078 - mean_absolute_error: 0.1078 - mean_squared_error: 0.0227 - val_loss: 0.1593 - val_mean_absolute_error: 0.1593 - val_mean_squared_error: 0.0516
Epoch 31/500
    9568/10471 [=====>...] - ETA: 0s - loss: 0.1051 - mean_absolute_error: 0.1051 - mean_squared_error: 0.0218
Epoch 00031: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 52us/sample - loss: 0.1057 - mean_absolute_error: 0.1057 - mean_squared_error: 0.0219 - val_loss: 0.1591 - val_mean_absolute_error: 0.1592 - val_mean_squared_error: 0.0500
Epoch 32/500
    10272/10471 [=====>.] - ETA: 0s - loss: 0.1054 - mean_absolute_error: 0.1054 - mean_squared_error: 0.0213
Epoch 00032: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 54us/sample - loss: 0.1054 - mean_absolute_error: 0.1057 - mean_squared_error: 0.0215 - val_loss: 0.1725 - val_mean_absolute_error: 0.1726 - val_mean_squared_error: 0.0567
Epoch 33/500
    10272/10471 [=====>.] - ETA: 0s - loss: 0.1063 - mean_absolute_error: 0.1063 - mean_squared_error: 0.0214
Epoch 00033: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 55us/sample - loss: 0.1060 - mean_absolute_error: 0.1060 - mean_squared_error: 0.0213 - val_loss: 0.1831 - val_mean_absolute_error: 0.1830 - val_mean_squared_error: 0.0617
Epoch 34/500
    10048/10471 [=====>..] - ETA: 0s - loss: 0.0961 - mean_absolute_error: 0.0961 - mean_squared_error: 0.0183
Epoch 00034: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 56us/sample - loss: 0.0970 - mean_absolute_error: 0.0971 - mean_squared_error: 0.0186 - val_loss: 0.1791 - val_mean_absolute_error: 0.1791 - val_mean_squared_error: 0.0592
Epoch 35/500
    9632/10471 [=====>...] - ETA: 0s - loss: 0.1043 - mean_absolute_error: 0.1043 - mean_squared_error: 0.0206
Epoch 00035: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 52us/sample - loss: 0.1066 - mean_absolute_error: 0.1066 - mean_squared_error: 0.0214 - val_loss: 0.1631 - val_mean_absolute_error: 0.1631 - val_mean_squared_error: 0.0519
Epoch 36/500
    9728/10471 [=====>...] - ETA: 0s - loss: 0.0987 - mean_absolute_error:
```

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ror: 0.0987 - mean_squared_error: 0.0190
Epoch 00036: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 51us/sample - loss: 0.0989 - mean_absolute_error: 0.0988 - mean_squared_error: 0.0192 - val_loss: 0.1561 - val_mean_absolute_error: 0.1561 - val_mean_squared_error: 0.0502
Epoch 37/500
    9760/10471 [=====>...] - ETA: 0s - loss: 0.0976 - mean_absolute_error: 0.0976 - mean_squared_error: 0.0184
Epoch 00037: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 51us/sample - loss: 0.0981 - mean_absolute_error: 0.0981 - mean_squared_error: 0.0185 - val_loss: 0.1573 - val_mean_absolute_error: 0.1573 - val_mean_squared_error: 0.0504
Epoch 38/500
    9760/10471 [=====>...] - ETA: 0s - loss: 0.0970 - mean_absolute_error: 0.0970 - mean_squared_error: 0.0182
Epoch 00038: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 51us/sample - loss: 0.0969 - mean_absolute_error: 0.0969 - mean_squared_error: 0.0181 - val_loss: 0.1633 - val_mean_absolute_error: 0.1632 - val_mean_squared_error: 0.0524
Epoch 39/500
    9760/10471 [=====>...] - ETA: 0s - loss: 0.0944 - mean_absolute_error: 0.0944 - mean_squared_error: 0.0172
Epoch 00039: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 51us/sample - loss: 0.0940 - mean_absolute_error: 0.0941 - mean_squared_error: 0.0171 - val_loss: 0.1586 - val_mean_absolute_error: 0.1586 - val_mean_squared_error: 0.0499
Epoch 40/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.0975 - mean_absolute_error: 0.0975 - mean_squared_error: 0.0177
Epoch 00040: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 54us/sample - loss: 0.0973 - mean_absolute_error: 0.0972 - mean_squared_error: 0.0176 - val_loss: 0.1570 - val_mean_absolute_error: 0.1570 - val_mean_squared_error: 0.0494
Epoch 41/500
    9920/10471 [=====>..] - ETA: 0s - loss: 0.0909 - mean_absolute_error: 0.0909 - mean_squared_error: 0.0158
Epoch 00041: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 56us/sample - loss: 0.0927 - mean_absolute_error: 0.0927 - mean_squared_error: 0.0165 - val_loss: 0.1967 - val_mean_absolute_error: 0.1967 - val_mean_squared_error: 0.0664
Epoch 42/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.0899 - mean_absolute_error: 0.0899 - mean_squared_error: 0.0154
Epoch 00042: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 54us/sample - loss: 0.0900 - mean_absolute_error: 0.0899 - mean_squared_error: 0.0155 - val_loss: 0.1795 - val_mean_absolute_error: 0.1795 - val_mean_squared_error: 0.0598
Epoch 43/500
    10464/10471 [=====>.] - ETA: 0s - loss: 0.0906 - mean_absolute_error: 0.0906 - mean_squared_error: 0.0157
Epoch 00043: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 53us/sample - loss: 0.0906 - mean_absolute_error: 0.0907 - mean_squared_error: 0.0157 - val_loss: 0.1604 - val_mean_absolute_error: 0.1604 - val_mean_squared_error: 0.0511
Epoch 44/500
    9664/10471 [=====>...] - ETA: 0s - loss: 0.0994 - mean_absolute_error: 0.0994 - mean_squared_error: 0.0178
Epoch 00044: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 52us/sample - loss: 0.0994 - mean_absolute_error: 0.0994 - mean_squared_error: 0.0177 - val_loss: 0.1782 - val_mean_absolute_error: 0.1782 - val_mean_squared_error: 0.0581
```

```
Epoch 45/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.0907 - mean_absolute_error: 0.0907 - mean_squared_error: 0.0157
Epoch 00045: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 53us/sample - loss: 0.0907 - mean_absolute_error: 0.0908 - mean_squared_error: 0.0157 - val_loss: 0.1640 - val_mean_absolute_error: 0.1639 - val_mean_squared_error: 0.0528
Epoch 46/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.0903 - mean_absolute_error: 0.0903 - mean_squared_error: 0.0156Restoring model weights from the end of the best epoch.
```

```
Epoch 00046: val_loss did not improve from 0.15347
10471/10471 [=====] - 1s 53us/sample - loss: 0.0902 - mean_absolute_error: 0.0902 - mean_squared_error: 0.0156 - val_loss: 0.1567 - val_mean_absolute_error: 0.1568 - val_mean_squared_error: 0.0498
Epoch 00046: early stopping
MAE: 0.15353224
RMSE: 0.21734056
Adding initial Dense layers with 128
Adding Dense layer with 128
Adding Dense layer with 128
Adding last layer with 128
Outputting predictive model - Tabular
Model: "model_69"
```

Layer (type)	Output Shape	Param #
input_70 (InputLayer)	[(None, 61)]	0
dense_492 (Dense)	(None, 128)	7936
dense_493 (Dense)	(None, 128)	16512
dense_494 (Dense)	(None, 128)	16512
dense_495 (Dense)	(None, 128)	16512
dense_496 (Dense)	(None, 1)	129

```
Total params: 57,601
Trainable params: 57,601
Non-trainable params: 0
```

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
9984/10471 [=====>..] - ETA: 0s - loss: 1.4110 - mean_absolute_error: 1.4110 - mean_squared_error: 6.5843
Epoch 00001: val_loss improved from inf to 2.02984, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 95us/sample - loss: 1.3823 - mean_absolute_error: 1.3841 - mean_squared_error: 6.3217 - val_loss: 2.0298 - val_mean_absolute_error: 2.0304 - val_mean_squared_error: 4.8993
Epoch 2/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.6013 - mean_absolute_error: 0.6013 - mean_squared_error: 0.5932
Epoch 00002: val_loss improved from 2.02984 to 0.38594, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.5976 - mean_abso
```

```
lute_error: 0.5968 - mean_squared_error: 0.5866 - val_loss: 0.3859 - val_mean_absolute_e
rror: 0.3859 - val_mean_squared_error: 0.2602
Epoch 3/500
 9920/10471 [=====>..] - ETA: 0s - loss: 0.4156 - mean_absolute_er
ror: 0.4156 - mean_squared_error: 0.2754
Epoch 00003: val_loss improved from 0.38594 to 0.23785, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.4072 - mean_abso
lute_error: 0.4068 - mean_squared_error: 0.2660 - val_loss: 0.2378 - val_mean_absolute_e
rror: 0.2378 - val_mean_squared_error: 0.1023
Epoch 4/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.2666 - mean_absolute_er
ror: 0.2666 - mean_squared_error: 0.1186
Epoch 00004: val_loss improved from 0.23785 to 0.18304, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.2676 - mean_abso
lute_error: 0.2684 - mean_squared_error: 0.1199 - val_loss: 0.1830 - val_mean_absolute_e
rror: 0.1831 - val_mean_squared_error: 0.0630
Epoch 5/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.2402 - mean_absolute_er
ror: 0.2402 - mean_squared_error: 0.0989
Epoch 00005: val_loss did not improve from 0.18304
10471/10471 [=====] - 1s 55us/sample - loss: 0.2396 - mean_abso
lute_error: 0.2401 - mean_squared_error: 0.0987 - val_loss: 0.3582 - val_mean_absolute_e
rror: 0.3583 - val_mean_squared_error: 0.1712
Epoch 6/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.2087 - mean_absolute_er
ror: 0.2087 - mean_squared_error: 0.0755
Epoch 00006: val_loss did not improve from 0.18304
10471/10471 [=====] - 1s 54us/sample - loss: 0.2091 - mean_abso
lute_error: 0.2092 - mean_squared_error: 0.0757 - val_loss: 0.2312 - val_mean_absolute_e
rror: 0.2312 - val_mean_squared_error: 0.0886
Epoch 7/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1924 - mean_absolute_er
ror: 0.1924 - mean_squared_error: 0.0651
Epoch 00007: val_loss did not improve from 0.18304
10471/10471 [=====] - 1s 54us/sample - loss: 0.1947 - mean_abso
lute_error: 0.1948 - mean_squared_error: 0.0665 - val_loss: 0.2256 - val_mean_absolute_e
rror: 0.2256 - val_mean_squared_error: 0.0812
Epoch 8/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1826 - mean_absolute_er
ror: 0.1826 - mean_squared_error: 0.0603
Epoch 00008: val_loss improved from 0.18304 to 0.17259, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 55us/sample - loss: 0.1821 - mean_abso
lute_error: 0.1820 - mean_squared_error: 0.0600 - val_loss: 0.1726 - val_mean_absolute_e
rror: 0.1726 - val_mean_squared_error: 0.0553
Epoch 9/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1689 - mean_absolute_er
ror: 0.1689 - mean_squared_error: 0.0531
Epoch 00009: val_loss did not improve from 0.17259
10471/10471 [=====] - 1s 54us/sample - loss: 0.1685 - mean_abso
lute_error: 0.1685 - mean_squared_error: 0.0528 - val_loss: 0.1961 - val_mean_absolute_e
rror: 0.1962 - val_mean_squared_error: 0.0635
Epoch 10/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1796 - mean_absolute_er
ror: 0.1796 - mean_squared_error: 0.0579
Epoch 00010: val_loss improved from 0.17259 to 0.15386, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.1788 - mean_abso
lute_error: 0.1786 - mean_squared_error: 0.0575 - val_loss: 0.1539 - val_mean_absolute_e
```

```
rror: 0.1538 - val_mean_squared_error: 0.0469
Epoch 11/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1633 - mean_absolute_error: 0.1633 - mean_squared_error: 0.0494
Epoch 00011: val_loss did not improve from 0.15386
10471/10471 [=====] - 1s 54us/sample - loss: 0.1640 - mean_absolute_error: 0.1642 - mean_squared_error: 0.0497 - val_loss: 0.3316 - val_mean_absolute_error: 0.3317 - val_mean_squared_error: 0.1415
Epoch 12/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1561 - mean_absolute_error: 0.1561 - mean_squared_error: 0.0468
Epoch 00012: val_loss did not improve from 0.15386
10471/10471 [=====] - 1s 54us/sample - loss: 0.1573 - mean_absolute_error: 0.1574 - mean_squared_error: 0.0474 - val_loss: 0.2986 - val_mean_absolute_error: 0.2987 - val_mean_squared_error: 0.1184
Epoch 13/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1623 - mean_absolute_error: 0.1623 - mean_squared_error: 0.0495
Epoch 00013: val_loss did not improve from 0.15386
10471/10471 [=====] - 1s 54us/sample - loss: 0.1615 - mean_absolute_error: 0.1614 - mean_squared_error: 0.0491 - val_loss: 0.1656 - val_mean_absolute_error: 0.1657 - val_mean_squared_error: 0.0509
Epoch 14/500
9536/10471 [=====>...] - ETA: 0s - loss: 0.1596 - mean_absolute_error: 0.1596 - mean_squared_error: 0.0469
Epoch 00014: val_loss improved from 0.15386 to 0.15187, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 59us/sample - loss: 0.1606 - mean_absolute_error: 0.1609 - mean_squared_error: 0.0485 - val_loss: 0.1519 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0468
Epoch 15/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1479 - mean_absolute_error: 0.1479 - mean_squared_error: 0.0428
Epoch 00015: val_loss did not improve from 0.15187
10471/10471 [=====] - 1s 55us/sample - loss: 0.1482 - mean_absolute_error: 0.1480 - mean_squared_error: 0.0431 - val_loss: 0.1534 - val_mean_absolute_error: 0.1533 - val_mean_squared_error: 0.0467
Epoch 16/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1561 - mean_absolute_error: 0.1561 - mean_squared_error: 0.0466
Epoch 00016: val_loss did not improve from 0.15187
10471/10471 [=====] - 1s 56us/sample - loss: 0.1566 - mean_absolute_error: 0.1565 - mean_squared_error: 0.0466 - val_loss: 0.2617 - val_mean_absolute_error: 0.2615 - val_mean_squared_error: 0.1012
Epoch 17/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1469 - mean_absolute_error: 0.1469 - mean_squared_error: 0.0420
Epoch 00017: val_loss did not improve from 0.15187
10471/10471 [=====] - 1s 54us/sample - loss: 0.1471 - mean_absolute_error: 0.1471 - mean_squared_error: 0.0421 - val_loss: 0.1552 - val_mean_absolute_error: 0.1552 - val_mean_squared_error: 0.0483
Epoch 18/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1451 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0413
Epoch 00018: val_loss did not improve from 0.15187
10471/10471 [=====] - 1s 54us/sample - loss: 0.1450 - mean_absolute_error: 0.1449 - mean_squared_error: 0.0412 - val_loss: 0.1574 - val_mean_absolute_error: 0.1574 - val_mean_squared_error: 0.0478
Epoch 19/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1388 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0386
```

Epoch 00019: val_loss improved from 0.15187 to 0.14903, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 56us/sample - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0386 - val_loss: 0.1490 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0451

Epoch 20/500

10144/10471 [=====>.] - ETA: 0s - loss: 0.1430 - mean_absolute_error: 0.1430 - mean_squared_error: 0.0403

Epoch 00020: val_loss did not improve from 0.14903

10471/10471 [=====] - 1s 54us/sample - loss: 0.1422 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0398 - val_loss: 0.1492 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0451

Epoch 21/500

10144/10471 [=====>.] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0367

Epoch 00021: val_loss did not improve from 0.14903

10471/10471 [=====] - 1s 54us/sample - loss: 0.1351 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0367 - val_loss: 0.1619 - val_mean_absolute_error: 0.1618 - val_mean_squared_error: 0.0501

Epoch 22/500

9952/10471 [=====>..] - ETA: 0s - loss: 0.1345 - mean_absolute_error: 0.1345 - mean_squared_error: 0.0371

Epoch 00022: val_loss did not improve from 0.14903

10471/10471 [=====] - 1s 56us/sample - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0367 - val_loss: 0.1586 - val_mean_absolute_error: 0.1586 - val_mean_squared_error: 0.0485

Epoch 23/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.1258 - mean_absolute_error: 0.1258 - mean_squared_error: 0.0336

Epoch 00023: val_loss did not improve from 0.14903

10471/10471 [=====] - 1s 54us/sample - loss: 0.1267 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0339 - val_loss: 0.1696 - val_mean_absolute_error: 0.1696 - val_mean_squared_error: 0.0534

Epoch 24/500

9824/10471 [=====>..] - ETA: 0s - loss: 0.1435 - mean_absolute_error: 0.1435 - mean_squared_error: 0.0400

Epoch 00024: val_loss did not improve from 0.14903

10471/10471 [=====] - 1s 56us/sample - loss: 0.1446 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0411 - val_loss: 0.2834 - val_mean_absolute_error: 0.2835 - val_mean_squared_error: 0.1070

Epoch 25/500

10048/10471 [=====>..] - ETA: 0s - loss: 0.1375 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0378

Epoch 00025: val_loss did not improve from 0.14903

10471/10471 [=====] - 1s 55us/sample - loss: 0.1371 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0375 - val_loss: 0.1714 - val_mean_absolute_error: 0.1713 - val_mean_squared_error: 0.0549

Epoch 26/500

10016/10471 [=====>..] - ETA: 0s - loss: 0.1292 - mean_absolute_error: 0.1292 - mean_squared_error: 0.0346

Epoch 00026: val_loss did not improve from 0.14903

10471/10471 [=====] - 1s 55us/sample - loss: 0.1283 - mean_absolute_error: 0.1281 - mean_squared_error: 0.0342 - val_loss: 0.1686 - val_mean_absolute_error: 0.1685 - val_mean_squared_error: 0.0545

Epoch 27/500

10208/10471 [=====>..] - ETA: 0s - loss: 0.1282 - mean_absolute_error: 0.1282 - mean_squared_error: 0.0340

Epoch 00027: val_loss did not improve from 0.14903

10471/10471 [=====] - 1s 54us/sample - loss: 0.1281 - mean_absolute_error: 0.1283 - mean_squared_error: 0.0341 - val_loss: 0.1748 - val_mean_absolute_error: 0.1748 - val_mean_squared_error: 0.0538

Epoch 28/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1368 - mean_absolute_error: 0.1368 - mean_squared_error: 0.0365
Epoch 00028: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1374 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0368 - val_loss: 0.1630 - val_mean_absolute_error: 0.1631 - val_mean_squared_error: 0.0504
Epoch 29/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1315 - mean_absolute_error: 0.1315 - mean_squared_error: 0.0347
Epoch 00029: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 56us/sample - loss: 0.1308 - mean_absolute_error: 0.1307 - mean_squared_error: 0.0345 - val_loss: 0.1496 - val_mean_absolute_error: 0.1496 - val_mean_squared_error: 0.0453
Epoch 30/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1247 - mean_absolute_error: 0.1247 - mean_squared_error: 0.0329
Epoch 00030: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 55us/sample - loss: 0.1257 - mean_absolute_error: 0.1256 - mean_squared_error: 0.0331 - val_loss: 0.1517 - val_mean_absolute_error: 0.1517 - val_mean_squared_error: 0.0464
Epoch 31/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1217 - mean_absolute_error: 0.1217 - mean_squared_error: 0.0314
Epoch 00031: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 55us/sample - loss: 0.1216 - mean_absolute_error: 0.1215 - mean_squared_error: 0.0312 - val_loss: 0.1586 - val_mean_absolute_error: 0.1585 - val_mean_squared_error: 0.0509
Epoch 32/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1286 - mean_absolute_error: 0.1286 - mean_squared_error: 0.0336
Epoch 00032: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1286 - mean_absolute_error: 0.1285 - mean_squared_error: 0.0336 - val_loss: 0.1873 - val_mean_absolute_error: 0.1874 - val_mean_squared_error: 0.0599
Epoch 33/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1254 - mean_absolute_error: 0.1254 - mean_squared_error: 0.0322
Epoch 00033: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 55us/sample - loss: 0.1253 - mean_absolute_error: 0.1252 - mean_squared_error: 0.0320 - val_loss: 0.1599 - val_mean_absolute_error: 0.1598 - val_mean_squared_error: 0.0493
Epoch 34/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1228 - mean_absolute_error: 0.1228 - mean_squared_error: 0.0310
Epoch 00034: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1244 - mean_absolute_error: 0.1245 - mean_squared_error: 0.0316 - val_loss: 0.1734 - val_mean_absolute_error: 0.1734 - val_mean_squared_error: 0.0567
Epoch 35/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1347 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0352
Epoch 00035: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1352 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0359 - val_loss: 0.1634 - val_mean_absolute_error: 0.1634 - val_mean_squared_error: 0.0524
Epoch 36/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1260 - mean_absolute_error: 0.1260 - mean_squared_error: 0.0328
Epoch 00036: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 53us/sample - loss: 0.1258 - mean_absolute_error: 0.1258 - mean_squared_error: 0.0327

```
lute_error: 0.1258 - mean_squared_error: 0.0327 - val_loss: 0.1601 - val_mean_absolute_e
rror: 0.1601 - val_mean_squared_error: 0.0503
Epoch 37/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1211 - mean_absolute_er
ror: 0.1211 - mean_squared_error: 0.0305
Epoch 00037: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1214 - mean_abso
lute_error: 0.1215 - mean_squared_error: 0.0306 - val_loss: 0.2034 - val_mean_absolute_e
rror: 0.2035 - val_mean_squared_error: 0.0683
Epoch 38/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1142 - mean_absolute_er
ror: 0.1142 - mean_squared_error: 0.0279
Epoch 00038: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1146 - mean_abso
lute_error: 0.1146 - mean_squared_error: 0.0280 - val_loss: 0.1665 - val_mean_absolute_e
rror: 0.1664 - val_mean_squared_error: 0.0538
Epoch 39/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1214 - mean_absolute_er
ror: 0.1214 - mean_squared_error: 0.0300
Epoch 00039: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1216 - mean_abso
lute_error: 0.1216 - mean_squared_error: 0.0301 - val_loss: 0.1539 - val_mean_absolute_e
rror: 0.1539 - val_mean_squared_error: 0.0472
Epoch 40/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1180 - mean_absolute_er
ror: 0.1180 - mean_squared_error: 0.0287
Epoch 00040: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1178 - mean_abso
lute_error: 0.1176 - mean_squared_error: 0.0285 - val_loss: 0.1601 - val_mean_absolute_e
rror: 0.1601 - val_mean_squared_error: 0.0507
Epoch 41/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1253 - mean_absolute_er
ror: 0.1253 - mean_squared_error: 0.0313
Epoch 00041: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1259 - mean_abso
lute_error: 0.1259 - mean_squared_error: 0.0317 - val_loss: 0.1553 - val_mean_absolute_e
rror: 0.1553 - val_mean_squared_error: 0.0484
Epoch 42/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1180 - mean_absolute_er
ror: 0.1180 - mean_squared_error: 0.0290
Epoch 00042: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 56us/sample - loss: 0.1178 - mean_abso
lute_error: 0.1177 - mean_squared_error: 0.0288 - val_loss: 0.1535 - val_mean_absolute_e
rror: 0.1535 - val_mean_squared_error: 0.0482
Epoch 43/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1167 - mean_absolute_er
ror: 0.1167 - mean_squared_error: 0.0278
Epoch 00043: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1165 - mean_abso
lute_error: 0.1166 - mean_squared_error: 0.0276 - val_loss: 0.1556 - val_mean_absolute_e
rror: 0.1555 - val_mean_squared_error: 0.0496
Epoch 44/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1214 - mean_absolute_er
ror: 0.1214 - mean_squared_error: 0.0293Restoring model weights from the end of the best
epoch.

Epoch 00044: val_loss did not improve from 0.14903
10471/10471 [=====] - 1s 54us/sample - loss: 0.1215 - mean_abso
lute_error: 0.1215 - mean_squared_error: 0.0297 - val_loss: 0.1544 - val_mean_absolute_e
rror: 0.1545 - val_mean_squared_error: 0.0483
Epoch 00044: early stopping
```

```

MAE: 0.1489826
RMSE: 0.2123085
Adding initial Dense layers with 256
Adding Dense layer with 256
Adding Dense layer with 256
Adding last layer with 256
Outputting predictive model - Tabular
Model: "model_70"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_71 (InputLayer)	[(None, 61)]	0
dense_497 (Dense)	(None, 256)	15872
dense_498 (Dense)	(None, 256)	65792
dense_499 (Dense)	(None, 256)	65792
dense_500 (Dense)	(None, 256)	65792
dense_501 (Dense)	(None, 1)	257
<hr/>		
Total params: 213,505		
Trainable params: 213,505		
Non-trainable params: 0		

```

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
    9792/10471 [=====>..] - ETA: 0s - loss: 1.2797 - mean_absolute_error: 1.2797 - mean_squared_error: 4.5367
Epoch 00001: val_loss improved from inf to 2.17733, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 95us/sample - loss: 1.2792 - mean_absolute_error: 1.2808 - mean_squared_error: 4.4011 - val_loss: 2.1773 - val_mean_absolute_error: 2.1774 - val_mean_squared_error: 5.2162
Epoch 2/500
    9728/10471 [=====>...] - ETA: 0s - loss: 0.7371 - mean_absolute_error: 0.7371 - mean_squared_error: 0.9165
Epoch 00002: val_loss improved from 2.17733 to 0.82108, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.7285 - mean_absolute_error: 0.7301 - mean_squared_error: 0.8974 - val_loss: 0.8211 - val_mean_absolute_error: 0.8212 - val_mean_squared_error: 1.0054
Epoch 3/500
    9632/10471 [=====>...] - ETA: 0s - loss: 0.6081 - mean_absolute_error: 0.6081 - mean_squared_error: 0.6142
Epoch 00003: val_loss improved from 0.82108 to 0.40595, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 59us/sample - loss: 0.6022 - mean_absolute_error: 0.6029 - mean_squared_error: 0.6015 - val_loss: 0.4060 - val_mean_absolute_error: 0.4060 - val_mean_squared_error: 0.2539
Epoch 4/500
    9888/10471 [=====>..] - ETA: 0s - loss: 0.2804 - mean_absolute_error: 0.2804 - mean_squared_error: 0.1369
Epoch 00004: val_loss improved from 0.40595 to 0.24224, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.2789 - mean_absolute_error: 0.2787 - mean_squared_error: 0.1349 - val_loss: 0.2422 - val_mean_absolute_error: 0.2422 - val_mean_squared_error: 0.1349

```

```
rror: 0.2422 - val_mean_squared_error: 0.0933
Epoch 5/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.2167 - mean_absolute_error: 0.2167 - mean_squared_error: 0.0794
Epoch 00005: val_loss improved from 0.24224 to 0.18119, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 59us/sample - loss: 0.2169 - mean_absolute_error: 0.2169 - mean_squared_error: 0.0798 - val_loss: 0.1812 - val_mean_absolute_error: 0.1812 - val_mean_squared_error: 0.0632
Epoch 6/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.2110 - mean_absolute_error: 0.2110 - mean_squared_error: 0.0768
Epoch 00006: val_loss did not improve from 0.18119
10471/10471 [=====] - 1s 57us/sample - loss: 0.2161 - mean_absolute_error: 0.2163 - mean_squared_error: 0.0799 - val_loss: 0.5003 - val_mean_absolute_error: 0.5005 - val_mean_squared_error: 0.2985
Epoch 7/500
9952/10471 [=====>...] - ETA: 0s - loss: 0.1908 - mean_absolute_error: 0.1908 - mean_squared_error: 0.0650
Epoch 00007: val_loss did not improve from 0.18119
10471/10471 [=====] - 1s 55us/sample - loss: 0.1910 - mean_absolute_error: 0.1908 - mean_squared_error: 0.0651 - val_loss: 0.2062 - val_mean_absolute_error: 0.2062 - val_mean_squared_error: 0.0742
Epoch 8/500
10208/10471 [=====>...] - ETA: 0s - loss: 0.1831 - mean_absolute_error: 0.1831 - mean_squared_error: 0.0603
Epoch 00008: val_loss did not improve from 0.18119
10471/10471 [=====] - 1s 59us/sample - loss: 0.1826 - mean_absolute_error: 0.1824 - mean_squared_error: 0.0599 - val_loss: 0.1870 - val_mean_absolute_error: 0.1870 - val_mean_squared_error: 0.0601
Epoch 9/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1705 - mean_absolute_error: 0.1705 - mean_squared_error: 0.0535
Epoch 00009: val_loss improved from 0.18119 to 0.17005, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 60us/sample - loss: 0.1700 - mean_absolute_error: 0.1699 - mean_squared_error: 0.0534 - val_loss: 0.1700 - val_mean_absolute_error: 0.1700 - val_mean_squared_error: 0.0563
Epoch 10/500
9824/10471 [=====>...] - ETA: 0s - loss: 0.1665 - mean_absolute_error: 0.1665 - mean_squared_error: 0.0516
Epoch 00010: val_loss improved from 0.17005 to 0.15493, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.1652 - mean_absolute_error: 0.1649 - mean_squared_error: 0.0508 - val_loss: 0.1549 - val_mean_absolute_error: 0.1549 - val_mean_squared_error: 0.0490
Epoch 11/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1641 - mean_absolute_error: 0.1641 - mean_squared_error: 0.0500
Epoch 00011: val_loss did not improve from 0.15493
10471/10471 [=====] - 1s 57us/sample - loss: 0.1633 - mean_absolute_error: 0.1633 - mean_squared_error: 0.0497 - val_loss: 0.1646 - val_mean_absolute_error: 0.1645 - val_mean_squared_error: 0.0532
Epoch 12/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1526 - mean_absolute_error: 0.1526 - mean_squared_error: 0.0447
Epoch 00012: val_loss improved from 0.15493 to 0.14974, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.1521 - mean_absolute_error: 0.1519 - mean_squared_error: 0.0444 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0462
```

Epoch 13/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1429 - mean_absolute_error: 0.1429 - mean_squared_error: 0.0407
Epoch 00013: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1419 - mean_absolute_error: 0.1418 - mean_squared_error: 0.0401 - val_loss: 0.1611 - val_mean_absolute_error: 0.1611 - val_mean_squared_error: 0.0516
Epoch 14/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0395
Epoch 00014: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 57us/sample - loss: 0.1414 - mean_absolute_error: 0.1414 - mean_squared_error: 0.0398 - val_loss: 0.2238 - val_mean_absolute_error: 0.2238 - val_mean_squared_error: 0.0744
Epoch 15/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1466 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0414
Epoch 00015: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1453 - mean_absolute_error: 0.1454 - mean_squared_error: 0.0406 - val_loss: 0.1542 - val_mean_absolute_error: 0.1541 - val_mean_squared_error: 0.0463
Epoch 16/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1591 - mean_absolute_error: 0.1591 - mean_squared_error: 0.0463
Epoch 00016: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1581 - mean_absolute_error: 0.1580 - mean_squared_error: 0.0458 - val_loss: 0.1544 - val_mean_absolute_error: 0.1543 - val_mean_squared_error: 0.0487
Epoch 17/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1400 - mean_absolute_error: 0.1400 - mean_squared_error: 0.0382
Epoch 00017: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0383 - val_loss: 0.1522 - val_mean_absolute_error: 0.1522 - val_mean_squared_error: 0.0459
Epoch 18/500
9664/10471 [=====>..] - ETA: 0s - loss: 0.1351 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0361
Epoch 00018: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 57us/sample - loss: 0.1342 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0356 - val_loss: 0.1501 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0452
Epoch 19/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1301 - mean_absolute_error: 0.1301 - mean_squared_error: 0.0345
Epoch 00019: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1299 - mean_absolute_error: 0.1298 - mean_squared_error: 0.0343 - val_loss: 0.1708 - val_mean_absolute_error: 0.1707 - val_mean_squared_error: 0.0555
Epoch 20/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.1492 - mean_absolute_error: 0.1492 - mean_squared_error: 0.0417
Epoch 00020: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1490 - mean_absolute_error: 0.1489 - mean_squared_error: 0.0413 - val_loss: 0.1739 - val_mean_absolute_error: 0.1740 - val_mean_squared_error: 0.0546
Epoch 21/500
9696/10471 [=====>..] - ETA: 0s - loss: 0.1255 - mean_absolute_error: 0.1255 - mean_squared_error: 0.0324
Epoch 00021: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1255 - mean_absolute_error: 0.1255 - mean_squared_error: 0.0324

lute_error: 0.1255 - mean_squared_error: 0.0324 - val_loss: 0.1523 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0483
Epoch 22/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1258 - mean_absolute_error: 0.1258 - mean_squared_error: 0.0323
Epoch 00022: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 59us/sample - loss: 0.1255 - mean_absolute_error: 0.1256 - mean_squared_error: 0.0322 - val_loss: 0.1949 - val_mean_absolute_error: 0.1950 - val_mean_squared_error: 0.0634
Epoch 23/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1262 - mean_absolute_error: 0.1262 - mean_squared_error: 0.0318
Epoch 00023: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1263 - mean_absolute_error: 0.1263 - mean_squared_error: 0.0320 - val_loss: 0.1649 - val_mean_absolute_error: 0.1647 - val_mean_squared_error: 0.0531
Epoch 24/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1258 - mean_absolute_error: 0.1258 - mean_squared_error: 0.0317
Epoch 00024: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 58us/sample - loss: 0.1260 - mean_absolute_error: 0.1265 - mean_squared_error: 0.0325 - val_loss: 0.1700 - val_mean_absolute_error: 0.1698 - val_mean_squared_error: 0.0563
Epoch 25/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1271 - mean_absolute_error: 0.1271 - mean_squared_error: 0.0321
Epoch 00025: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 57us/sample - loss: 0.1266 - mean_absolute_error: 0.1269 - mean_squared_error: 0.0322 - val_loss: 0.1907 - val_mean_absolute_error: 0.1905 - val_mean_squared_error: 0.0661
Epoch 26/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1328 - mean_absolute_error: 0.1328 - mean_squared_error: 0.0336
Epoch 00026: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1321 - mean_absolute_error: 0.1320 - mean_squared_error: 0.0334 - val_loss: 0.1960 - val_mean_absolute_error: 0.1958 - val_mean_squared_error: 0.0683
Epoch 27/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1305 - mean_absolute_error: 0.1305 - mean_squared_error: 0.0329
Epoch 00027: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1306 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0328 - val_loss: 0.1619 - val_mean_absolute_error: 0.1619 - val_mean_squared_error: 0.0509
Epoch 28/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1267 - mean_absolute_error: 0.1267 - mean_squared_error: 0.0312
Epoch 00028: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 59us/sample - loss: 0.1262 - mean_absolute_error: 0.1262 - mean_squared_error: 0.0311 - val_loss: 0.1664 - val_mean_absolute_error: 0.1662 - val_mean_squared_error: 0.0536
Epoch 29/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1202 - mean_absolute_error: 0.1202 - mean_squared_error: 0.0291
Epoch 00029: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1208 - mean_absolute_error: 0.1208 - mean_squared_error: 0.0295 - val_loss: 0.1530 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0480
Epoch 30/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1199 - mean_absolute_error: 0.1199 - mean_squared_error: 0.0288

```
Epoch 00030: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 62us/sample - loss: 0.1198 - mean_absolute_error: 0.1198 - mean_squared_error: 0.0287 - val_loss: 0.1929 - val_mean_absolute_error: 0.1930 - val_mean_squared_error: 0.0640
Epoch 31/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1141 - mean_absolute_error: 0.1141 - mean_squared_error: 0.0266
Epoch 00031: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 60us/sample - loss: 0.1150 - mean_absolute_error: 0.1151 - mean_squared_error: 0.0268 - val_loss: 0.1583 - val_mean_absolute_error: 0.1583 - val_mean_squared_error: 0.0495
Epoch 32/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1238 - mean_absolute_error: 0.1238 - mean_squared_error: 0.0297
Epoch 00032: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 59us/sample - loss: 0.1236 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0295 - val_loss: 0.1565 - val_mean_absolute_error: 0.1564 - val_mean_squared_error: 0.0496
Epoch 33/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1077 - mean_absolute_error: 0.1077 - mean_squared_error: 0.0240
Epoch 00033: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1076 - mean_absolute_error: 0.1077 - mean_squared_error: 0.0242 - val_loss: 0.1549 - val_mean_absolute_error: 0.1549 - val_mean_squared_error: 0.0489
Epoch 34/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1207 - mean_absolute_error: 0.1207 - mean_squared_error: 0.0280
Epoch 00034: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 57us/sample - loss: 0.1205 - mean_absolute_error: 0.1205 - mean_squared_error: 0.0277 - val_loss: 0.1861 - val_mean_absolute_error: 0.1861 - val_mean_squared_error: 0.0608
Epoch 35/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1106 - mean_absolute_error: 0.1106 - mean_squared_error: 0.0246
Epoch 00035: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 57us/sample - loss: 0.1106 - mean_absolute_error: 0.1106 - mean_squared_error: 0.0245 - val_loss: 0.1613 - val_mean_absolute_error: 0.1612 - val_mean_squared_error: 0.0525
Epoch 36/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1195 - mean_absolute_error: 0.1195 - mean_squared_error: 0.0271
Epoch 00036: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 57us/sample - loss: 0.1195 - mean_absolute_error: 0.1197 - mean_squared_error: 0.0270 - val_loss: 0.1621 - val_mean_absolute_error: 0.1621 - val_mean_squared_error: 0.0536
Epoch 37/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1067 - mean_absolute_error: 0.1067 - mean_squared_error: 0.0229Restoring model weights from the end of the best epoch.

Epoch 00037: val_loss did not improve from 0.14974
10471/10471 [=====] - 1s 56us/sample - loss: 0.1067 - mean_absolute_error: 0.1066 - mean_squared_error: 0.0229 - val_loss: 0.2139 - val_mean_absolute_error: 0.2140 - val_mean_squared_error: 0.0737
Epoch 00037: early stopping
MAE: 0.1497063
RMSE: 0.21496668
Adding initial Dense layers with 100
Adding Dense layer with 100
Adding Dense layer with 100
```

```
Adding last layer with 100
Outputting predictive model - Tabular
Model: "model_71"
```

Layer (type)	Output Shape	Param #
=====		
input_72 (InputLayer)	[(None, 61)]	0
dense_502 (Dense)	(None, 100)	6200
dense_503 (Dense)	(None, 100)	10100
dense_504 (Dense)	(None, 100)	10100
dense_505 (Dense)	(None, 100)	10100
dense_506 (Dense)	(None, 1)	101
=====		
Total params: 36,601		
Trainable params: 36,601		
Non-trainable params: 0		

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
    9728/10471 [=====>...] - ETA: 0s - loss: 1.4471 - mean_absolute_error: 1.4471 - mean_squared_error: 8.0179
Epoch 00001: val_loss improved from inf to 0.53108, saving model to best_basic_model.hdf5
    10471/10471 [=====] - 1s 95us/sample - loss: 1.4163 - mean_absolute_error: 1.4164 - mean_squared_error: 7.5439 - val_loss: 0.5311 - val_mean_absolute_error: 0.5311 - val_mean_squared_error: 0.4544
Epoch 2/500
    9824/10471 [=====>...] - ETA: 0s - loss: 0.5833 - mean_absolute_error: 0.5833 - mean_squared_error: 0.5747
Epoch 00002: val_loss did not improve from 0.53108
    10471/10471 [=====] - 1s 56us/sample - loss: 0.5687 - mean_absolute_error: 0.5678 - mean_squared_error: 0.5503 - val_loss: 0.6699 - val_mean_absolute_error: 0.6702 - val_mean_squared_error: 0.5809
Epoch 3/500
    9632/10471 [=====>...] - ETA: 0s - loss: 0.4551 - mean_absolute_error: 0.4551 - mean_squared_error: 0.3559
Epoch 00003: val_loss improved from 0.53108 to 0.27131, saving model to best_basic_mode1.hdf5
    10471/10471 [=====] - 1s 58us/sample - loss: 0.4394 - mean_absolute_error: 0.4397 - mean_squared_error: 0.3362 - val_loss: 0.2713 - val_mean_absolute_error: 0.2711 - val_mean_squared_error: 0.1176
Epoch 4/500
    9920/10471 [=====>...] - ETA: 0s - loss: 0.2673 - mean_absolute_error: 0.2673 - mean_squared_error: 0.1198
Epoch 00004: val_loss improved from 0.27131 to 0.24447, saving model to best_basic_mode1.hdf5
    10471/10471 [=====] - 1s 57us/sample - loss: 0.2642 - mean_absolute_error: 0.2639 - mean_squared_error: 0.1171 - val_loss: 0.2445 - val_mean_absolute_error: 0.2444 - val_mean_squared_error: 0.1022
Epoch 5/500
    10208/10471 [=====>.] - ETA: 0s - loss: 0.2207 - mean_absolute_error: 0.2207 - mean_squared_error: 0.0824
Epoch 00005: val_loss did not improve from 0.24447
    10471/10471 [=====] - 1s 60us/sample - loss: 0.2207 - mean_absolute_error: 0.2207 - mean_squared_error: 0.0824
```

```
lute_error: 0.2211 - mean_squared_error: 0.0825 - val_loss: 0.2565 - val_mean_absolute_e
rror: 0.2564 - val_mean_squared_error: 0.1029
Epoch 6/500
 9632/10471 [=====>...] - ETA: 0s - loss: 0.2048 - mean_absolute_er
ror: 0.2048 - mean_squared_error: 0.0717
Epoch 00006: val_loss improved from 0.24447 to 0.17734, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 59us/sample - loss: 0.2040 - mean_abso
lute_error: 0.2044 - mean_squared_error: 0.0711 - val_loss: 0.1773 - val_mean_absolute_e
rror: 0.1773 - val_mean_squared_error: 0.0583
Epoch 7/500
 9600/10471 [=====>...] - ETA: 0s - loss: 0.1877 - mean_absolute_er
ror: 0.1877 - mean_squared_error: 0.0628
Epoch 00007: val_loss improved from 0.17734 to 0.15745, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 59us/sample - loss: 0.1863 - mean_abso
lute_error: 0.1863 - mean_squared_error: 0.0617 - val_loss: 0.1575 - val_mean_absolute_e
rror: 0.1574 - val_mean_squared_error: 0.0492
Epoch 8/500
 9728/10471 [=====>...] - ETA: 0s - loss: 0.2121 - mean_absolute_er
ror: 0.2121 - mean_squared_error: 0.0772
Epoch 00008: val_loss did not improve from 0.15745
10471/10471 [=====] - 1s 56us/sample - loss: 0.2112 - mean_abso
lute_error: 0.2111 - mean_squared_error: 0.0766 - val_loss: 0.3071 - val_mean_absolute_e
rror: 0.3071 - val_mean_squared_error: 0.1475
Epoch 9/500
 9888/10471 [=====>...] - ETA: 0s - loss: 0.2004 - mean_absolute_er
ror: 0.2004 - mean_squared_error: 0.0692
Epoch 00009: val_loss did not improve from 0.15745
10471/10471 [=====] - 1s 56us/sample - loss: 0.1983 - mean_abso
lute_error: 0.1984 - mean_squared_error: 0.0682 - val_loss: 0.2269 - val_mean_absolute_e
rror: 0.2269 - val_mean_squared_error: 0.0790
Epoch 10/500
10176/10471 [=====>...] - ETA: 0s - loss: 0.1704 - mean_absolute_er
ror: 0.1704 - mean_squared_error: 0.0537
Epoch 00010: val_loss improved from 0.15745 to 0.15435, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1700 - mean_abso
lute_error: 0.1702 - mean_squared_error: 0.0534 - val_loss: 0.1543 - val_mean_absolute_e
rror: 0.1543 - val_mean_squared_error: 0.0489
Epoch 11/500
 9760/10471 [=====>...] - ETA: 0s - loss: 0.1686 - mean_absolute_er
ror: 0.1686 - mean_squared_error: 0.0521
Epoch 00011: val_loss improved from 0.15435 to 0.14801, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.1681 - mean_abso
lute_error: 0.1681 - mean_squared_error: 0.0524 - val_loss: 0.1480 - val_mean_absolute_e
rror: 0.1480 - val_mean_squared_error: 0.0443
Epoch 12/500
 9696/10471 [=====>...] - ETA: 0s - loss: 0.1647 - mean_absolute_er
ror: 0.1647 - mean_squared_error: 0.0511
Epoch 00012: val_loss did not improve from 0.14801
10471/10471 [=====] - 1s 57us/sample - loss: 0.1665 - mean_abso
lute_error: 0.1665 - mean_squared_error: 0.0518 - val_loss: 0.1665 - val_mean_absolute_e
rror: 0.1665 - val_mean_squared_error: 0.0522
Epoch 13/500
 9888/10471 [=====>...] - ETA: 0s - loss: 0.1556 - mean_absolute_er
ror: 0.1556 - mean_squared_error: 0.0470
Epoch 00013: val_loss did not improve from 0.14801
10471/10471 [=====] - 1s 56us/sample - loss: 0.1552 - mean_abso
lute_error: 0.1551 - mean_squared_error: 0.0465 - val_loss: 0.2757 - val_mean_absolute_e
```

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rror: 0.2756 - val_mean_squared_error: 0.1102
Epoch 14/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1598 - mean_absolute_error: 0.1598 - mean_squared_error: 0.0497
Epoch 00014: val_loss did not improve from 0.14801
10471/10471 [=====] - 1s 56us/sample - loss: 0.1605 - mean_absolute_error: 0.1606 - mean_squared_error: 0.0498 - val_loss: 0.1640 - val_mean_absolute_error: 0.1640 - val_mean_squared_error: 0.0521
Epoch 15/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1500 - mean_absolute_error: 0.1500 - mean_squared_error: 0.0444
Epoch 00015: val_loss improved from 0.14801 to 0.14666, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 56us/sample - loss: 0.1501 - mean_absolute_error: 0.1502 - mean_squared_error: 0.0445 - val_loss: 0.1467 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0438
Epoch 16/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1511 - mean_absolute_error: 0.1511 - mean_squared_error: 0.0447
Epoch 00016: val_loss did not improve from 0.14666
10471/10471 [=====] - 1s 56us/sample - loss: 0.1511 - mean_absolute_error: 0.1510 - mean_squared_error: 0.0445 - val_loss: 0.1650 - val_mean_absolute_error: 0.1649 - val_mean_squared_error: 0.0504
Epoch 17/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1488 - mean_absolute_error: 0.1488 - mean_squared_error: 0.0439
Epoch 00017: val_loss improved from 0.14666 to 0.14428, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 58us/sample - loss: 0.1482 - mean_absolute_error: 0.1481 - mean_squared_error: 0.0437 - val_loss: 0.1443 - val_mean_absolute_error: 0.1442 - val_mean_squared_error: 0.0426
Epoch 18/500
9632/10471 [=====>..] - ETA: 0s - loss: 0.1551 - mean_absolute_error: 0.1551 - mean_squared_error: 0.0454
Epoch 00018: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 57us/sample - loss: 0.1556 - mean_absolute_error: 0.1555 - mean_squared_error: 0.0459 - val_loss: 0.1631 - val_mean_absolute_error: 0.1630 - val_mean_squared_error: 0.0505
Epoch 19/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1406 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0404
Epoch 00019: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 59us/sample - loss: 0.1406 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0403 - val_loss: 0.1591 - val_mean_absolute_error: 0.1591 - val_mean_squared_error: 0.0476
Epoch 20/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.1421 - mean_absolute_error: 0.1421 - mean_squared_error: 0.0403
Epoch 00020: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 56us/sample - loss: 0.1419 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0403 - val_loss: 0.1714 - val_mean_absolute_error: 0.1714 - val_mean_squared_error: 0.0527
Epoch 21/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1490 - mean_absolute_error: 0.1490 - mean_squared_error: 0.0430
Epoch 00021: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 55us/sample - loss: 0.1490 - mean_absolute_error: 0.1489 - mean_squared_error: 0.0430 - val_loss: 0.1642 - val_mean_absolute_error: 0.1642 - val_mean_squared_error: 0.0511
Epoch 22/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1391 - mean_absolute_error:
```

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ror: 0.1391 - mean_squared_error: 0.0389
Epoch 00022: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 54us/sample - loss: 0.1391 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0388 - val_loss: 0.1629 - val_mean_absolute_error: 0.1629 - val_mean_squared_error: 0.0506
Epoch 23/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1383 - mean_absolute_error: 0.1383 - mean_squared_error: 0.0394
Epoch 00023: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 55us/sample - loss: 0.1378 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0390 - val_loss: 0.1506 - val_mean_absolute_error: 0.1506 - val_mean_squared_error: 0.0431
Epoch 24/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1363 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0380
Epoch 00024: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 55us/sample - loss: 0.1366 - mean_absolute_error: 0.1365 - mean_squared_error: 0.0383 - val_loss: 0.1474 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0445
Epoch 25/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1373 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0384
Epoch 00025: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 55us/sample - loss: 0.1370 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0382 - val_loss: 0.1726 - val_mean_absolute_error: 0.1727 - val_mean_squared_error: 0.0542
Epoch 26/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1372 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0379
Epoch 00026: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 54us/sample - loss: 0.1384 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0386 - val_loss: 0.2442 - val_mean_absolute_error: 0.2440 - val_mean_squared_error: 0.0914
Epoch 27/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1345 - mean_absolute_error: 0.1345 - mean_squared_error: 0.0368
Epoch 00027: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 54us/sample - loss: 0.1349 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0370 - val_loss: 0.1476 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0448
Epoch 28/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1457 - mean_absolute_error: 0.1457 - mean_squared_error: 0.0410
Epoch 00028: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 56us/sample - loss: 0.1451 - mean_absolute_error: 0.1455 - mean_squared_error: 0.0415 - val_loss: 0.1587 - val_mean_absolute_error: 0.1587 - val_mean_squared_error: 0.0488
Epoch 29/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1396 - mean_absolute_error: 0.1396 - mean_squared_error: 0.0384
Epoch 00029: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 57us/sample - loss: 0.1392 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0385 - val_loss: 0.1467 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0438
Epoch 30/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1367 - mean_absolute_error: 0.1367 - mean_squared_error: 0.0375
Epoch 00030: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 58us/sample - loss: 0.1367 - mean_absolute_error: 0.1367 - mean_squared_error: 0.0375 - val_loss: 0.1530 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0452
```

Epoch 31/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1337 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0358
Epoch 00031: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 57us/sample - loss: 0.1333 - mean_absolute_error: 0.1331 - mean_squared_error: 0.0357 - val_loss: 0.2246 - val_mean_absolute_error: 0.2245 - val_mean_squared_error: 0.0795
Epoch 32/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1293 - mean_absolute_error: 0.1293 - mean_squared_error: 0.0344
Epoch 00032: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 57us/sample - loss: 0.1297 - mean_absolute_error: 0.1297 - mean_squared_error: 0.0345 - val_loss: 0.1671 - val_mean_absolute_error: 0.1671 - val_mean_squared_error: 0.0508
Epoch 33/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1371 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0374
Epoch 00033: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 58us/sample - loss: 0.1371 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0374 - val_loss: 0.2128 - val_mean_absolute_error: 0.2130 - val_mean_squared_error: 0.0701
Epoch 34/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1307 - mean_absolute_error: 0.1307 - mean_squared_error: 0.0347
Epoch 00034: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 58us/sample - loss: 0.1300 - mean_absolute_error: 0.1300 - mean_squared_error: 0.0345 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0439
Epoch 35/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1233 - mean_absolute_error: 0.1233 - mean_squared_error: 0.0320
Epoch 00035: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 55us/sample - loss: 0.1235 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0322 - val_loss: 0.1679 - val_mean_absolute_error: 0.1680 - val_mean_squared_error: 0.0505
Epoch 36/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1303 - mean_absolute_error: 0.1303 - mean_squared_error: 0.0347
Epoch 00036: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 55us/sample - loss: 0.1305 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0348 - val_loss: 0.1482 - val_mean_absolute_error: 0.1482 - val_mean_squared_error: 0.0439
Epoch 37/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1224 - mean_absolute_error: 0.1224 - mean_squared_error: 0.0324
Epoch 00037: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 54us/sample - loss: 0.1225 - mean_absolute_error: 0.1225 - mean_squared_error: 0.0324 - val_loss: 0.1457 - val_mean_absolute_error: 0.1457 - val_mean_squared_error: 0.0428
Epoch 38/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1312 - mean_absolute_error: 0.1312 - mean_squared_error: 0.0347
Epoch 00038: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 55us/sample - loss: 0.1319 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0348 - val_loss: 0.1937 - val_mean_absolute_error: 0.1936 - val_mean_squared_error: 0.0631
Epoch 39/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1254 - mean_absolute_error: 0.1254 - mean_squared_error: 0.0325
Epoch 00039: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 54us/sample - loss: 0.1256 - mean_absolute_error:

```
lute_error: 0.1256 - mean_squared_error: 0.0324 - val_loss: 0.1643 - val_mean_absolute_e
rror: 0.1642 - val_mean_squared_error: 0.0517
Epoch 40/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1278 - mean_absolute_er
ror: 0.1278 - mean_squared_error: 0.0329
Epoch 00040: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 55us/sample - loss: 0.1269 - mean_abso
lute_error: 0.1269 - mean_squared_error: 0.0325 - val_loss: 0.1480 - val_mean_absolute_e
rror: 0.1480 - val_mean_squared_error: 0.0432
Epoch 41/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1223 - mean_absolute_er
ror: 0.1223 - mean_squared_error: 0.0313
Epoch 00041: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 54us/sample - loss: 0.1233 - mean_abso
lute_error: 0.1234 - mean_squared_error: 0.0319 - val_loss: 0.1641 - val_mean_absolute_e
rror: 0.1641 - val_mean_squared_error: 0.0501
Epoch 42/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1239 - mean_absolute_er
ror: 0.1239 - mean_squared_error: 0.0317Restoring model weights from the end of the best
epoch.
```

```
Epoch 00042: val_loss did not improve from 0.14428
10471/10471 [=====] - 1s 55us/sample - loss: 0.1238 - mean_abso
lute_error: 0.1237 - mean_squared_error: 0.0317 - val_loss: 0.2500 - val_mean_absolute_e
rror: 0.2499 - val_mean_squared_error: 0.0931
Epoch 00042: early stopping
MAE: 0.14423797
RMSE: 0.20639013
Adding initial Dense layers with 128
Adding Dense layer with 128
Adding Dense layer with 64
Adding Dense layer with 64
Adding Dense layer with 32
Adding last layer with 32
Outputting predictive model - Tabular
Model: "model_72"
```

Layer (type)	Output Shape	Param #
=====		
input_73 (InputLayer)	[(None, 61)]	0
dense_507 (Dense)	(None, 128)	7936
dense_508 (Dense)	(None, 128)	16512
dense_509 (Dense)	(None, 64)	8256
dense_510 (Dense)	(None, 64)	4160
dense_511 (Dense)	(None, 32)	2080
dense_512 (Dense)	(None, 32)	1056
dense_513 (Dense)	(None, 1)	33
=====		

```
Total params: 40,033
Trainable params: 40,033
Non-trainable params: 0
```

```
None
[INFO] training model...
```

Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10112/10471 [=====>..] - ETA: 0s - loss: 1.5332 - mean_absolute_error: 1.5332 - mean_squared_error: 8.3833
Epoch 00001: val_loss improved from inf to 0.36399, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 137us/sample - loss: 1.4942 - mean_absolute_error: 1.4919 - mean_squared_error: 8.0865 - val_loss: 0.3640 - val_mean_absolute_error: 0.3639 - val_mean_squared_error: 0.2260
Epoch 2/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.4129 - mean_absolute_error: 0.4129 - mean_squared_error: 0.2996
Epoch 00002: val_loss improved from 0.36399 to 0.33922, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 62us/sample - loss: 0.4075 - mean_absolute_error: 0.4075 - mean_squared_error: 0.2925 - val_loss: 0.3392 - val_mean_absolute_error: 0.3390 - val_mean_squared_error: 0.1650
Epoch 3/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.2705 - mean_absolute_error: 0.2705 - mean_squared_error: 0.1217
Epoch 00003: val_loss improved from 0.33922 to 0.30232, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.2697 - mean_absolute_error: 0.2696 - mean_squared_error: 0.1204 - val_loss: 0.3023 - val_mean_absolute_error: 0.3022 - val_mean_squared_error: 0.1335
Epoch 4/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.2023 - mean_absolute_error: 0.2023 - mean_squared_error: 0.0714
Epoch 00004: val_loss did not improve from 0.30232
10471/10471 [=====] - 1s 63us/sample - loss: 0.2016 - mean_absolute_error: 0.2015 - mean_squared_error: 0.0716 - val_loss: 0.3208 - val_mean_absolute_error: 0.3210 - val_mean_squared_error: 0.1366
Epoch 5/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1974 - mean_absolute_error: 0.1974 - mean_squared_error: 0.0677
Epoch 00005: val_loss improved from 0.30232 to 0.17015, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.2010 - mean_absolute_error: 0.2014 - mean_squared_error: 0.0700 - val_loss: 0.1701 - val_mean_absolute_error: 0.1701 - val_mean_squared_error: 0.0569
Epoch 6/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1868 - mean_absolute_error: 0.1868 - mean_squared_error: 0.0632
Epoch 00006: val_loss did not improve from 0.17015
10471/10471 [=====] - 1s 60us/sample - loss: 0.1862 - mean_absolute_error: 0.1861 - mean_squared_error: 0.0627 - val_loss: 0.2020 - val_mean_absolute_error: 0.2019 - val_mean_squared_error: 0.0722
Epoch 7/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.2077 - mean_absolute_error: 0.2077 - mean_squared_error: 0.0728
Epoch 00007: val_loss did not improve from 0.17015
10471/10471 [=====] - 1s 60us/sample - loss: 0.2060 - mean_absolute_error: 0.2060 - mean_squared_error: 0.0718 - val_loss: 0.1863 - val_mean_absolute_error: 0.1863 - val_mean_squared_error: 0.0584
Epoch 8/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.2109 - mean_absolute_error: 0.2109 - mean_squared_error: 0.0767
Epoch 00008: val_loss improved from 0.17015 to 0.16741, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 63us/sample - loss: 0.2110 - mean_absolute_error: 0.2111 - mean_squared_error: 0.0766 - val_loss: 0.1674 - val_mean_absolute_error: 0.1674 - val_mean_squared_error: 0.0584

```
rror: 0.1674 - val_mean_squared_error: 0.0522
Epoch 9/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1773 - mean_absolute_error: 0.1773 - mean_squared_error: 0.0586
Epoch 00009: val_loss improved from 0.16741 to 0.16623, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.1762 - mean_absolute_error: 0.1760 - mean_squared_error: 0.0582 - val_loss: 0.1662 - val_mean_absolute_error: 0.1662 - val_mean_squared_error: 0.0554
Epoch 10/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1831 - mean_absolute_error: 0.1831 - mean_squared_error: 0.0598
Epoch 00010: val_loss did not improve from 0.16623
10471/10471 [=====] - 1s 61us/sample - loss: 0.1820 - mean_absolute_error: 0.1819 - mean_squared_error: 0.0593 - val_loss: 0.2955 - val_mean_absolute_error: 0.2954 - val_mean_squared_error: 0.1236
Epoch 11/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1767 - mean_absolute_error: 0.1767 - mean_squared_error: 0.0574
Epoch 00011: val_loss improved from 0.16623 to 0.15487, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 63us/sample - loss: 0.1783 - mean_absolute_error: 0.1787 - mean_squared_error: 0.0585 - val_loss: 0.1549 - val_mean_absolute_error: 0.1549 - val_mean_squared_error: 0.0460
Epoch 12/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1663 - mean_absolute_error: 0.1663 - mean_squared_error: 0.0513
Epoch 00012: val_loss did not improve from 0.15487
10471/10471 [=====] - 1s 63us/sample - loss: 0.1662 - mean_absolute_error: 0.1661 - mean_squared_error: 0.0512 - val_loss: 0.1995 - val_mean_absolute_error: 0.1994 - val_mean_squared_error: 0.0696
Epoch 13/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1675 - mean_absolute_error: 0.1675 - mean_squared_error: 0.0537
Epoch 00013: val_loss did not improve from 0.15487
10471/10471 [=====] - 1s 64us/sample - loss: 0.1672 - mean_absolute_error: 0.1673 - mean_squared_error: 0.0535 - val_loss: 0.1574 - val_mean_absolute_error: 0.1574 - val_mean_squared_error: 0.0477
Epoch 14/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1588 - mean_absolute_error: 0.1588 - mean_squared_error: 0.0491
Epoch 00014: val_loss did not improve from 0.15487
10471/10471 [=====] - 1s 60us/sample - loss: 0.1582 - mean_absolute_error: 0.1584 - mean_squared_error: 0.0489 - val_loss: 0.3420 - val_mean_absolute_error: 0.3419 - val_mean_squared_error: 0.1533
Epoch 15/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1752 - mean_absolute_error: 0.1752 - mean_squared_error: 0.0557
Epoch 00015: val_loss improved from 0.15487 to 0.14704, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 63us/sample - loss: 0.1740 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0553 - val_loss: 0.1470 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0441
Epoch 16/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1590 - mean_absolute_error: 0.1590 - mean_squared_error: 0.0479
Epoch 00016: val_loss did not improve from 0.14704
10471/10471 [=====] - 1s 62us/sample - loss: 0.1594 - mean_absolute_error: 0.1593 - mean_squared_error: 0.0480 - val_loss: 0.1508 - val_mean_absolute_error: 0.1508 - val_mean_squared_error: 0.0462
Epoch 17/500
```

9856/10471 [=====>..] - ETA: 0s - loss: 0.1513 - mean_absolute_error: 0.1513 - mean_squared_error: 0.0441
Epoch 00017: val_loss did not improve from 0.14704
10471/10471 [=====] - 1s 61us/sample - loss: 0.1503 - mean_absolute_error: 0.1502 - mean_squared_error: 0.0435 - val_loss: 0.1579 - val_mean_absolute_error: 0.1579 - val_mean_squared_error: 0.0488
Epoch 18/500
9760/10471 [=====>..] - ETA: 0s - loss: 0.1479 - mean_absolute_error: 0.1479 - mean_squared_error: 0.0431
Epoch 00018: val_loss improved from 0.14704 to 0.14580, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.1476 - mean_absolute_error: 0.1476 - mean_squared_error: 0.0432 - val_loss: 0.1458 - val_mean_absolute_error: 0.1457 - val_mean_squared_error: 0.0446
Epoch 19/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1517 - mean_absolute_error: 0.1517 - mean_squared_error: 0.0445
Epoch 00019: val_loss improved from 0.14580 to 0.14562, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 63us/sample - loss: 0.1509 - mean_absolute_error: 0.1508 - mean_squared_error: 0.0440 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0439
Epoch 20/500
9696/10471 [=====>..] - ETA: 0s - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0388
Epoch 00020: val_loss did not improve from 0.14562
10471/10471 [=====] - 1s 62us/sample - loss: 0.1376 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0389 - val_loss: 0.1522 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0477
Epoch 21/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1355 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0380
Epoch 00021: val_loss did not improve from 0.14562
10471/10471 [=====] - 1s 61us/sample - loss: 0.1351 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0378 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0448
Epoch 22/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1451 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0415
Epoch 00022: val_loss did not improve from 0.14562
10471/10471 [=====] - 1s 59us/sample - loss: 0.1442 - mean_absolute_error: 0.1442 - mean_squared_error: 0.0410 - val_loss: 0.1458 - val_mean_absolute_error: 0.1457 - val_mean_squared_error: 0.0444
Epoch 23/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1308 - mean_absolute_error: 0.1308 - mean_squared_error: 0.0361
Epoch 00023: val_loss did not improve from 0.14562
10471/10471 [=====] - 1s 61us/sample - loss: 0.1311 - mean_absolute_error: 0.1313 - mean_squared_error: 0.0362 - val_loss: 0.1476 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0448
Epoch 24/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0375
Epoch 00024: val_loss did not improve from 0.14562
10471/10471 [=====] - 1s 60us/sample - loss: 0.1354 - mean_absolute_error: 0.1357 - mean_squared_error: 0.0379 - val_loss: 0.1491 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0452
Epoch 25/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1407 - mean_absolute_error: 0.1407 - mean_squared_error: 0.0388
Epoch 00025: val_loss did not improve from 0.14562

```
10471/10471 [=====] - 1s 61us/sample - loss: 0.1417 - mean_absolute_error: 0.1417 - mean_squared_error: 0.0391 - val_loss: 0.2021 - val_mean_absolute_error: 0.2022 - val_mean_squared_error: 0.0685
Epoch 26/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1247 - mean_absolute_error: 0.1247 - mean_squared_error: 0.0338
Epoch 00026: val_loss improved from 0.14562 to 0.14311, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 63us/sample - loss: 0.1242 - mean_absolute_error: 0.1241 - mean_squared_error: 0.0334 - val_loss: 0.1431 - val_mean_absolute_error: 0.1431 - val_mean_squared_error: 0.0437
Epoch 27/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1305 - mean_absolute_error: 0.1305 - mean_squared_error: 0.0350
Epoch 00027: val_loss did not improve from 0.14311
10471/10471 [=====] - 1s 60us/sample - loss: 0.1305 - mean_absolute_error: 0.1305 - mean_squared_error: 0.0353 - val_loss: 0.1675 - val_mean_absolute_error: 0.1674 - val_mean_squared_error: 0.0530
Epoch 28/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1321 - mean_absolute_error: 0.1321 - mean_squared_error: 0.0357
Epoch 00028: val_loss did not improve from 0.14311
10471/10471 [=====] - 1s 61us/sample - loss: 0.1319 - mean_absolute_error: 0.1319 - mean_squared_error: 0.0355 - val_loss: 0.1439 - val_mean_absolute_error: 0.1439 - val_mean_squared_error: 0.0439
Epoch 29/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1291 - mean_absolute_error: 0.1291 - mean_squared_error: 0.0347
Epoch 00029: val_loss did not improve from 0.14311
10471/10471 [=====] - 1s 61us/sample - loss: 0.1303 - mean_absolute_error: 0.1304 - mean_squared_error: 0.0352 - val_loss: 0.1937 - val_mean_absolute_error: 0.1937 - val_mean_squared_error: 0.0624
Epoch 30/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1240 - mean_absolute_error: 0.1240 - mean_squared_error: 0.0326
Epoch 00030: val_loss did not improve from 0.14311
10471/10471 [=====] - 1s 60us/sample - loss: 0.1240 - mean_absolute_error: 0.1241 - mean_squared_error: 0.0328 - val_loss: 0.2112 - val_mean_absolute_error: 0.2112 - val_mean_squared_error: 0.0702
Epoch 31/500
9760/10471 [=====>..] - ETA: 0s - loss: 0.1261 - mean_absolute_error: 0.1261 - mean_squared_error: 0.0333
Epoch 00031: val_loss did not improve from 0.14311
10471/10471 [=====] - 1s 62us/sample - loss: 0.1251 - mean_absolute_error: 0.1252 - mean_squared_error: 0.0331 - val_loss: 0.2131 - val_mean_absolute_error: 0.2131 - val_mean_squared_error: 0.0701
Epoch 32/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1279 - mean_absolute_error: 0.1279 - mean_squared_error: 0.0342
Epoch 00032: val_loss did not improve from 0.14311
10471/10471 [=====] - 1s 64us/sample - loss: 0.1277 - mean_absolute_error: 0.1277 - mean_squared_error: 0.0341 - val_loss: 0.1553 - val_mean_absolute_error: 0.1553 - val_mean_squared_error: 0.0498
Epoch 33/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1242 - mean_absolute_error: 0.1242 - mean_squared_error: 0.0324
Epoch 00033: val_loss improved from 0.14311 to 0.14243, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 68us/sample - loss: 0.1241 - mean_absolute_error: 0.1240 - mean_squared_error: 0.0322 - val_loss: 0.1424 - val_mean_absolute_error: 0.1424 - val_mean_squared_error: 0.0444
```

Epoch 34/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1253 - mean_absolute_error: 0.1253 - mean_squared_error: 0.0328
Epoch 00034: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 65us/sample - loss: 0.1257 - mean_absolute_error: 0.1257 - mean_squared_error: 0.0328 - val_loss: 0.1509 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0470
Epoch 35/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1205 - mean_absolute_error: 0.1205 - mean_squared_error: 0.0312
Epoch 00035: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 64us/sample - loss: 0.1214 - mean_absolute_error: 0.1213 - mean_squared_error: 0.0312 - val_loss: 0.1605 - val_mean_absolute_error: 0.1605 - val_mean_squared_error: 0.0492
Epoch 36/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1215 - mean_absolute_error: 0.1215 - mean_squared_error: 0.0312
Epoch 00036: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 65us/sample - loss: 0.1213 - mean_absolute_error: 0.1213 - mean_squared_error: 0.0310 - val_loss: 0.1511 - val_mean_absolute_error: 0.1511 - val_mean_squared_error: 0.0470
Epoch 37/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1318 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0347
Epoch 00037: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 65us/sample - loss: 0.1309 - mean_absolute_error: 0.1308 - mean_squared_error: 0.0343 - val_loss: 0.1626 - val_mean_absolute_error: 0.1626 - val_mean_squared_error: 0.0514
Epoch 38/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1193 - mean_absolute_error: 0.1193 - mean_squared_error: 0.0301
Epoch 00038: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 61us/sample - loss: 0.1195 - mean_absolute_error: 0.1196 - mean_squared_error: 0.0302 - val_loss: 0.1514 - val_mean_absolute_error: 0.1514 - val_mean_squared_error: 0.0474
Epoch 39/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1238 - mean_absolute_error: 0.1238 - mean_squared_error: 0.0316
Epoch 00039: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 60us/sample - loss: 0.1237 - mean_absolute_error: 0.1236 - mean_squared_error: 0.0315 - val_loss: 0.1517 - val_mean_absolute_error: 0.1516 - val_mean_squared_error: 0.0475
Epoch 40/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1241 - mean_absolute_error: 0.1241 - mean_squared_error: 0.0316
Epoch 00040: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 60us/sample - loss: 0.1236 - mean_absolute_error: 0.1236 - mean_squared_error: 0.0315 - val_loss: 0.1566 - val_mean_absolute_error: 0.1566 - val_mean_squared_error: 0.0492
Epoch 41/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1202 - mean_absolute_error: 0.1202 - mean_squared_error: 0.0301
Epoch 00041: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 60us/sample - loss: 0.1201 - mean_absolute_error: 0.1201 - mean_squared_error: 0.0299 - val_loss: 0.1490 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0468
Epoch 42/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1184 - mean_absolute_error: 0.1184 - mean_squared_error: 0.0297
Epoch 00042: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 60us/sample - loss: 0.1177 - mean_absolute_error:

lute_error: 0.1178 - mean_squared_error: 0.0293 - val_loss: 0.1480 - val_mean_absolute_error: 0.1480 - val_mean_squared_error: 0.0455

Epoch 43/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1209 - mean_absolute_error: 0.1209 - mean_squared_error: 0.0297

Epoch 00043: val_loss did not improve from 0.14243

10471/10471 [=====] - 1s 62us/sample - loss: 0.1213 - mean_absolute_error: 0.1213 - mean_squared_error: 0.0298 - val_loss: 0.1805 - val_mean_absolute_error: 0.1805 - val_mean_squared_error: 0.0568

Epoch 44/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1188 - mean_absolute_error: 0.1188 - mean_squared_error: 0.0290

Epoch 00044: val_loss did not improve from 0.14243

10471/10471 [=====] - 1s 62us/sample - loss: 0.1189 - mean_absolute_error: 0.1187 - mean_squared_error: 0.0288 - val_loss: 0.1501 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0474

Epoch 45/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1223 - mean_absolute_error: 0.1223 - mean_squared_error: 0.0302

Epoch 00045: val_loss did not improve from 0.14243

10471/10471 [=====] - 1s 61us/sample - loss: 0.1219 - mean_absolute_error: 0.1221 - mean_squared_error: 0.0299 - val_loss: 0.1514 - val_mean_absolute_error: 0.1513 - val_mean_squared_error: 0.0487

Epoch 46/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1138 - mean_absolute_error: 0.1138 - mean_squared_error: 0.0279

Epoch 00046: val_loss did not improve from 0.14243

10471/10471 [=====] - 1s 60us/sample - loss: 0.1146 - mean_absolute_error: 0.1145 - mean_squared_error: 0.0280 - val_loss: 0.1825 - val_mean_absolute_error: 0.1825 - val_mean_squared_error: 0.0584

Epoch 47/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1117 - mean_absolute_error: 0.1117 - mean_squared_error: 0.0266

Epoch 00047: val_loss did not improve from 0.14243

10471/10471 [=====] - 1s 61us/sample - loss: 0.1121 - mean_absolute_error: 0.1121 - mean_squared_error: 0.0266 - val_loss: 0.1781 - val_mean_absolute_error: 0.1781 - val_mean_squared_error: 0.0560

Epoch 48/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1173 - mean_absolute_error: 0.1173 - mean_squared_error: 0.0281

Epoch 00048: val_loss did not improve from 0.14243

10471/10471 [=====] - 1s 61us/sample - loss: 0.1176 - mean_absolute_error: 0.1175 - mean_squared_error: 0.0285 - val_loss: 0.2072 - val_mean_absolute_error: 0.2071 - val_mean_squared_error: 0.0726

Epoch 49/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1145 - mean_absolute_error: 0.1145 - mean_squared_error: 0.0273

Epoch 00049: val_loss did not improve from 0.14243

10471/10471 [=====] - 1s 60us/sample - loss: 0.1140 - mean_absolute_error: 0.1140 - mean_squared_error: 0.0270 - val_loss: 0.1649 - val_mean_absolute_error: 0.1649 - val_mean_squared_error: 0.0524

Epoch 50/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1139 - mean_absolute_error: 0.1139 - mean_squared_error: 0.0265

Epoch 00050: val_loss did not improve from 0.14243

10471/10471 [=====] - 1s 61us/sample - loss: 0.1148 - mean_absolute_error: 0.1150 - mean_squared_error: 0.0271 - val_loss: 0.2114 - val_mean_absolute_error: 0.2115 - val_mean_squared_error: 0.0737

Epoch 51/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1154 - mean_absolute_error: 0.1154 - mean_squared_error: 0.0276

```
Epoch 00051: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 60us/sample - loss: 0.1149 - mean_absolute_error: 0.1150 - mean_squared_error: 0.0275 - val_loss: 0.1671 - val_mean_absolute_error: 0.1671 - val_mean_squared_error: 0.0540
Epoch 52/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1090 - mean_absolute_error: 0.1090 - mean_squared_error: 0.0250
Epoch 00052: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 60us/sample - loss: 0.1091 - mean_absolute_error: 0.1091 - mean_squared_error: 0.0251 - val_loss: 0.1822 - val_mean_absolute_error: 0.1822 - val_mean_squared_error: 0.0614
Epoch 53/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1072 - mean_absolute_error: 0.1072 - mean_squared_error: 0.0246
Epoch 00053: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 61us/sample - loss: 0.1084 - mean_absolute_error: 0.1084 - mean_squared_error: 0.0251 - val_loss: 0.1790 - val_mean_absolute_error: 0.1790 - val_mean_squared_error: 0.0614
Epoch 54/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1090 - mean_absolute_error: 0.1090 - mean_squared_error: 0.0250
Epoch 00054: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 60us/sample - loss: 0.1084 - mean_absolute_error: 0.1083 - mean_squared_error: 0.0248 - val_loss: 0.1680 - val_mean_absolute_error: 0.1680 - val_mean_squared_error: 0.0550
Epoch 55/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1059 - mean_absolute_error: 0.1059 - mean_squared_error: 0.0238
Epoch 00055: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 59us/sample - loss: 0.1063 - mean_absolute_error: 0.1062 - mean_squared_error: 0.0240 - val_loss: 0.1531 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0494
Epoch 56/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1075 - mean_absolute_error: 0.1075 - mean_squared_error: 0.0245
Epoch 00056: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 60us/sample - loss: 0.1072 - mean_absolute_error: 0.1073 - mean_squared_error: 0.0245 - val_loss: 0.1541 - val_mean_absolute_error: 0.1541 - val_mean_squared_error: 0.0485
Epoch 57/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1086 - mean_absolute_error: 0.1086 - mean_squared_error: 0.0250
Epoch 00057: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 60us/sample - loss: 0.1083 - mean_absolute_error: 0.1086 - mean_squared_error: 0.0254 - val_loss: 0.1578 - val_mean_absolute_error: 0.1579 - val_mean_squared_error: 0.0496
Epoch 58/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1075 - mean_absolute_error: 0.1075 - mean_squared_error: 0.0243Restoring model weights from the end of the best epoch.

Epoch 00058: val_loss did not improve from 0.14243
10471/10471 [=====] - 1s 62us/sample - loss: 0.1077 - mean_absolute_error: 0.1076 - mean_squared_error: 0.0245 - val_loss: 0.2446 - val_mean_absolute_error: 0.2447 - val_mean_squared_error: 0.0880
Epoch 00058: early stopping
MAE: 0.14239165
RMSE: 0.21063781
Adding initial Dense layers with 64
Adding Dense layer with 64
Adding Dense layer with 64
```

```
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_73"
```

Layer (type)	Output Shape	Param #
<hr/>		
input_74 (InputLayer)	[(None, 61)]	0
dense_514 (Dense)	(None, 64)	3968
dense_515 (Dense)	(None, 64)	4160
dense_516 (Dense)	(None, 64)	4160
dense_517 (Dense)	(None, 64)	4160
dense_518 (Dense)	(None, 1)	65
<hr/>		
Total params: 16,513		
Trainable params: 16,513		
Non-trainable params: 0		

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
 9920/10471 [=====>..] - ETA: 0s - loss: 1.6348 - mean_absolute_error: 1.6348 - mean_squared_error: 10.8670
Epoch 00001: val_loss improved from inf to 0.67281, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 94us/sample - loss: 1.5777 - mean_absolute_error: 1.5750 - mean_squared_error: 10.2973 - val_loss: 0.6728 - val_mean_absolute_error: 0.6729 - val_mean_squared_error: 0.6109
Epoch 2/500
 9952/10471 [=====>..] - ETA: 0s - loss: 0.5394 - mean_absolute_error: 0.5394 - mean_squared_error: 0.4702
Epoch 00002: val_loss improved from 0.67281 to 0.64016, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 57us/sample - loss: 0.5358 - mean_absolute_error: 0.5351 - mean_squared_error: 0.4615 - val_loss: 0.6402 - val_mean_absolute_error: 0.6399 - val_mean_squared_error: 0.5486
Epoch 3/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.3534 - mean_absolute_error: 0.3534 - mean_squared_error: 0.2239
Epoch 00003: val_loss improved from 0.64016 to 0.22886, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.3511 - mean_absolute_error: 0.3511 - mean_squared_error: 0.2214 - val_loss: 0.2289 - val_mean_absolute_error: 0.2289 - val_mean_squared_error: 0.0854
Epoch 4/500
 9920/10471 [=====>..] - ETA: 0s - loss: 0.2458 - mean_absolute_error: 0.2458 - mean_squared_error: 0.0979
Epoch 00004: val_loss did not improve from 0.22886
10471/10471 [=====] - 1s 61us/sample - loss: 0.2436 - mean_absolute_error: 0.2436 - mean_squared_error: 0.0964 - val_loss: 0.2893 - val_mean_absolute_error: 0.2893 - val_mean_squared_error: 0.1193
Epoch 5/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1965 - mean_absolute_error: 0.1965 - mean_squared_error: 0.0677
Epoch 00005: val_loss did not improve from 0.22886
10471/10471 [=====] - 1s 59us/sample - loss: 0.1956 - mean_absolute_error:
```

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lute_error: 0.1954 - mean_squared_error: 0.0672 - val_loss: 0.3488 - val_mean_absolute_e
rror: 0.3487 - val_mean_squared_error: 0.1626
Epoch 6/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2244 - mean_absolute_er
ror: 0.2244 - mean_squared_error: 0.0865
Epoch 00006: val_loss improved from 0.22886 to 0.20042, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.2234 - mean_abso
lute_error: 0.2234 - mean_squared_error: 0.0860 - val_loss: 0.2004 - val_mean_absolute_e
rror: 0.2005 - val_mean_squared_error: 0.0671
Epoch 7/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1947 - mean_absolute_er
ror: 0.1947 - mean_squared_error: 0.0684
Epoch 00007: val_loss did not improve from 0.20042
10471/10471 [=====] - 1s 59us/sample - loss: 0.1944 - mean_abso
lute_error: 0.1943 - mean_squared_error: 0.0681 - val_loss: 0.3079 - val_mean_absolute_e
rror: 0.3080 - val_mean_squared_error: 0.1264
Epoch 8/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.2014 - mean_absolute_er
ror: 0.2014 - mean_squared_error: 0.0723
Epoch 00008: val_loss improved from 0.20042 to 0.16806, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 62us/sample - loss: 0.1998 - mean_abso
lute_error: 0.1996 - mean_squared_error: 0.0713 - val_loss: 0.1681 - val_mean_absolute_e
rror: 0.1680 - val_mean_squared_error: 0.0540
Epoch 9/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1874 - mean_absolute_er
ror: 0.1874 - mean_squared_error: 0.0632
Epoch 00009: val_loss did not improve from 0.16806
10471/10471 [=====] - 1s 58us/sample - loss: 0.1935 - mean_abso
lute_error: 0.1935 - mean_squared_error: 0.0669 - val_loss: 0.3921 - val_mean_absolute_e
rror: 0.3923 - val_mean_squared_error: 0.1950
Epoch 10/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1776 - mean_absolute_er
ror: 0.1776 - mean_squared_error: 0.0574
Epoch 00010: val_loss did not improve from 0.16806
10471/10471 [=====] - 1s 60us/sample - loss: 0.1775 - mean_abso
lute_error: 0.1776 - mean_squared_error: 0.0573 - val_loss: 0.1704 - val_mean_absolute_e
rror: 0.1703 - val_mean_squared_error: 0.0563
Epoch 11/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1823 - mean_absolute_er
ror: 0.1823 - mean_squared_error: 0.0607
Epoch 00011: val_loss did not improve from 0.16806
10471/10471 [=====] - 1s 59us/sample - loss: 0.1824 - mean_abso
lute_error: 0.1823 - mean_squared_error: 0.0605 - val_loss: 0.2048 - val_mean_absolute_e
rror: 0.2047 - val_mean_squared_error: 0.0722
Epoch 12/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1923 - mean_absolute_er
ror: 0.1923 - mean_squared_error: 0.0665
Epoch 00012: val_loss improved from 0.16806 to 0.16260, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.1936 - mean_abso
lute_error: 0.1934 - mean_squared_error: 0.0672 - val_loss: 0.1626 - val_mean_absolute_e
rror: 0.1626 - val_mean_squared_error: 0.0531
Epoch 13/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1619 - mean_absolute_er
ror: 0.1619 - mean_squared_error: 0.0499
Epoch 00013: val_loss improved from 0.16260 to 0.15851, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 62us/sample - loss: 0.1614 - mean_abso
lute_error: 0.1614 - mean_squared_error: 0.0497 - val_loss: 0.1585 - val_mean_absolute_e
```

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rror: 0.1585 - val_mean_squared_error: 0.0490
Epoch 14/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1586 - mean_absolute_error: 0.1586 - mean_squared_error: 0.0484
Epoch 00014: val_loss did not improve from 0.15851
10471/10471 [=====] - 1s 61us/sample - loss: 0.1602 - mean_absolute_error: 0.1608 - mean_squared_error: 0.0496 - val_loss: 0.1745 - val_mean_absolute_error: 0.1746 - val_mean_squared_error: 0.0575
Epoch 15/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1656 - mean_absolute_error: 0.1656 - mean_squared_error: 0.0519
Epoch 00015: val_loss did not improve from 0.15851
10471/10471 [=====] - 1s 60us/sample - loss: 0.1656 - mean_absolute_error: 0.1655 - mean_squared_error: 0.0519 - val_loss: 0.1781 - val_mean_absolute_error: 0.1781 - val_mean_squared_error: 0.0557
Epoch 16/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1599 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0494
Epoch 00016: val_loss did not improve from 0.15851
10471/10471 [=====] - 1s 61us/sample - loss: 0.1593 - mean_absolute_error: 0.1596 - mean_squared_error: 0.0496 - val_loss: 0.1659 - val_mean_absolute_error: 0.1659 - val_mean_squared_error: 0.0527
Epoch 17/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1594 - mean_absolute_error: 0.1594 - mean_squared_error: 0.0489
Epoch 00017: val_loss improved from 0.15851 to 0.14791, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 63us/sample - loss: 0.1583 - mean_absolute_error: 0.1581 - mean_squared_error: 0.0483 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0462
Epoch 18/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1485 - mean_absolute_error: 0.1485 - mean_squared_error: 0.0448
Epoch 00018: val_loss improved from 0.14791 to 0.14526, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.1487 - mean_absolute_error: 0.1487 - mean_squared_error: 0.0449 - val_loss: 0.1453 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0434
Epoch 19/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1475 - mean_absolute_error: 0.1475 - mean_squared_error: 0.0441
Epoch 00019: val_loss did not improve from 0.14526
10471/10471 [=====] - 1s 60us/sample - loss: 0.1468 - mean_absolute_error: 0.1468 - mean_squared_error: 0.0436 - val_loss: 0.1983 - val_mean_absolute_error: 0.1982 - val_mean_squared_error: 0.0687
Epoch 20/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1458 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0430
Epoch 00020: val_loss did not improve from 0.14526
10471/10471 [=====] - 1s 59us/sample - loss: 0.1456 - mean_absolute_error: 0.1454 - mean_squared_error: 0.0428 - val_loss: 0.1772 - val_mean_absolute_error: 0.1771 - val_mean_squared_error: 0.0582
Epoch 21/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1417 - mean_absolute_error: 0.1417 - mean_squared_error: 0.0417
Epoch 00021: val_loss did not improve from 0.14526
10471/10471 [=====] - 1s 60us/sample - loss: 0.1422 - mean_absolute_error: 0.1422 - mean_squared_error: 0.0421 - val_loss: 0.1465 - val_mean_absolute_error: 0.1465 - val_mean_squared_error: 0.0429
Epoch 22/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1420 - mean_absolute_error:
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ror: 0.1420 - mean_squared_error: 0.0414
Epoch 00022: val_loss did not improve from 0.14526
10471/10471 [=====] - 1s 61us/sample - loss: 0.1416 - mean_absolute_error: 0.1415 - mean_squared_error: 0.0411 - val_loss: 0.1773 - val_mean_absolute_error: 0.1773 - val_mean_squared_error: 0.0574
Epoch 23/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1407 - mean_absolute_error: 0.1407 - mean_squared_error: 0.0412
Epoch 00023: val_loss did not improve from 0.14526
10471/10471 [=====] - 1s 61us/sample - loss: 0.1426 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0421 - val_loss: 0.2815 - val_mean_absolute_error: 0.2816 - val_mean_squared_error: 0.1057
Epoch 24/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1460 - mean_absolute_error: 0.1460 - mean_squared_error: 0.0428
Epoch 00024: val_loss improved from 0.14526 to 0.14221, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 62us/sample - loss: 0.1466 - mean_absolute_error: 0.1465 - mean_squared_error: 0.0435 - val_loss: 0.1422 - val_mean_absolute_error: 0.1422 - val_mean_squared_error: 0.0436
Epoch 25/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1395 - mean_absolute_error: 0.1395 - mean_squared_error: 0.0407
Epoch 00025: val_loss did not improve from 0.14221
10471/10471 [=====] - 1s 67us/sample - loss: 0.1396 - mean_absolute_error: 0.1396 - mean_squared_error: 0.0406 - val_loss: 0.1443 - val_mean_absolute_error: 0.1443 - val_mean_squared_error: 0.0436
Epoch 26/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1388 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0405
Epoch 00026: val_loss did not improve from 0.14221
10471/10471 [=====] - 1s 59us/sample - loss: 0.1389 - mean_absolute_error: 0.1389 - mean_squared_error: 0.0404 - val_loss: 0.1906 - val_mean_absolute_error: 0.1905 - val_mean_squared_error: 0.0636
Epoch 27/500
9664/10471 [=====>..] - ETA: 0s - loss: 0.1386 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0402
Epoch 00027: val_loss did not improve from 0.14221
10471/10471 [=====] - 1s 62us/sample - loss: 0.1385 - mean_absolute_error: 0.1385 - mean_squared_error: 0.0403 - val_loss: 0.1503 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0444
Epoch 28/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1404 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0411
Epoch 00028: val_loss did not improve from 0.14221
10471/10471 [=====] - 1s 60us/sample - loss: 0.1404 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0412 - val_loss: 0.1514 - val_mean_absolute_error: 0.1514 - val_mean_squared_error: 0.0470
Epoch 29/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1485 - mean_absolute_error: 0.1485 - mean_squared_error: 0.0437
Epoch 00029: val_loss did not improve from 0.14221
10471/10471 [=====] - 1s 59us/sample - loss: 0.1485 - mean_absolute_error: 0.1484 - mean_squared_error: 0.0436 - val_loss: 0.1560 - val_mean_absolute_error: 0.1560 - val_mean_squared_error: 0.0463
Epoch 30/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1473 - mean_absolute_error: 0.1473 - mean_squared_error: 0.0435
Epoch 00030: val_loss did not improve from 0.14221
10471/10471 [=====] - 1s 64us/sample - loss: 0.1473 - mean_absolute_error: 0.1472 - mean_squared_error: 0.0434 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0462
```

```
rror: 0.1475 - val_mean_squared_error: 0.0451
Epoch 31/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1337 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0382
Epoch 00031: val_loss did not improve from 0.14221
10471/10471 [=====] - 1s 71us/sample - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0381 - val_loss: 0.1684 - val_mean_absolute_error: 0.1683 - val_mean_squared_error: 0.0545
Epoch 32/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1406 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0406
Epoch 00032: val_loss did not improve from 0.14221
10471/10471 [=====] - 1s 65us/sample - loss: 0.1402 - mean_absolute_error: 0.1400 - mean_squared_error: 0.0403 - val_loss: 0.1608 - val_mean_absolute_error: 0.1608 - val_mean_squared_error: 0.0482
Epoch 33/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1381 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0394
Epoch 00033: val_loss did not improve from 0.14221
10471/10471 [=====] - 1s 64us/sample - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0395 - val_loss: 0.1697 - val_mean_absolute_error: 0.1696 - val_mean_squared_error: 0.0545
Epoch 34/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1313 - mean_absolute_error: 0.1313 - mean_squared_error: 0.0372
Epoch 00034: val_loss did not improve from 0.14221
10471/10471 [=====] - 1s 61us/sample - loss: 0.1314 - mean_absolute_error: 0.1316 - mean_squared_error: 0.0372 - val_loss: 0.1433 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0437
Epoch 35/500
9504/10471 [=====>..] - ETA: 0s - loss: 0.1448 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0410
Epoch 00035: val_loss improved from 0.14221 to 0.14199, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 59us/sample - loss: 0.1438 - mean_absolute_error: 0.1440 - mean_squared_error: 0.0412 - val_loss: 0.1420 - val_mean_absolute_error: 0.1420 - val_mean_squared_error: 0.0431
Epoch 36/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1323 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0367
Epoch 00036: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 59us/sample - loss: 0.1324 - mean_absolute_error: 0.1322 - mean_squared_error: 0.0367 - val_loss: 0.1829 - val_mean_absolute_error: 0.1827 - val_mean_squared_error: 0.0604
Epoch 37/500
9632/10471 [=====>..] - ETA: 0s - loss: 0.1343 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0380
Epoch 00037: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 57us/sample - loss: 0.1344 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0378 - val_loss: 0.1673 - val_mean_absolute_error: 0.1672 - val_mean_squared_error: 0.0525
Epoch 38/500
9632/10471 [=====>..] - ETA: 0s - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0402
Epoch 00038: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 57us/sample - loss: 0.1467 - mean_absolute_error: 0.1468 - mean_squared_error: 0.0430 - val_loss: 0.2534 - val_mean_absolute_error: 0.2536 - val_mean_squared_error: 0.0925
Epoch 39/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.1354 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0384
```

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Epoch 00039: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 56us/sample - loss: 0.1364 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0384 - val_loss: 0.1591 - val_mean_absolute_error: 0.1589 - val_mean_squared_error: 0.0494
Epoch 40/500
    9696/10471 [=====>...] - ETA: 0s - loss: 0.1290 - mean_absolute_error: 0.1290 - mean_squared_error: 0.0357
Epoch 00040: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 57us/sample - loss: 0.1289 - mean_absolute_error: 0.1289 - mean_squared_error: 0.0354 - val_loss: 0.1559 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0462
Epoch 41/500
    9728/10471 [=====>...] - ETA: 0s - loss: 0.1377 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0384
Epoch 00041: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 56us/sample - loss: 0.1367 - mean_absolute_error: 0.1366 - mean_squared_error: 0.0381 - val_loss: 0.1593 - val_mean_absolute_error: 0.1592 - val_mean_squared_error: 0.0496
Epoch 42/500
    10304/10471 [=====>.] - ETA: 0s - loss: 0.1312 - mean_absolute_error: 0.1312 - mean_squared_error: 0.0362
Epoch 00042: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 59us/sample - loss: 0.1309 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0361 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0449
Epoch 43/500
    10304/10471 [=====>.] - ETA: 0s - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0382
Epoch 00043: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 59us/sample - loss: 0.1373 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0381 - val_loss: 0.1745 - val_mean_absolute_error: 0.1744 - val_mean_squared_error: 0.0559
Epoch 44/500
    9568/10471 [=====>...] - ETA: 0s - loss: 0.1294 - mean_absolute_error: 0.1294 - mean_squared_error: 0.0356
Epoch 00044: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 57us/sample - loss: 0.1307 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0360 - val_loss: 0.1944 - val_mean_absolute_error: 0.1943 - val_mean_squared_error: 0.0664
Epoch 45/500
    10400/10471 [=====>.] - ETA: 0s - loss: 0.1314 - mean_absolute_error: 0.1314 - mean_squared_error: 0.0362
Epoch 00045: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 58us/sample - loss: 0.1314 - mean_absolute_error: 0.1312 - mean_squared_error: 0.0361 - val_loss: 0.2234 - val_mean_absolute_error: 0.2235 - val_mean_squared_error: 0.0757
Epoch 46/500
    9568/10471 [=====>...] - ETA: 0s - loss: 0.1354 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0371
Epoch 00046: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 57us/sample - loss: 0.1349 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0370 - val_loss: 0.1453 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0433
Epoch 47/500
    9664/10471 [=====>...] - ETA: 0s - loss: 0.1266 - mean_absolute_error: 0.1266 - mean_squared_error: 0.0348
Epoch 00047: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 57us/sample - loss: 0.1274 - mean_absolute_error: 0.1274 - mean_squared_error: 0.0349 - val_loss: 0.1527 - val_mean_absolute_error: 0.1526 - val_mean_squared_error: 0.0466
Epoch 48/500
```

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10304/10471 [=====>.] - ETA: 0s - loss: 0.1271 - mean_absolute_error: 0.1271 - mean_squared_error: 0.0344
Epoch 00048: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 59us/sample - loss: 0.1273 - mean_absolute_error: 0.1272 - mean_squared_error: 0.0343 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0437
Epoch 49/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1298 - mean_absolute_error: 0.1298 - mean_squared_error: 0.0353
Epoch 00049: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 58us/sample - loss: 0.1299 - mean_absolute_error: 0.1297 - mean_squared_error: 0.0353 - val_loss: 0.1724 - val_mean_absolute_error: 0.1724 - val_mean_squared_error: 0.0553
Epoch 50/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1331 - mean_absolute_error: 0.1331 - mean_squared_error: 0.0366
Epoch 00050: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 56us/sample - loss: 0.1335 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0370 - val_loss: 0.1752 - val_mean_absolute_error: 0.1752 - val_mean_squared_error: 0.0529
Epoch 51/500
9568/10471 [=====>...] - ETA: 0s - loss: 0.1317 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0359
Epoch 00051: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 57us/sample - loss: 0.1309 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0356 - val_loss: 0.1506 - val_mean_absolute_error: 0.1506 - val_mean_squared_error: 0.0462
Epoch 52/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1314 - mean_absolute_error: 0.1314 - mean_squared_error: 0.0360
Epoch 00052: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 58us/sample - loss: 0.1311 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0358 - val_loss: 0.1510 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0456
Epoch 53/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1297 - mean_absolute_error: 0.1297 - mean_squared_error: 0.0352
Epoch 00053: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 59us/sample - loss: 0.1297 - mean_absolute_error: 0.1297 - mean_squared_error: 0.0353 - val_loss: 0.1762 - val_mean_absolute_error: 0.1762 - val_mean_squared_error: 0.0543
Epoch 54/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1267 - mean_absolute_error: 0.1267 - mean_squared_error: 0.0339
Epoch 00054: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 56us/sample - loss: 0.1266 - mean_absolute_error: 0.1266 - mean_squared_error: 0.0340 - val_loss: 0.1483 - val_mean_absolute_error: 0.1483 - val_mean_squared_error: 0.0444
Epoch 55/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1299 - mean_absolute_error: 0.1299 - mean_squared_error: 0.0348
Epoch 00055: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 56us/sample - loss: 0.1300 - mean_absolute_error: 0.1301 - mean_squared_error: 0.0352 - val_loss: 0.1757 - val_mean_absolute_error: 0.1756 - val_mean_squared_error: 0.0533
Epoch 56/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1203 - mean_absolute_error: 0.1203 - mean_squared_error: 0.0316
Epoch 00056: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 60us/sample - loss: 0.1208 - mean_absolute_error: 0.1208 - mean_squared_error: 0.0319 - val_loss: 0.1486 - val_mean_absolute_error: 0.1486 - val_mean_squared_error: 0.0533
```

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rror: 0.1486 - val_mean_squared_error: 0.0456
Epoch 57/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1252 - mean_absolute_error: 0.1252 - mean_squared_error: 0.0332
Epoch 00057: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 58us/sample - loss: 0.1252 - mean_absolute_error: 0.1250 - mean_squared_error: 0.0331 - val_loss: 0.1764 - val_mean_absolute_error: 0.1763 - val_mean_squared_error: 0.0583
Epoch 58/500
9600/10471 [=====>...] - ETA: 0s - loss: 0.1220 - mean_absolute_error: 0.1220 - mean_squared_error: 0.0324
Epoch 00058: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 57us/sample - loss: 0.1209 - mean_absolute_error: 0.1209 - mean_squared_error: 0.0317 - val_loss: 0.1476 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0443
Epoch 59/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1269 - mean_absolute_error: 0.1269 - mean_squared_error: 0.0339
Epoch 00059: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 58us/sample - loss: 0.1269 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0338 - val_loss: 0.1553 - val_mean_absolute_error: 0.1553 - val_mean_squared_error: 0.0471
Epoch 60/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1198 - mean_absolute_error: 0.1198 - mean_squared_error: 0.0315Restoring model weights from the end of the best epoch.

```

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Epoch 00060: val_loss did not improve from 0.14199
10471/10471 [=====] - 1s 57us/sample - loss: 0.1197 - mean_absolute_error: 0.1197 - mean_squared_error: 0.0313 - val_loss: 0.1567 - val_mean_absolute_error: 0.1567 - val_mean_squared_error: 0.0479
Epoch 00060: early stopping
MAE: 0.14195013
RMSE: 0.20759182
Adding initial Dense layers with 32
Adding Dense layer with 32
Adding Dense layer with 32
Adding Dense layer with 32
Adding last layer with 32
Outputting predictive model - Tabular
Model: "model_74"

```

Layer (type)	Output Shape	Param #
input_75 (InputLayer)	[None, 61]	0
dense_519 (Dense)	(None, 32)	1984
dense_520 (Dense)	(None, 32)	1056
dense_521 (Dense)	(None, 32)	1056
dense_522 (Dense)	(None, 32)	1056
dense_523 (Dense)	(None, 32)	1056
dense_524 (Dense)	(None, 1)	33

```

Total params: 6,241
Trainable params: 6,241
Non-trainable params: 0

```

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
 9856/10471 [=====>..] - ETA: 0s - loss: 1.6410 - mean_absolute_error: 1.6410 - mean_squared_error: 11.0989
Epoch 00001: val_loss improved from inf to 1.05632, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 103us/sample - loss: 1.5808 - mean_absolute_error: 1.5798 - mean_squared_error: 10.4620 - val_loss: 1.0563 - val_mean_absolute_error: 1.0564 - val_mean_squared_error: 1.2902
Epoch 2/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.4227 - mean_absolute_error: 0.4227 - mean_squared_error: 0.3229
Epoch 00002: val_loss improved from 1.05632 to 0.22615, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 62us/sample - loss: 0.4206 - mean_absolute_error: 0.4204 - mean_squared_error: 0.3182 - val_loss: 0.2261 - val_mean_absolute_error: 0.2262 - val_mean_squared_error: 0.0896
Epoch 3/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.2605 - mean_absolute_error: 0.2605 - mean_squared_error: 0.1112
Epoch 00003: val_loss did not improve from 0.22615
10471/10471 [=====] - 1s 60us/sample - loss: 0.2592 - mean_absolute_error: 0.2590 - mean_squared_error: 0.1102 - val_loss: 0.2904 - val_mean_absolute_error: 0.2906 - val_mean_squared_error: 0.1207
Epoch 4/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.2212 - mean_absolute_error: 0.2212 - mean_squared_error: 0.0839
Epoch 00004: val_loss did not improve from 0.22615
10471/10471 [=====] - 1s 60us/sample - loss: 0.2273 - mean_absolute_error: 0.2271 - mean_squared_error: 0.0882 - val_loss: 0.4096 - val_mean_absolute_error: 0.4097 - val_mean_squared_error: 0.2078
Epoch 5/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.2042 - mean_absolute_error: 0.2042 - mean_squared_error: 0.0725
Epoch 00005: val_loss did not improve from 0.22615
10471/10471 [=====] - 1s 61us/sample - loss: 0.2025 - mean_absolute_error: 0.2024 - mean_squared_error: 0.0717 - val_loss: 0.2314 - val_mean_absolute_error: 0.2315 - val_mean_squared_error: 0.0845
Epoch 6/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2092 - mean_absolute_error: 0.2092 - mean_squared_error: 0.0758
Epoch 00006: val_loss improved from 0.22615 to 0.20457, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.2082 - mean_absolute_error: 0.2083 - mean_squared_error: 0.0751 - val_loss: 0.2046 - val_mean_absolute_error: 0.2046 - val_mean_squared_error: 0.0690
Epoch 7/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1871 - mean_absolute_error: 0.1871 - mean_squared_error: 0.0627
Epoch 00007: val_loss did not improve from 0.20457
10471/10471 [=====] - 1s 60us/sample - loss: 0.1865 - mean_absolute_error: 0.1864 - mean_squared_error: 0.0623 - val_loss: 0.3382 - val_mean_absolute_error: 0.3381 - val_mean_squared_error: 0.1536
Epoch 8/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.2095 - mean_absolute_error: 0.2095 - mean_squared_error: 0.0756
Epoch 00008: val_loss improved from 0.20457 to 0.15476, saving model to best_basic_model.hdf5
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10471/10471 [=====] - 1s 61us/sample - loss: 0.2087 - mean_absolute_error: 0.2085 - mean_squared_error: 0.0749 - val_loss: 0.1548 - val_mean_absolute_error: 0.1547 - val_mean_squared_error: 0.0479
Epoch 9/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1896 - mean_absolute_error: 0.1896 - mean_squared_error: 0.0629
Epoch 00009: val_loss improved from 0.15476 to 0.15306, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.1893 - mean_absolute_error: 0.1892 - mean_squared_error: 0.0628 - val_loss: 0.1531 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0471
Epoch 10/500
10016/10471 [=====.>..] - ETA: 0s - loss: 0.1843 - mean_absolute_error: 0.1843 - mean_squared_error: 0.0614
Epoch 00010: val_loss did not improve from 0.15306
10471/10471 [=====] - 1s 60us/sample - loss: 0.1835 - mean_absolute_error: 0.1833 - mean_squared_error: 0.0606 - val_loss: 0.1557 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0491
Epoch 11/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1795 - mean_absolute_error: 0.1795 - mean_squared_error: 0.0583
Epoch 00011: val_loss did not improve from 0.15306
10471/10471 [=====] - 1s 59us/sample - loss: 0.1810 - mean_absolute_error: 0.1810 - mean_squared_error: 0.0589 - val_loss: 0.1968 - val_mean_absolute_error: 0.1968 - val_mean_squared_error: 0.0650
Epoch 12/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1717 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0546
Epoch 00012: val_loss did not improve from 0.15306
10471/10471 [=====] - 1s 59us/sample - loss: 0.1717 - mean_absolute_error: 0.1716 - mean_squared_error: 0.0547 - val_loss: 0.1538 - val_mean_absolute_error: 0.1538 - val_mean_squared_error: 0.0501
Epoch 13/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1684 - mean_absolute_error: 0.1684 - mean_squared_error: 0.0539
Epoch 00013: val_loss did not improve from 0.15306
10471/10471 [=====] - 1s 59us/sample - loss: 0.1698 - mean_absolute_error: 0.1701 - mean_squared_error: 0.0548 - val_loss: 0.2540 - val_mean_absolute_error: 0.2541 - val_mean_squared_error: 0.0907
Epoch 14/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1910 - mean_absolute_error: 0.1910 - mean_squared_error: 0.0651
Epoch 00014: val_loss did not improve from 0.15306
10471/10471 [=====] - 1s 60us/sample - loss: 0.1896 - mean_absolute_error: 0.1894 - mean_squared_error: 0.0642 - val_loss: 0.1863 - val_mean_absolute_error: 0.1862 - val_mean_squared_error: 0.0647
Epoch 15/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1711 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0546
Epoch 00015: val_loss did not improve from 0.15306
10471/10471 [=====] - 1s 59us/sample - loss: 0.1719 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0547 - val_loss: 0.2335 - val_mean_absolute_error: 0.2335 - val_mean_squared_error: 0.0787
Epoch 16/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1627 - mean_absolute_error: 0.1627 - mean_squared_error: 0.0504
Epoch 00016: val_loss did not improve from 0.15306
10471/10471 [=====] - 1s 59us/sample - loss: 0.1625 - mean_absolute_error: 0.1624 - mean_squared_error: 0.0502 - val_loss: 0.3093 - val_mean_absolute_error: 0.3094 - val_mean_squared_error: 0.1239
Epoch 17/500
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10112/10471 [=====>..] - ETA: 0s - loss: 0.1667 - mean_absolute_error: 0.1667 - mean_squared_error: 0.0518
Epoch 00017: val_loss did not improve from 0.15306
10471/10471 [=====] - 1s 60us/sample - loss: 0.1683 - mean_absolute_error: 0.1683 - mean_squared_error: 0.0530 - val_loss: 0.1570 - val_mean_absolute_error: 0.1570 - val_mean_squared_error: 0.0508
Epoch 18/500
 9952/10471 [=====>..] - ETA: 0s - loss: 0.1601 - mean_absolute_error: 0.1601 - mean_squared_error: 0.0492
Epoch 00018: val_loss did not improve from 0.15306
10471/10471 [=====] - 1s 60us/sample - loss: 0.1591 - mean_absolute_error: 0.1591 - mean_squared_error: 0.0486 - val_loss: 0.2053 - val_mean_absolute_error: 0.2054 - val_mean_squared_error: 0.0701
Epoch 19/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1564 - mean_absolute_error: 0.1564 - mean_squared_error: 0.0477
Epoch 00019: val_loss improved from 0.15306 to 0.14881, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.1557 - mean_absolute_error: 0.1556 - mean_squared_error: 0.0473 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0465
Epoch 20/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1556 - mean_absolute_error: 0.1556 - mean_squared_error: 0.0470
Epoch 00020: val_loss did not improve from 0.14881
10471/10471 [=====] - 1s 60us/sample - loss: 0.1552 - mean_absolute_error: 0.1553 - mean_squared_error: 0.0469 - val_loss: 0.1766 - val_mean_absolute_error: 0.1767 - val_mean_squared_error: 0.0543
Epoch 21/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1475 - mean_absolute_error: 0.1475 - mean_squared_error: 0.0441
Epoch 00021: val_loss improved from 0.14881 to 0.14656, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.1469 - mean_absolute_error: 0.1472 - mean_squared_error: 0.0440 - val_loss: 0.1466 - val_mean_absolute_error: 0.1465 - val_mean_squared_error: 0.0442
Epoch 22/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1454 - mean_absolute_error: 0.1454 - mean_squared_error: 0.0433
Epoch 00022: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 59us/sample - loss: 0.1451 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0431 - val_loss: 0.1667 - val_mean_absolute_error: 0.1666 - val_mean_squared_error: 0.0554
Epoch 23/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1461 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0443
Epoch 00023: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 60us/sample - loss: 0.1460 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0440 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0440
Epoch 24/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1484 - mean_absolute_error: 0.1484 - mean_squared_error: 0.0435
Epoch 00024: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 59us/sample - loss: 0.1481 - mean_absolute_error: 0.1480 - mean_squared_error: 0.0436 - val_loss: 0.1505 - val_mean_absolute_error: 0.1505 - val_mean_squared_error: 0.0479
Epoch 25/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1426 - mean_absolute_error: 0.1426 - mean_squared_error: 0.0422
Epoch 00025: val_loss did not improve from 0.14656
```

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10471/10471 [=====] - 1s 59us/sample - loss: 0.1431 - mean_absolute_error: 0.1430 - mean_squared_error: 0.0426 - val_loss: 0.1598 - val_mean_absolute_error: 0.1597 - val_mean_squared_error: 0.0504
Epoch 26/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1462 - mean_absolute_error: 0.1462 - mean_squared_error: 0.0434
Epoch 00026: val_loss did not improve from 0.14656
10471/10471 [=====] - 1s 59us/sample - loss: 0.1467 - mean_absolute_error: 0.1468 - mean_squared_error: 0.0435 - val_loss: 0.1562 - val_mean_absolute_error: 0.1562 - val_mean_squared_error: 0.0486
Epoch 27/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1458 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0433
Epoch 00027: val_loss improved from 0.14656 to 0.14635, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.1459 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0435 - val_loss: 0.1463 - val_mean_absolute_error: 0.1463 - val_mean_squared_error: 0.0455
Epoch 28/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1503 - mean_absolute_error: 0.1503 - mean_squared_error: 0.0456
Epoch 00028: val_loss did not improve from 0.14635
10471/10471 [=====] - 1s 59us/sample - loss: 0.1502 - mean_absolute_error: 0.1504 - mean_squared_error: 0.0455 - val_loss: 0.1567 - val_mean_absolute_error: 0.1568 - val_mean_squared_error: 0.0463
Epoch 29/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1486 - mean_absolute_error: 0.1486 - mean_squared_error: 0.0439
Epoch 00029: val_loss did not improve from 0.14635
10471/10471 [=====] - 1s 60us/sample - loss: 0.1491 - mean_absolute_error: 0.1490 - mean_squared_error: 0.0441 - val_loss: 0.1757 - val_mean_absolute_error: 0.1756 - val_mean_squared_error: 0.0578
Epoch 30/500
9728/10471 [=====.>...] - ETA: 0s - loss: 0.1466 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0434
Epoch 00030: val_loss did not improve from 0.14635
10471/10471 [=====] - 1s 62us/sample - loss: 0.1461 - mean_absolute_error: 0.1462 - mean_squared_error: 0.0433 - val_loss: 0.1547 - val_mean_absolute_error: 0.1547 - val_mean_squared_error: 0.0484
Epoch 31/500
9792/10471 [=====.>..] - ETA: 0s - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0406
Epoch 00031: val_loss did not improve from 0.14635
10471/10471 [=====] - 1s 62us/sample - loss: 0.1406 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0410 - val_loss: 0.1510 - val_mean_absolute_error: 0.1510 - val_mean_squared_error: 0.0459
Epoch 32/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1489 - mean_absolute_error: 0.1489 - mean_squared_error: 0.0445
Epoch 00032: val_loss did not improve from 0.14635
10471/10471 [=====] - 1s 63us/sample - loss: 0.1489 - mean_absolute_error: 0.1489 - mean_squared_error: 0.0445 - val_loss: 0.1582 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0510
Epoch 33/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1448 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0423
Epoch 00033: val_loss improved from 0.14635 to 0.14212, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1444 - mean_absolute_error: 0.1445 - mean_squared_error: 0.0422 - val_loss: 0.1421 - val_mean_absolute_error: 0.1421 - val_mean_squared_error: 0.0421
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Epoch 34/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1413 - mean_absolute_error: 0.1413 - mean_squared_error: 0.0416
Epoch 00034: val_loss did not improve from 0.14212
10471/10471 [=====] - 1s 66us/sample - loss: 0.1419 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0417 - val_loss: 0.1483 - val_mean_absolute_error: 0.1483 - val_mean_squared_error: 0.0451
Epoch 35/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1430 - mean_absolute_error: 0.1430 - mean_squared_error: 0.0420
Epoch 00035: val_loss did not improve from 0.14212
10471/10471 [=====] - 1s 64us/sample - loss: 0.1427 - mean_absolute_error: 0.1425 - mean_squared_error: 0.0418 - val_loss: 0.1577 - val_mean_absolute_error: 0.1577 - val_mean_squared_error: 0.0493
Epoch 36/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1388 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0404
Epoch 00036: val_loss did not improve from 0.14212
10471/10471 [=====] - 1s 61us/sample - loss: 0.1391 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0405 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0458
Epoch 37/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1491 - mean_absolute_error: 0.1491 - mean_squared_error: 0.0435
Epoch 00037: val_loss did not improve from 0.14212
10471/10471 [=====] - 1s 61us/sample - loss: 0.1498 - mean_absolute_error: 0.1499 - mean_squared_error: 0.0441 - val_loss: 0.1467 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0432
Epoch 38/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1429 - mean_absolute_error: 0.1429 - mean_squared_error: 0.0414
Epoch 00038: val_loss did not improve from 0.14212
10471/10471 [=====] - 1s 61us/sample - loss: 0.1427 - mean_absolute_error: 0.1427 - mean_squared_error: 0.0416 - val_loss: 0.1447 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0439
Epoch 39/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1430 - mean_absolute_error: 0.1430 - mean_squared_error: 0.0417
Epoch 00039: val_loss did not improve from 0.14212
10471/10471 [=====] - 1s 60us/sample - loss: 0.1429 - mean_absolute_error: 0.1430 - mean_squared_error: 0.0416 - val_loss: 0.1631 - val_mean_absolute_error: 0.1631 - val_mean_squared_error: 0.0489
Epoch 40/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1417 - mean_absolute_error: 0.1417 - mean_squared_error: 0.0416
Epoch 00040: val_loss did not improve from 0.14212
10471/10471 [=====] - 1s 61us/sample - loss: 0.1410 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0410 - val_loss: 0.1594 - val_mean_absolute_error: 0.1595 - val_mean_squared_error: 0.0471
Epoch 41/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0392
Epoch 00041: val_loss improved from 0.14212 to 0.14167, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.1369 - mean_absolute_error: 0.1368 - mean_squared_error: 0.0391 - val_loss: 0.1417 - val_mean_absolute_error: 0.1417 - val_mean_squared_error: 0.0426
Epoch 42/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1414 - mean_absolute_error: 0.1414 - mean_squared_error: 0.0408
Epoch 00042: val_loss did not improve from 0.14167

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10471/10471 [=====] - 1s 60us/sample - loss: 0.1413 - mean_absolute_error: 0.1414 - mean_squared_error: 0.0408 - val_loss: 0.1812 - val_mean_absolute_error: 0.1812 - val_mean_squared_error: 0.0562
Epoch 43/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1364 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0396
Epoch 00043: val_loss did not improve from 0.14167
10471/10471 [=====] - 1s 60us/sample - loss: 0.1369 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0401 - val_loss: 0.1696 - val_mean_absolute_error: 0.1697 - val_mean_squared_error: 0.0524
Epoch 44/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1379 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0401
Epoch 00044: val_loss did not improve from 0.14167
10471/10471 [=====] - 1s 61us/sample - loss: 0.1373 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0398 - val_loss: 0.2253 - val_mean_absolute_error: 0.2254 - val_mean_squared_error: 0.0759
Epoch 45/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1379 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0395
Epoch 00045: val_loss improved from 0.14167 to 0.14072, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 62us/sample - loss: 0.1377 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0396 - val_loss: 0.1407 - val_mean_absolute_error: 0.1407 - val_mean_squared_error: 0.0421
Epoch 46/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1384 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0404
Epoch 00046: val_loss did not improve from 0.14072
10471/10471 [=====] - 1s 61us/sample - loss: 0.1381 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0400 - val_loss: 0.1529 - val_mean_absolute_error: 0.1529 - val_mean_squared_error: 0.0480
Epoch 47/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1497 - mean_absolute_error: 0.1497 - mean_squared_error: 0.0437
Epoch 00047: val_loss did not improve from 0.14072
10471/10471 [=====] - 1s 60us/sample - loss: 0.1495 - mean_absolute_error: 0.1495 - mean_squared_error: 0.0438 - val_loss: 0.1509 - val_mean_absolute_error: 0.1510 - val_mean_squared_error: 0.0466
Epoch 48/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0386
Epoch 00048: val_loss did not improve from 0.14072
10471/10471 [=====] - 1s 60us/sample - loss: 0.1347 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0385 - val_loss: 0.1724 - val_mean_absolute_error: 0.1723 - val_mean_squared_error: 0.0564
Epoch 49/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1348 - mean_absolute_error: 0.1348 - mean_squared_error: 0.0387
Epoch 00049: val_loss did not improve from 0.14072
10471/10471 [=====] - 1s 60us/sample - loss: 0.1344 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0385 - val_loss: 0.1501 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0463
Epoch 50/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1397 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0404
Epoch 00050: val_loss did not improve from 0.14072
10471/10471 [=====] - 1s 60us/sample - loss: 0.1388 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0398 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0432
Epoch 51/500
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10112/10471 [=====>..] - ETA: 0s - loss: 0.1373 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0394
Epoch 00051: val_loss did not improve from 0.14072
10471/10471 [=====] - 1s 59us/sample - loss: 0.1374 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0393 - val_loss: 0.1981 - val_mean_absolute_error: 0.1982 - val_mean_squared_error: 0.0651
Epoch 52/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1338 - mean_absolute_error: 0.1338 - mean_squared_error: 0.0374
Epoch 00052: val_loss did not improve from 0.14072
10471/10471 [=====] - 1s 59us/sample - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0378 - val_loss: 0.1680 - val_mean_absolute_error: 0.1680 - val_mean_squared_error: 0.0513
Epoch 53/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0386
Epoch 00053: val_loss did not improve from 0.14072
10471/10471 [=====] - 1s 59us/sample - loss: 0.1351 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0383 - val_loss: 0.1437 - val_mean_absolute_error: 0.1436 - val_mean_squared_error: 0.0429
Epoch 54/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1377 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0392
Epoch 00054: val_loss did not improve from 0.14072
10471/10471 [=====] - 1s 59us/sample - loss: 0.1384 - mean_absolute_error: 0.1389 - mean_squared_error: 0.0404 - val_loss: 0.1587 - val_mean_absolute_error: 0.1586 - val_mean_squared_error: 0.0497
Epoch 55/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1368 - mean_absolute_error: 0.1368 - mean_squared_error: 0.0391
Epoch 00055: val_loss improved from 0.14072 to 0.14065, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 61us/sample - loss: 0.1364 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0386 - val_loss: 0.1407 - val_mean_absolute_error: 0.1406 - val_mean_squared_error: 0.0426
Epoch 56/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1342 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0383
Epoch 00056: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 60us/sample - loss: 0.1346 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0384 - val_loss: 0.1730 - val_mean_absolute_error: 0.1730 - val_mean_squared_error: 0.0549
Epoch 57/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1428 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0418
Epoch 00057: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 60us/sample - loss: 0.1438 - mean_absolute_error: 0.1438 - mean_squared_error: 0.0420 - val_loss: 0.1540 - val_mean_absolute_error: 0.1539 - val_mean_squared_error: 0.0481
Epoch 58/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1354 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0384
Epoch 00058: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 62us/sample - loss: 0.1349 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0384 - val_loss: 0.1539 - val_mean_absolute_error: 0.1540 - val_mean_squared_error: 0.0457
Epoch 59/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1336 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0378
Epoch 00059: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 61us/sample - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0381
```

lute_error: 0.1338 - mean_squared_error: 0.0377 - val_loss: 0.2158 - val_mean_absolute_error: 0.2159 - val_mean_squared_error: 0.0723

Epoch 60/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1364 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0386

Epoch 00060: val_loss did not improve from 0.14065

10471/10471 [=====] - 1s 62us/sample - loss: 0.1360 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0385 - val_loss: 0.1455 - val_mean_absolute_error: 0.1455 - val_mean_squared_error: 0.0442

Epoch 61/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1317 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0370

Epoch 00061: val_loss did not improve from 0.14065

10471/10471 [=====] - 1s 61us/sample - loss: 0.1323 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0373 - val_loss: 0.1499 - val_mean_absolute_error: 0.1499 - val_mean_squared_error: 0.0459

Epoch 62/500
9824/10471 [=====>...] - ETA: 0s - loss: 0.1323 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0372

Epoch 00062: val_loss did not improve from 0.14065

10471/10471 [=====] - 1s 61us/sample - loss: 0.1320 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0368 - val_loss: 0.1419 - val_mean_absolute_error: 0.1419 - val_mean_squared_error: 0.0428

Epoch 63/500
9792/10471 [=====>...] - ETA: 0s - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0384

Epoch 00063: val_loss did not improve from 0.14065

10471/10471 [=====] - 1s 61us/sample - loss: 0.1371 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0389 - val_loss: 0.1710 - val_mean_absolute_error: 0.1711 - val_mean_squared_error: 0.0525

Epoch 64/500
10304/10471 [=====>...] - ETA: 0s - loss: 0.1310 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0364

Epoch 00064: val_loss did not improve from 0.14065

10471/10471 [=====] - 1s 59us/sample - loss: 0.1310 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0363 - val_loss: 0.2307 - val_mean_absolute_error: 0.2308 - val_mean_squared_error: 0.0784

Epoch 65/500
10048/10471 [=====>...] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0391

Epoch 00065: val_loss did not improve from 0.14065

10471/10471 [=====] - 1s 60us/sample - loss: 0.1380 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0390 - val_loss: 0.2106 - val_mean_absolute_error: 0.2107 - val_mean_squared_error: 0.0684

Epoch 66/500
10240/10471 [=====>...] - ETA: 0s - loss: 0.1341 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0378

Epoch 00066: val_loss did not improve from 0.14065

10471/10471 [=====] - 1s 59us/sample - loss: 0.1337 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0374 - val_loss: 0.1509 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0467

Epoch 67/500
10368/10471 [=====>...] - ETA: 0s - loss: 0.1303 - mean_absolute_error: 0.1303 - mean_squared_error: 0.0362

Epoch 00067: val_loss did not improve from 0.14065

10471/10471 [=====] - 1s 59us/sample - loss: 0.1306 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0363 - val_loss: 0.1438 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0434

Epoch 68/500
10304/10471 [=====>...] - ETA: 0s - loss: 0.1381 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0398

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Epoch 00068: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 59us/sample - loss: 0.1377 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0396 - val_loss: 0.1411 - val_mean_absolute_error: 0.1411 - val_mean_squared_error: 0.0426
Epoch 69/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1356 - mean_absolute_error: 0.1356 - mean_squared_error: 0.0380
Epoch 00069: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 60us/sample - loss: 0.1351 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0378 - val_loss: 0.1508 - val_mean_absolute_error: 0.1507 - val_mean_squared_error: 0.0463
Epoch 70/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1306 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0370
Epoch 00070: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 59us/sample - loss: 0.1307 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0371 - val_loss: 0.1448 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0441
Epoch 71/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1313 - mean_absolute_error: 0.1313 - mean_squared_error: 0.0367
Epoch 00071: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 61us/sample - loss: 0.1306 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0363 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0435
Epoch 72/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1357 - mean_absolute_error: 0.1357 - mean_squared_error: 0.0377
Epoch 00072: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 59us/sample - loss: 0.1357 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0375 - val_loss: 0.1506 - val_mean_absolute_error: 0.1506 - val_mean_squared_error: 0.0456
Epoch 73/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0392
Epoch 00073: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 59us/sample - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0390 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0455
Epoch 74/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1350 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0381
Epoch 00074: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 59us/sample - loss: 0.1349 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0379 - val_loss: 0.1444 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0433
Epoch 75/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1351 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0379
Epoch 00075: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 59us/sample - loss: 0.1350 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0378 - val_loss: 0.1531 - val_mean_absolute_error: 0.1531 - val_mean_squared_error: 0.0467
Epoch 76/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1324 - mean_absolute_error: 0.1324 - mean_squared_error: 0.0366
Epoch 00076: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 60us/sample - loss: 0.1328 - mean_absolute_error: 0.1329 - mean_squared_error: 0.0371 - val_loss: 0.1582 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0485
Epoch 77/500
```

```

10080/10471 [=====>..] - ETA: 0s - loss: 0.1301 - mean_absolute_error: 0.1301 - mean_squared_error: 0.0362
Epoch 00077: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 60us/sample - loss: 0.1300 - mean_absolute_error: 0.1301 - mean_squared_error: 0.0364 - val_loss: 0.1829 - val_mean_absolute_error: 0.1830 - val_mean_squared_error: 0.0595
Epoch 78/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1294 - mean_absolute_error: 0.1294 - mean_squared_error: 0.0361
Epoch 00078: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 60us/sample - loss: 0.1293 - mean_absolute_error: 0.1292 - mean_squared_error: 0.0360 - val_loss: 0.1453 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0436
Epoch 79/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1342 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0378
Epoch 00079: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 60us/sample - loss: 0.1348 - mean_absolute_error: 0.1348 - mean_squared_error: 0.0379 - val_loss: 0.2030 - val_mean_absolute_error: 0.2030 - val_mean_squared_error: 0.0687
Epoch 80/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1283 - mean_absolute_error: 0.1283 - mean_squared_error: 0.0354Restoring model weights from the end of the best epoch.

Epoch 00080: val_loss did not improve from 0.14065
10471/10471 [=====] - 1s 60us/sample - loss: 0.1288 - mean_absolute_error: 0.1287 - mean_squared_error: 0.0354 - val_loss: 0.1956 - val_mean_absolute_error: 0.1957 - val_mean_squared_error: 0.0647
Epoch 00080: early stopping
MAE: 0.14064403
RMSE: 0.20634586
Adding initial Dense layers with 64
Adding Dense layer with 64
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_75"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_76 (InputLayer)	[(None, 61)]	0
dense_525 (Dense)	(None, 64)	3968
dense_526 (Dense)	(None, 64)	4160
dense_527 (Dense)	(None, 64)	4160
dense_528 (Dense)	(None, 64)	4160

dense_529 (Dense)	(None, 64)	4160
dense_530 (Dense)	(None, 64)	4160
dense_531 (Dense)	(None, 64)	4160
dense_532 (Dense)	(None, 64)	4160
dense_533 (Dense)	(None, 64)	4160
dense_534 (Dense)	(None, 64)	4160
dense_535 (Dense)	(None, 64)	4160
dense_536 (Dense)	(None, 64)	4160
dense_537 (Dense)	(None, 64)	4160
dense_538 (Dense)	(None, 64)	4160
dense_539 (Dense)	(None, 64)	4160
dense_540 (Dense)	(None, 1)	65

=====

Total params: 62,273
Trainable params: 62,273
Non-trainable params: 0

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10080/10471 [=====>..] - ETA: 0s - loss: 1.4435 - mean_absolute_error: 1.4435 - mean_squared_error: 7.1692

Epoch 00001: val_loss improved from inf to 1.32966, saving model to best_basic_model.hdf5

10471/10471 [=====] - 2s 165us/sample - loss: 1.4124 - mean_absolute_error: 1.4120 - mean_squared_error: 6.9085 - val_loss: 1.3297 - val_mean_absolute_error: 1.3295 - val_mean_squared_error: 1.8570

Epoch 2/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.4329 - mean_absolute_error: 0.4329 - mean_squared_error: 0.3401

Epoch 00002: val_loss improved from 1.32966 to 0.37521, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 98us/sample - loss: 0.4329 - mean_absolute_error: 0.4329 - mean_squared_error: 0.3400 - val_loss: 0.3752 - val_mean_absolute_error: 0.3753 - val_mean_squared_error: 0.1905

Epoch 3/500

10144/10471 [=====>.] - ETA: 0s - loss: 0.2798 - mean_absolute_error: 0.2798 - mean_squared_error: 0.1259

Epoch 00003: val_loss improved from 0.37521 to 0.19620, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 101us/sample - loss: 0.2793 - mean_absolute_error: 0.2792 - mean_squared_error: 0.1255 - val_loss: 0.1962 - val_mean_absolute_error: 0.1962 - val_mean_squared_error: 0.0675

Epoch 4/500

10240/10471 [=====>.] - ETA: 0s - loss: 0.2609 - mean_absolute_error: 0.2609 - mean_squared_error: 0.1116

Epoch 00004: val_loss did not improve from 0.19620

10471/10471 [=====] - 1s 97us/sample - loss: 0.2596 - mean_absolute_error: 0.2596 - mean_squared_error: 0.1088

```
lute_error: 0.2598 - mean_squared_error: 0.1107 - val_loss: 0.2072 - val_mean_absolute_e
rror: 0.2072 - val_mean_squared_error: 0.0706
Epoch 5/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.2308 - mean_absolute_er
ror: 0.2308 - mean_squared_error: 0.0894
Epoch 00005: val_loss did not improve from 0.19620
10471/10471 [=====] - 1s 96us/sample - loss: 0.2321 - mean_abso
lute_error: 0.2326 - mean_squared_error: 0.0909 - val_loss: 0.3832 - val_mean_absolute_e
rror: 0.3831 - val_mean_squared_error: 0.1936
Epoch 6/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.2066 - mean_absolute_er
ror: 0.2066 - mean_squared_error: 0.0736
Epoch 00006: val_loss improved from 0.19620 to 0.17372, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 98us/sample - loss: 0.2066 - mean_abso
lute_error: 0.2065 - mean_squared_error: 0.0734 - val_loss: 0.1737 - val_mean_absolute_e
rror: 0.1737 - val_mean_squared_error: 0.0571
Epoch 7/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2109 - mean_absolute_er
ror: 0.2109 - mean_squared_error: 0.0755
Epoch 00007: val_loss did not improve from 0.17372
10471/10471 [=====] - 1s 94us/sample - loss: 0.2109 - mean_abso
lute_error: 0.2108 - mean_squared_error: 0.0754 - val_loss: 0.1791 - val_mean_absolute_e
rror: 0.1791 - val_mean_squared_error: 0.0568
Epoch 8/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.2029 - mean_absolute_er
ror: 0.2029 - mean_squared_error: 0.0713
Epoch 00008: val_loss did not improve from 0.17372
10471/10471 [=====] - 1s 95us/sample - loss: 0.2020 - mean_abso
lute_error: 0.2020 - mean_squared_error: 0.0709 - val_loss: 0.2112 - val_mean_absolute_e
rror: 0.2113 - val_mean_squared_error: 0.0721
Epoch 9/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1896 - mean_absolute_er
ror: 0.1896 - mean_squared_error: 0.0639
Epoch 00009: val_loss did not improve from 0.17372
10471/10471 [=====] - 1s 97us/sample - loss: 0.1893 - mean_abso
lute_error: 0.1892 - mean_squared_error: 0.0635 - val_loss: 0.2710 - val_mean_absolute_e
rror: 0.2708 - val_mean_squared_error: 0.1112
Epoch 10/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1940 - mean_absolute_er
ror: 0.1940 - mean_squared_error: 0.0666
Epoch 00010: val_loss improved from 0.17372 to 0.16876, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 99us/sample - loss: 0.1939 - mean_abso
lute_error: 0.1939 - mean_squared_error: 0.0664 - val_loss: 0.1688 - val_mean_absolute_e
rror: 0.1687 - val_mean_squared_error: 0.0554
Epoch 11/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1756 - mean_absolute_er
ror: 0.1756 - mean_squared_error: 0.0563
Epoch 00011: val_loss did not improve from 0.16876
10471/10471 [=====] - 1s 96us/sample - loss: 0.1752 - mean_abso
lute_error: 0.1751 - mean_squared_error: 0.0560 - val_loss: 0.2681 - val_mean_absolute_e
rror: 0.2682 - val_mean_squared_error: 0.0993
Epoch 12/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1824 - mean_absolute_er
ror: 0.1824 - mean_squared_error: 0.0600
Epoch 00012: val_loss improved from 0.16876 to 0.15405, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 100us/sample - loss: 0.1817 - mean_abso
lute_error: 0.1815 - mean_squared_error: 0.0595 - val_loss: 0.1541 - val_mean_absolute_
error: 0.1540 - val_mean_squared_error: 0.0466
```

Epoch 13/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1709 - mean_absolute_error: 0.1709 - mean_squared_error: 0.0536
Epoch 00013: val_loss did not improve from 0.15405
10471/10471 [=====] - 1s 95us/sample - loss: 0.1708 - mean_absolute_error: 0.1706 - mean_squared_error: 0.0534 - val_loss: 0.2715 - val_mean_absolute_error: 0.2716 - val_mean_squared_error: 0.1008
Epoch 14/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1825 - mean_absolute_error: 0.1825 - mean_squared_error: 0.0598
Epoch 00014: val_loss did not improve from 0.15405
10471/10471 [=====] - 1s 95us/sample - loss: 0.1821 - mean_absolute_error: 0.1819 - mean_squared_error: 0.0594 - val_loss: 0.1627 - val_mean_absolute_error: 0.1627 - val_mean_squared_error: 0.0503
Epoch 15/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1572 - mean_absolute_error: 0.1572 - mean_squared_error: 0.0483
Epoch 00015: val_loss did not improve from 0.15405
10471/10471 [=====] - 1s 94us/sample - loss: 0.1574 - mean_absolute_error: 0.1576 - mean_squared_error: 0.0485 - val_loss: 0.2312 - val_mean_absolute_error: 0.2313 - val_mean_squared_error: 0.0800
Epoch 16/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1675 - mean_absolute_error: 0.1675 - mean_squared_error: 0.0519
Epoch 00016: val_loss did not improve from 0.15405
10471/10471 [=====] - 1s 94us/sample - loss: 0.1675 - mean_absolute_error: 0.1676 - mean_squared_error: 0.0519 - val_loss: 0.1682 - val_mean_absolute_error: 0.1680 - val_mean_squared_error: 0.0547
Epoch 17/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1596 - mean_absolute_error: 0.1596 - mean_squared_error: 0.0483
Epoch 00017: val_loss improved from 0.15405 to 0.15186, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 103us/sample - loss: 0.1595 - mean_absolute_error: 0.1596 - mean_squared_error: 0.0486 - val_loss: 0.1519 - val_mean_absolute_error: 0.1519 - val_mean_squared_error: 0.0452
Epoch 18/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1568 - mean_absolute_error: 0.1568 - mean_squared_error: 0.0471
Epoch 00018: val_loss did not improve from 0.15186
10471/10471 [=====] - 1s 95us/sample - loss: 0.1571 - mean_absolute_error: 0.1571 - mean_squared_error: 0.0473 - val_loss: 0.2110 - val_mean_absolute_error: 0.2110 - val_mean_squared_error: 0.0695
Epoch 19/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1625 - mean_absolute_error: 0.1625 - mean_squared_error: 0.0499
Epoch 00019: val_loss did not improve from 0.15186
10471/10471 [=====] - 1s 97us/sample - loss: 0.1621 - mean_absolute_error: 0.1621 - mean_squared_error: 0.0496 - val_loss: 0.1816 - val_mean_absolute_error: 0.1816 - val_mean_squared_error: 0.0583
Epoch 20/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1529 - mean_absolute_error: 0.1529 - mean_squared_error: 0.0463
Epoch 00020: val_loss improved from 0.15186 to 0.14834, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 101us/sample - loss: 0.1522 - mean_absolute_error: 0.1521 - mean_squared_error: 0.0458 - val_loss: 0.1483 - val_mean_absolute_error: 0.1483 - val_mean_squared_error: 0.0454
Epoch 21/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1462 - mean_absolute_error: 0.1462 - mean_squared_error: 0.0438

Epoch 00021: val_loss improved from 0.14834 to 0.14490, saving model to best_basic_mode_1.hdf5

10471/10471 [=====] - 1s 99us/sample - loss: 0.1462 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0436 - val_loss: 0.1449 - val_mean_absolute_error: 0.1449 - val_mean_squared_error: 0.0436

Epoch 22/500

10208/10471 [=====.>.] - ETA: 0s - loss: 0.1535 - mean_absolute_error: 0.1535 - mean_squared_error: 0.0466

Epoch 00022: val_loss did not improve from 0.14490

10471/10471 [=====] - 1s 95us/sample - loss: 0.1535 - mean_absolute_error: 0.1536 - mean_squared_error: 0.0469 - val_loss: 0.1544 - val_mean_absolute_error: 0.1544 - val_mean_squared_error: 0.0454

Epoch 23/500

10144/10471 [=====.>.] - ETA: 0s - loss: 0.1575 - mean_absolute_error: 0.1575 - mean_squared_error: 0.0478

Epoch 00023: val_loss did not improve from 0.14490

10471/10471 [=====] - 1s 96us/sample - loss: 0.1578 - mean_absolute_error: 0.1578 - mean_squared_error: 0.0478 - val_loss: 0.1531 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0470

Epoch 24/500

10144/10471 [=====.>.] - ETA: 0s - loss: 0.1468 - mean_absolute_error: 0.1468 - mean_squared_error: 0.0432

Epoch 00024: val_loss did not improve from 0.14490

10471/10471 [=====] - 1s 95us/sample - loss: 0.1468 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0431 - val_loss: 0.2514 - val_mean_absolute_error: 0.2513 - val_mean_squared_error: 0.0962

Epoch 25/500

10336/10471 [=====.>.] - ETA: 0s - loss: 0.1398 - mean_absolute_error: 0.1398 - mean_squared_error: 0.0410

Epoch 00025: val_loss did not improve from 0.14490

10471/10471 [=====] - 1s 95us/sample - loss: 0.1399 - mean_absolute_error: 0.1400 - mean_squared_error: 0.0411 - val_loss: 0.2848 - val_mean_absolute_error: 0.2849 - val_mean_squared_error: 0.1086

Epoch 26/500

10336/10471 [=====.>.] - ETA: 0s - loss: 0.1544 - mean_absolute_error: 0.1544 - mean_squared_error: 0.0461

Epoch 00026: val_loss did not improve from 0.14490

10471/10471 [=====] - 1s 95us/sample - loss: 0.1547 - mean_absolute_error: 0.1547 - mean_squared_error: 0.0462 - val_loss: 0.1552 - val_mean_absolute_error: 0.1551 - val_mean_squared_error: 0.0482

Epoch 27/500

10400/10471 [=====.>.] - ETA: 0s - loss: 0.1459 - mean_absolute_error: 0.1459 - mean_squared_error: 0.0426

Epoch 00027: val_loss did not improve from 0.14490

10471/10471 [=====] - 1s 95us/sample - loss: 0.1464 - mean_absolute_error: 0.1465 - mean_squared_error: 0.0430 - val_loss: 0.2657 - val_mean_absolute_error: 0.2659 - val_mean_squared_error: 0.0998

Epoch 28/500

10400/10471 [=====.>.] - ETA: 0s - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0405

Epoch 00028: val_loss did not improve from 0.14490

10471/10471 [=====] - 1s 94us/sample - loss: 0.1410 - mean_absolute_error: 0.1409 - mean_squared_error: 0.0404 - val_loss: 0.1633 - val_mean_absolute_error: 0.1633 - val_mean_squared_error: 0.0504

Epoch 29/500

10272/10471 [=====.>.] - ETA: 0s - loss: 0.1419 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0411

Epoch 00029: val_loss did not improve from 0.14490

10471/10471 [=====] - 1s 101us/sample - loss: 0.1421 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0410 - val_loss: 0.2006 - val_mean_absolute_error: 0.2005 - val_mean_squared_error: 0.0711

Epoch 30/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1464 - mean_absolute_error: 0.1464 - mean_squared_error: 0.0431
Epoch 00030: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 93us/sample - loss: 0.1462 - mean_absolute_error: 0.1460 - mean_squared_error: 0.0429 - val_loss: 0.1480 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0448
Epoch 31/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1369 - mean_absolute_error: 0.1369 - mean_squared_error: 0.0392
Epoch 00031: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 94us/sample - loss: 0.1368 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0394 - val_loss: 0.1732 - val_mean_absolute_error: 0.1731 - val_mean_squared_error: 0.0564
Epoch 32/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1399 - mean_absolute_error: 0.1399 - mean_squared_error: 0.0401
Epoch 00032: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 97us/sample - loss: 0.1398 - mean_absolute_error: 0.1399 - mean_squared_error: 0.0400 - val_loss: 0.1736 - val_mean_absolute_error: 0.1736 - val_mean_squared_error: 0.0529
Epoch 33/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1392 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0399
Epoch 00033: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 98us/sample - loss: 0.1386 - mean_absolute_error: 0.1385 - mean_squared_error: 0.0396 - val_loss: 0.1644 - val_mean_absolute_error: 0.1645 - val_mean_squared_error: 0.0512
Epoch 34/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0393
Epoch 00034: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 100us/sample - loss: 0.1387 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0392 - val_loss: 0.2271 - val_mean_absolute_error: 0.2271 - val_mean_squared_error: 0.0789
Epoch 35/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1383 - mean_absolute_error: 0.1383 - mean_squared_error: 0.0390
Epoch 00035: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 96us/sample - loss: 0.1382 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0391 - val_loss: 0.1450 - val_mean_absolute_error: 0.1449 - val_mean_squared_error: 0.0441
Epoch 36/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1413 - mean_absolute_error: 0.1413 - mean_squared_error: 0.0398
Epoch 00036: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 97us/sample - loss: 0.1416 - mean_absolute_error: 0.1418 - mean_squared_error: 0.0403 - val_loss: 0.2376 - val_mean_absolute_error: 0.2375 - val_mean_squared_error: 0.0871
Epoch 37/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1396 - mean_absolute_error: 0.1396 - mean_squared_error: 0.0396
Epoch 00037: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 98us/sample - loss: 0.1399 - mean_absolute_error: 0.1398 - mean_squared_error: 0.0399 - val_loss: 0.2890 - val_mean_absolute_error: 0.2891 - val_mean_squared_error: 0.1124
Epoch 38/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1450 - mean_absolute_error: 0.1450 - mean_squared_error: 0.0416
Epoch 00038: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 95us/sample - loss: 0.1448 - mean_absolute_error:

```
lute_error: 0.1449 - mean_squared_error: 0.0416 - val_loss: 0.1452 - val_mean_absolute_e
rror: 0.1451 - val_mean_squared_error: 0.0426
Epoch 39/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1365 - mean_absolute_er
ror: 0.1365 - mean_squared_error: 0.0382
Epoch 00039: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 101us/sample - loss: 0.1372 - mean_abs
olute_error: 0.1373 - mean_squared_error: 0.0384 - val_loss: 0.1548 - val_mean_absolute_
error: 0.1547 - val_mean_squared_error: 0.0484
Epoch 40/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1323 - mean_absolute_er
ror: 0.1323 - mean_squared_error: 0.0369
Epoch 00040: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 101us/sample - loss: 0.1319 - mean_abs
olute_error: 0.1319 - mean_squared_error: 0.0367 - val_loss: 0.1500 - val_mean_absolute_
error: 0.1499 - val_mean_squared_error: 0.0455
Epoch 41/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1315 - mean_absolute_er
ror: 0.1315 - mean_squared_error: 0.0369
Epoch 00041: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 96us/sample - loss: 0.1322 - mean_abso
lute_error: 0.1323 - mean_squared_error: 0.0370 - val_loss: 0.1764 - val_mean_absolute_e
rror: 0.1763 - val_mean_squared_error: 0.0582
Epoch 42/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1284 - mean_absolute_er
ror: 0.1284 - mean_squared_error: 0.0354
Epoch 00042: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 99us/sample - loss: 0.1293 - mean_abso
lute_error: 0.1293 - mean_squared_error: 0.0358 - val_loss: 0.1865 - val_mean_absolute_e
rror: 0.1866 - val_mean_squared_error: 0.0590
Epoch 43/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1347 - mean_absolute_er
ror: 0.1347 - mean_squared_error: 0.0376
Epoch 00043: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 100us/sample - loss: 0.1346 - mean_abs
olute_error: 0.1345 - mean_squared_error: 0.0375 - val_loss: 0.1768 - val_mean_absolute_
error: 0.1768 - val_mean_squared_error: 0.0580
Epoch 44/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1363 - mean_absolute_er
ror: 0.1363 - mean_squared_error: 0.0375
Epoch 00044: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 97us/sample - loss: 0.1360 - mean_abso
lute_error: 0.1360 - mean_squared_error: 0.0375 - val_loss: 0.1470 - val_mean_absolute_e
rror: 0.1469 - val_mean_squared_error: 0.0434
Epoch 45/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1303 - mean_absolute_er
ror: 0.1303 - mean_squared_error: 0.0355
Epoch 00045: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 94us/sample - loss: 0.1303 - mean_abso
lute_error: 0.1305 - mean_squared_error: 0.0356 - val_loss: 0.1661 - val_mean_absolute_e
rror: 0.1661 - val_mean_squared_error: 0.0512
Epoch 46/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1355 - mean_absolute_er
ror: 0.1355 - mean_squared_error: 0.0374Restoring model weights from the end of the best
epoch.

Epoch 00046: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 95us/sample - loss: 0.1355 - mean_abso
lute_error: 0.1360 - mean_squared_error: 0.0378 - val_loss: 0.2636 - val_mean_absolute_e
rror: 0.2637 - val_mean_squared_error: 0.0959
Epoch 00046: early stopping
```

```

MAE: 0.14485298
RMSE: 0.20885284
Adding initial Dense layers with 64
Adding Dense layer with 64
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_76"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_77 (InputLayer)	[(None, 61)]	0
dense_541 (Dense)	(None, 64)	3968
dense_542 (Dense)	(None, 64)	4160
dense_543 (Dense)	(None, 64)	4160
dense_544 (Dense)	(None, 64)	4160
dense_545 (Dense)	(None, 64)	4160
dense_546 (Dense)	(None, 64)	4160
dense_547 (Dense)	(None, 64)	4160
dense_548 (Dense)	(None, 64)	4160
dense_549 (Dense)	(None, 1)	65
<hr/>		

```

Total params: 33,153
Trainable params: 33,153
Non-trainable params: 0

```

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10368/10471 [=====>.] - ETA: 0s - loss: 1.4694 - mean_absolute_error: 1.4694 - mean_squared_error: 7.0935

Epoch 00001: val_loss improved from inf to 0.47615, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 118us/sample - loss: 1.4599 - mean_absolute_error: 1.4580 - mean_squared_error: 7.0117 - val_loss: 0.4762 - val_mean_absolute_error: 0.4760 - val_mean_squared_error: 0.3173

Epoch 2/500

10048/10471 [=====>..] - ETA: 0s - loss: 0.4508 - mean_absolute_error: 0.4508 - mean_squared_error: 0.3422

Epoch 00002: val_loss did not improve from 0.47615

10471/10471 [=====] - 1s 70us/sample - loss: 0.4473 - mean_absolute_error: 0.4466 - mean_squared_error: 0.3353 - val_loss: 0.5164 - val_mean_absolute_error: 0.5162 - val_mean_squared_error: 0.3380

Epoch 3/500

10144/10471 [=====>.] - ETA: 0s - loss: 0.2743 - mean_absolute_error: 0.2743 - mean_squared_error: 0.1236

Epoch 00003: val_loss improved from 0.47615 to 0.22824, saving model to best_basic_mode

```
1.hdf5
10471/10471 [=====] - 1s 72us/sample - loss: 0.2724 - mean_absolute_error: 0.2722 - mean_squared_error: 0.1221 - val_loss: 0.2282 - val_mean_absolute_error: 0.2283 - val_mean_squared_error: 0.0823
Epoch 4/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2411 - mean_absolute_error: 0.2411 - mean_squared_error: 0.1000
Epoch 00004: val_loss did not improve from 0.22824
10471/10471 [=====] - 1s 70us/sample - loss: 0.2423 - mean_absolute_error: 0.2421 - mean_squared_error: 0.1007 - val_loss: 0.4793 - val_mean_absolute_error: 0.4792 - val_mean_squared_error: 0.2907
Epoch 5/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.2446 - mean_absolute_error: 0.2446 - mean_squared_error: 0.1029
Epoch 00005: val_loss improved from 0.22824 to 0.16842, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 72us/sample - loss: 0.2434 - mean_absolute_error: 0.2430 - mean_squared_error: 0.1019 - val_loss: 0.1684 - val_mean_absolute_error: 0.1684 - val_mean_squared_error: 0.0561
Epoch 6/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.2143 - mean_absolute_error: 0.2143 - mean_squared_error: 0.0778
Epoch 00006: val_loss improved from 0.16842 to 0.16026, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.2137 - mean_absolute_error: 0.2141 - mean_squared_error: 0.0777 - val_loss: 0.1603 - val_mean_absolute_error: 0.1602 - val_mean_squared_error: 0.0510
Epoch 7/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2141 - mean_absolute_error: 0.2141 - mean_squared_error: 0.0790
Epoch 00007: val_loss did not improve from 0.16026
10471/10471 [=====] - 1s 74us/sample - loss: 0.2142 - mean_absolute_error: 0.2141 - mean_squared_error: 0.0791 - val_loss: 0.1637 - val_mean_absolute_error: 0.1637 - val_mean_squared_error: 0.0538
Epoch 8/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1900 - mean_absolute_error: 0.1900 - mean_squared_error: 0.0643
Epoch 00008: val_loss did not improve from 0.16026
10471/10471 [=====] - 1s 73us/sample - loss: 0.1900 - mean_absolute_error: 0.1902 - mean_squared_error: 0.0644 - val_loss: 0.2844 - val_mean_absolute_error: 0.2843 - val_mean_squared_error: 0.1179
Epoch 9/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1988 - mean_absolute_error: 0.1988 - mean_squared_error: 0.0685
Epoch 00009: val_loss did not improve from 0.16026
10471/10471 [=====] - 1s 73us/sample - loss: 0.1989 - mean_absolute_error: 0.1985 - mean_squared_error: 0.0683 - val_loss: 0.3015 - val_mean_absolute_error: 0.3016 - val_mean_squared_error: 0.1247
Epoch 10/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1877 - mean_absolute_error: 0.1877 - mean_squared_error: 0.0635
Epoch 00010: val_loss improved from 0.16026 to 0.15014, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 75us/sample - loss: 0.1863 - mean_absolute_error: 0.1861 - mean_squared_error: 0.0627 - val_loss: 0.1501 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0456
Epoch 11/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.2052 - mean_absolute_error: 0.2052 - mean_squared_error: 0.0716
Epoch 00011: val_loss did not improve from 0.15014
10471/10471 [=====] - 1s 72us/sample - loss: 0.2066 - mean_absolute_error:
```

lute_error: 0.2066 - mean_squared_error: 0.0721 - val_loss: 0.1686 - val_mean_absolute_error: 0.1685 - val_mean_squared_error: 0.0555

Epoch 12/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1755 - mean_absolute_error: 0.1755 - mean_squared_error: 0.0563

Epoch 00012: val_loss did not improve from 0.15014

10471/10471 [=====] - 1s 72us/sample - loss: 0.1796 - mean_absolute_error: 0.1797 - mean_squared_error: 0.0583 - val_loss: 0.2572 - val_mean_absolute_error: 0.2570 - val_mean_squared_error: 0.1007

Epoch 13/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1779 - mean_absolute_error: 0.1779 - mean_squared_error: 0.0580

Epoch 00013: val_loss did not improve from 0.15014

10471/10471 [=====] - 1s 71us/sample - loss: 0.1766 - mean_absolute_error: 0.1766 - mean_squared_error: 0.0572 - val_loss: 0.1522 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0476

Epoch 14/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1717 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0546

Epoch 00014: val_loss did not improve from 0.15014

10471/10471 [=====] - 1s 72us/sample - loss: 0.1703 - mean_absolute_error: 0.1700 - mean_squared_error: 0.0537 - val_loss: 0.1963 - val_mean_absolute_error: 0.1964 - val_mean_squared_error: 0.0611

Epoch 15/500
9696/10471 [=====>..] - ETA: 0s - loss: 0.1623 - mean_absolute_error: 0.1623 - mean_squared_error: 0.0503

Epoch 00015: val_loss did not improve from 0.15014

10471/10471 [=====] - 1s 73us/sample - loss: 0.1624 - mean_absolute_error: 0.1624 - mean_squared_error: 0.0499 - val_loss: 0.1654 - val_mean_absolute_error: 0.1653 - val_mean_squared_error: 0.0537

Epoch 16/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1570 - mean_absolute_error: 0.1570 - mean_squared_error: 0.0474

Epoch 00016: val_loss improved from 0.15014 to 0.14996, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 74us/sample - loss: 0.1571 - mean_absolute_error: 0.1571 - mean_squared_error: 0.0478 - val_loss: 0.1500 - val_mean_absolute_error: 0.1499 - val_mean_squared_error: 0.0441

Epoch 17/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.1685 - mean_absolute_error: 0.1685 - mean_squared_error: 0.0531

Epoch 00017: val_loss did not improve from 0.14996

10471/10471 [=====] - 1s 74us/sample - loss: 0.1686 - mean_absolute_error: 0.1686 - mean_squared_error: 0.0531 - val_loss: 0.1711 - val_mean_absolute_error: 0.1710 - val_mean_squared_error: 0.0551

Epoch 18/500
9760/10471 [=====>..] - ETA: 0s - loss: 0.1515 - mean_absolute_error: 0.1515 - mean_squared_error: 0.0452

Epoch 00018: val_loss did not improve from 0.14996

10471/10471 [=====] - 1s 73us/sample - loss: 0.1507 - mean_absolute_error: 0.1506 - mean_squared_error: 0.0449 - val_loss: 0.1675 - val_mean_absolute_error: 0.1674 - val_mean_squared_error: 0.0535

Epoch 19/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1453 - mean_absolute_error: 0.1453 - mean_squared_error: 0.0426

Epoch 00019: val_loss did not improve from 0.14996

10471/10471 [=====] - 1s 73us/sample - loss: 0.1450 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0425 - val_loss: 0.1613 - val_mean_absolute_error: 0.1614 - val_mean_squared_error: 0.0496

Epoch 20/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1444 - mean_absolute_error:

```
ror: 0.1444 - mean_squared_error: 0.0420
Epoch 00020: val_loss improved from 0.14996 to 0.14224, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1443 - mean_absolute_error: 0.1443 - mean_squared_error: 0.0420 - val_loss: 0.1422 - val_mean_absolute_error: 0.1422 - val_mean_squared_error: 0.0417
Epoch 21/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1451 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0427
Epoch 00021: val_loss did not improve from 0.14224
10471/10471 [=====] - 1s 73us/sample - loss: 0.1448 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0424 - val_loss: 0.1538 - val_mean_absolute_error: 0.1537 - val_mean_squared_error: 0.0480
Epoch 22/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1524 - mean_absolute_error: 0.1524 - mean_squared_error: 0.0456
Epoch 00022: val_loss did not improve from 0.14224
10471/10471 [=====] - 1s 71us/sample - loss: 0.1518 - mean_absolute_error: 0.1517 - mean_squared_error: 0.0452 - val_loss: 0.1960 - val_mean_absolute_error: 0.1961 - val_mean_squared_error: 0.0623
Epoch 23/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1451 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0427
Epoch 00023: val_loss did not improve from 0.14224
10471/10471 [=====] - 1s 71us/sample - loss: 0.1464 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0435 - val_loss: 0.1912 - val_mean_absolute_error: 0.1912 - val_mean_squared_error: 0.0600
Epoch 24/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1384 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0397
Epoch 00024: val_loss did not improve from 0.14224
10471/10471 [=====] - 1s 73us/sample - loss: 0.1384 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0400 - val_loss: 0.1449 - val_mean_absolute_error: 0.1449 - val_mean_squared_error: 0.0443
Epoch 25/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1402 - mean_absolute_error: 0.1402 - mean_squared_error: 0.0407
Epoch 00025: val_loss improved from 0.14224 to 0.14038, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.1399 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0406 - val_loss: 0.1404 - val_mean_absolute_error: 0.1404 - val_mean_squared_error: 0.0411
Epoch 26/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1431 - mean_absolute_error: 0.1431 - mean_squared_error: 0.0417
Epoch 00026: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 74us/sample - loss: 0.1430 - mean_absolute_error: 0.1430 - mean_squared_error: 0.0415 - val_loss: 0.1516 - val_mean_absolute_error: 0.1516 - val_mean_squared_error: 0.0453
Epoch 27/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1388 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0394
Epoch 00027: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 76us/sample - loss: 0.1390 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0399 - val_loss: 0.1755 - val_mean_absolute_error: 0.1754 - val_mean_squared_error: 0.0562
Epoch 28/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1439 - mean_absolute_error: 0.1439 - mean_squared_error: 0.0411
Epoch 00028: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 75us/sample - loss: 0.1434 - mean_absolute_error: 0.1434 - mean_squared_error: 0.0411
```

lute_error: 0.1432 - mean_squared_error: 0.0408 - val_loss: 0.1448 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0420
Epoch 29/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1388 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0396
Epoch 00029: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 75us/sample - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0396 - val_loss: 0.1418 - val_mean_absolute_error: 0.1417 - val_mean_squared_error: 0.0429
Epoch 30/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1345 - mean_absolute_error: 0.1345 - mean_squared_error: 0.0378
Epoch 00030: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 72us/sample - loss: 0.1345 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0382 - val_loss: 0.1889 - val_mean_absolute_error: 0.1890 - val_mean_squared_error: 0.0596
Epoch 31/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0397
Epoch 00031: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 70us/sample - loss: 0.1378 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0395 - val_loss: 0.1585 - val_mean_absolute_error: 0.1584 - val_mean_squared_error: 0.0500
Epoch 32/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1371 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0384
Epoch 00032: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 71us/sample - loss: 0.1366 - mean_absolute_error: 0.1366 - mean_squared_error: 0.0382 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0439
Epoch 33/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1343 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0373
Epoch 00033: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 70us/sample - loss: 0.1339 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0372 - val_loss: 0.1447 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0432
Epoch 34/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0376
Epoch 00034: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 70us/sample - loss: 0.1352 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0376 - val_loss: 0.1572 - val_mean_absolute_error: 0.1571 - val_mean_squared_error: 0.0490
Epoch 35/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1405 - mean_absolute_error: 0.1405 - mean_squared_error: 0.0394
Epoch 00035: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 69us/sample - loss: 0.1402 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0393 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0444
Epoch 36/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1321 - mean_absolute_error: 0.1321 - mean_squared_error: 0.0371
Epoch 00036: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 73us/sample - loss: 0.1323 - mean_absolute_error: 0.1326 - mean_squared_error: 0.0371 - val_loss: 0.1439 - val_mean_absolute_error: 0.1439 - val_mean_squared_error: 0.0434
Epoch 37/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1275 - mean_absolute_error: 0.1275 - mean_squared_error: 0.0350

```
Epoch 00037: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 74us/sample - loss: 0.1278 - mean_absolute_error: 0.1277 - mean_squared_error: 0.0351 - val_loss: 0.1670 - val_mean_absolute_error: 0.1670 - val_mean_squared_error: 0.0519
Epoch 38/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1356 - mean_absolute_error: 0.1356 - mean_squared_error: 0.0378
Epoch 00038: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 81us/sample - loss: 0.1354 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0376 - val_loss: 0.1421 - val_mean_absolute_error: 0.1421 - val_mean_squared_error: 0.0421
Epoch 39/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1309 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0362
Epoch 00039: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 82us/sample - loss: 0.1304 - mean_absolute_error: 0.1304 - mean_squared_error: 0.0361 - val_loss: 0.1429 - val_mean_absolute_error: 0.1429 - val_mean_squared_error: 0.0429
Epoch 40/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1330 - mean_absolute_error: 0.1330 - mean_squared_error: 0.0366
Epoch 00040: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 75us/sample - loss: 0.1330 - mean_absolute_error: 0.1332 - mean_squared_error: 0.0368 - val_loss: 0.1661 - val_mean_absolute_error: 0.1660 - val_mean_squared_error: 0.0513
Epoch 41/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1304 - mean_absolute_error: 0.1304 - mean_squared_error: 0.0354
Epoch 00041: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 70us/sample - loss: 0.1296 - mean_absolute_error: 0.1297 - mean_squared_error: 0.0351 - val_loss: 0.1481 - val_mean_absolute_error: 0.1480 - val_mean_squared_error: 0.0453
Epoch 42/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1310 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0359
Epoch 00042: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 72us/sample - loss: 0.1306 - mean_absolute_error: 0.1304 - mean_squared_error: 0.0355 - val_loss: 0.1503 - val_mean_absolute_error: 0.1503 - val_mean_squared_error: 0.0441
Epoch 43/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1291 - mean_absolute_error: 0.1291 - mean_squared_error: 0.0352
Epoch 00043: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 70us/sample - loss: 0.1285 - mean_absolute_error: 0.1285 - mean_squared_error: 0.0349 - val_loss: 0.1439 - val_mean_absolute_error: 0.1439 - val_mean_squared_error: 0.0428
Epoch 44/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1248 - mean_absolute_error: 0.1248 - mean_squared_error: 0.0337
Epoch 00044: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 69us/sample - loss: 0.1251 - mean_absolute_error: 0.1252 - mean_squared_error: 0.0338 - val_loss: 0.1435 - val_mean_absolute_error: 0.1434 - val_mean_squared_error: 0.0434
Epoch 45/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1276 - mean_absolute_error: 0.1276 - mean_squared_error: 0.0343
Epoch 00045: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 72us/sample - loss: 0.1274 - mean_absolute_error: 0.1274 - mean_squared_error: 0.0344 - val_loss: 0.1520 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0458
Epoch 46/500
```

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10176/10471 [=====>.] - ETA: 0s - loss: 0.1263 - mean_absolute_error: 0.1263 - mean_squared_error: 0.0339
Epoch 00046: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 70us/sample - loss: 0.1261 - mean_absolute_error: 0.1263 - mean_squared_error: 0.0340 - val_loss: 0.1451 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0433
Epoch 47/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1252 - mean_absolute_error: 0.1252 - mean_squared_error: 0.0327
Epoch 00047: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 70us/sample - loss: 0.1254 - mean_absolute_error: 0.1254 - mean_squared_error: 0.0331 - val_loss: 0.1604 - val_mean_absolute_error: 0.1603 - val_mean_squared_error: 0.0499
Epoch 48/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1235 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0331
Epoch 00048: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 70us/sample - loss: 0.1241 - mean_absolute_error: 0.1240 - mean_squared_error: 0.0332 - val_loss: 0.1463 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0448
Epoch 49/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1238 - mean_absolute_error: 0.1238 - mean_squared_error: 0.0327
Epoch 00049: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 70us/sample - loss: 0.1237 - mean_absolute_error: 0.1240 - mean_squared_error: 0.0329 - val_loss: 0.1929 - val_mean_absolute_error: 0.1927 - val_mean_squared_error: 0.0641
Epoch 50/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1241 - mean_absolute_error: 0.1241 - mean_squared_error: 0.0327Restoring model weights from the end of the best epoch.

Epoch 00050: val_loss did not improve from 0.14038
10471/10471 [=====] - 1s 70us/sample - loss: 0.1255 - mean_absolute_error: 0.1256 - mean_squared_error: 0.0333 - val_loss: 0.2518 - val_mean_absolute_error: 0.2519 - val_mean_squared_error: 0.0908
Epoch 00050: early stopping
MAE: 0.14035107
RMSE: 0.20262375
Adding initial Dense layers with 32
Adding Dense layer with 32
Adding last layer with 32
Outputting predictive model - Tabular
Model: "model_77"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_78 (InputLayer)	[(None, 61)]	0
dense_550 (Dense)	(None, 32)	1984
dense_551 (Dense)	(None, 32)	1056
dense_552 (Dense)	(None, 32)	1056
dense_553 (Dense)	(None, 32)	1056

dense_554 (Dense)	(None, 32)	1056
dense_555 (Dense)	(None, 32)	1056
dense_556 (Dense)	(None, 32)	1056
dense_557 (Dense)	(None, 32)	1056
dense_558 (Dense)	(None, 1)	33
<hr/>		
Total params: 9,409		
Trainable params: 9,409		
Non-trainable params: 0		
<hr/>		
None		
[INFO] training model...		
Train on 10471 samples, validate on 1309 samples		
Epoch 1/500		
10080/10471 [=====>..] - ETA: 0s - loss: 1.8613 - mean_absolute_error: 1.8613 - mean_squared_error: 13.7125		
Epoch 00001: val_loss improved from inf to 0.30199, saving model to best_basic_model.hdf5		
10471/10471 [=====] - 1s 120us/sample - loss: 1.8048 - mean_absolute_error: 1.8014 - mean_squared_error: 13.1763 - val_loss: 0.3020 - val_mean_absolute_error: 0.3021 - val_mean_squared_error: 0.1455		
Epoch 2/500		
9952/10471 [=====>..] - ETA: 0s - loss: 0.3553 - mean_absolute_error: 0.3553 - mean_squared_error: 0.2243		
Epoch 00002: val_loss improved from 0.30199 to 0.28271, saving model to best_basic_mode1.hdf5		
10471/10471 [=====] - 1s 74us/sample - loss: 0.3480 - mean_absolute_error: 0.3476 - mean_squared_error: 0.2163 - val_loss: 0.2827 - val_mean_absolute_error: 0.2825 - val_mean_squared_error: 0.1232		
Epoch 3/500		
9888/10471 [=====>..] - ETA: 0s - loss: 0.2886 - mean_absolute_error: 0.2886 - mean_squared_error: 0.1403		
Epoch 00003: val_loss did not improve from 0.28271		
10471/10471 [=====] - 1s 72us/sample - loss: 0.2852 - mean_absolute_error: 0.2852 - mean_squared_error: 0.1369 - val_loss: 0.4855 - val_mean_absolute_error: 0.4857 - val_mean_squared_error: 0.2876		
Epoch 4/500		
10272/10471 [=====>..] - ETA: 0s - loss: 0.2408 - mean_absolute_error: 0.2408 - mean_squared_error: 0.0958		
Epoch 00004: val_loss improved from 0.28271 to 0.17853, saving model to best_basic_mode1.hdf5		
10471/10471 [=====] - 1s 78us/sample - loss: 0.2413 - mean_absolute_error: 0.2416 - mean_squared_error: 0.0963 - val_loss: 0.1785 - val_mean_absolute_error: 0.1785 - val_mean_squared_error: 0.0608		
Epoch 5/500		
10400/10471 [=====>..] - ETA: 0s - loss: 0.2349 - mean_absolute_error: 0.2349 - mean_squared_error: 0.0923		
Epoch 00005: val_loss did not improve from 0.17853		
10471/10471 [=====] - 1s 73us/sample - loss: 0.2349 - mean_absolute_error: 0.2348 - mean_squared_error: 0.0922 - val_loss: 0.2017 - val_mean_absolute_error: 0.2015 - val_mean_squared_error: 0.0749		
Epoch 6/500		
9856/10471 [=====>..] - ETA: 0s - loss: 0.2186 - mean_absolute_error: 0.2186 - mean_squared_error: 0.0812		
Epoch 00006: val_loss did not improve from 0.17853		
10471/10471 [=====] - 1s 72us/sample - loss: 0.2162 - mean_absolute_error: 0.2162 - mean_squared_error: 0.0795		

lute_error: 0.2159 - mean_squared_error: 0.0796 - val_loss: 0.2020 - val_mean_absolute_error: 0.2020 - val_mean_squared_error: 0.0686

Epoch 7/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1966 - mean_absolute_error: 0.1966 - mean_squared_error: 0.0678

Epoch 00007: val_loss did not improve from 0.17853

10471/10471 [=====] - 1s 73us/sample - loss: 0.1948 - mean_absolute_error: 0.1947 - mean_squared_error: 0.0669 - val_loss: 0.1823 - val_mean_absolute_error: 0.1822 - val_mean_squared_error: 0.0638

Epoch 8/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1869 - mean_absolute_error: 0.1869 - mean_squared_error: 0.0626

Epoch 00008: val_loss did not improve from 0.17853

10471/10471 [=====] - 1s 75us/sample - loss: 0.1869 - mean_absolute_error: 0.1874 - mean_squared_error: 0.0629 - val_loss: 0.2030 - val_mean_absolute_error: 0.2030 - val_mean_squared_error: 0.0687

Epoch 9/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1889 - mean_absolute_error: 0.1889 - mean_squared_error: 0.0641

Epoch 00009: val_loss did not improve from 0.17853

10471/10471 [=====] - 1s 72us/sample - loss: 0.1883 - mean_absolute_error: 0.1883 - mean_squared_error: 0.0636 - val_loss: 0.2150 - val_mean_absolute_error: 0.2151 - val_mean_squared_error: 0.0727

Epoch 10/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1784 - mean_absolute_error: 0.1784 - mean_squared_error: 0.0582

Epoch 00010: val_loss did not improve from 0.17853

10471/10471 [=====] - 1s 73us/sample - loss: 0.1795 - mean_absolute_error: 0.1794 - mean_squared_error: 0.0587 - val_loss: 0.3227 - val_mean_absolute_error: 0.3229 - val_mean_squared_error: 0.1387

Epoch 11/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1897 - mean_absolute_error: 0.1897 - mean_squared_error: 0.0639

Epoch 00011: val_loss did not improve from 0.17853

10471/10471 [=====] - 1s 74us/sample - loss: 0.1897 - mean_absolute_error: 0.1896 - mean_squared_error: 0.0639 - val_loss: 0.1804 - val_mean_absolute_error: 0.1805 - val_mean_squared_error: 0.0586

Epoch 12/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1690 - mean_absolute_error: 0.1690 - mean_squared_error: 0.0540

Epoch 00012: val_loss improved from 0.17853 to 0.17022, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 74us/sample - loss: 0.1684 - mean_absolute_error: 0.1683 - mean_squared_error: 0.0536 - val_loss: 0.1702 - val_mean_absolute_error: 0.1701 - val_mean_squared_error: 0.0568

Epoch 13/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1699 - mean_absolute_error: 0.1699 - mean_squared_error: 0.0538

Epoch 00013: val_loss did not improve from 0.17022

10471/10471 [=====] - 1s 72us/sample - loss: 0.1695 - mean_absolute_error: 0.1696 - mean_squared_error: 0.0535 - val_loss: 0.1936 - val_mean_absolute_error: 0.1937 - val_mean_squared_error: 0.0631

Epoch 14/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1868 - mean_absolute_error: 0.1868 - mean_squared_error: 0.0645

Epoch 00014: val_loss did not improve from 0.17022

10471/10471 [=====] - 1s 71us/sample - loss: 0.1913 - mean_absolute_error: 0.1924 - mean_squared_error: 0.0681 - val_loss: 0.4955 - val_mean_absolute_error: 0.4958 - val_mean_squared_error: 0.2851

Epoch 15/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1789 - mean_absolute_error:

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ror: 0.1789 - mean_squared_error: 0.0596
Epoch 00015: val_loss improved from 0.17022 to 0.15038, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 73us/sample - loss: 0.1782 - mean_absolute_error: 0.1784 - mean_squared_error: 0.0592 - val_loss: 0.1504 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0459
Epoch 16/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1649 - mean_absolute_error: 0.1649 - mean_squared_error: 0.0511
Epoch 00016: val_loss did not improve from 0.15038
10471/10471 [=====] - 1s 72us/sample - loss: 0.1641 - mean_absolute_error: 0.1640 - mean_squared_error: 0.0508 - val_loss: 0.1850 - val_mean_absolute_error: 0.1850 - val_mean_squared_error: 0.0584
Epoch 17/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.1796 - mean_absolute_error: 0.1796 - mean_squared_error: 0.0587
Epoch 00017: val_loss did not improve from 0.15038
10471/10471 [=====] - 1s 74us/sample - loss: 0.1799 - mean_absolute_error: 0.1798 - mean_squared_error: 0.0588 - val_loss: 0.1744 - val_mean_absolute_error: 0.1742 - val_mean_squared_error: 0.0582
Epoch 18/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1644 - mean_absolute_error: 0.1644 - mean_squared_error: 0.0514
Epoch 00018: val_loss did not improve from 0.15038
10471/10471 [=====] - 1s 71us/sample - loss: 0.1654 - mean_absolute_error: 0.1653 - mean_squared_error: 0.0517 - val_loss: 0.1539 - val_mean_absolute_error: 0.1539 - val_mean_squared_error: 0.0477
Epoch 19/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1647 - mean_absolute_error: 0.1647 - mean_squared_error: 0.0514
Epoch 00019: val_loss improved from 0.15038 to 0.14579, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 73us/sample - loss: 0.1638 - mean_absolute_error: 0.1637 - mean_squared_error: 0.0507 - val_loss: 0.1458 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0438
Epoch 20/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1549 - mean_absolute_error: 0.1549 - mean_squared_error: 0.0470
Epoch 00020: val_loss did not improve from 0.14579
10471/10471 [=====] - 1s 72us/sample - loss: 0.1538 - mean_absolute_error: 0.1535 - mean_squared_error: 0.0466 - val_loss: 0.1699 - val_mean_absolute_error: 0.1699 - val_mean_squared_error: 0.0570
Epoch 21/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1553 - mean_absolute_error: 0.1553 - mean_squared_error: 0.0473
Epoch 00021: val_loss did not improve from 0.14579
10471/10471 [=====] - 1s 71us/sample - loss: 0.1549 - mean_absolute_error: 0.1548 - mean_squared_error: 0.0472 - val_loss: 0.1815 - val_mean_absolute_error: 0.1815 - val_mean_squared_error: 0.0565
Epoch 22/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1490 - mean_absolute_error: 0.1490 - mean_squared_error: 0.0449
Epoch 00022: val_loss did not improve from 0.14579
10471/10471 [=====] - 1s 71us/sample - loss: 0.1490 - mean_absolute_error: 0.1490 - mean_squared_error: 0.0451 - val_loss: 0.1625 - val_mean_absolute_error: 0.1625 - val_mean_squared_error: 0.0526
Epoch 23/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1519 - mean_absolute_error: 0.1519 - mean_squared_error: 0.0460
Epoch 00023: val_loss improved from 0.14579 to 0.14220, saving model to best_basic_mode
1.hdf5
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10471/10471 [=====] - 1s 75us/sample - loss: 0.1529 - mean_absolute_error: 0.1527 - mean_squared_error: 0.0464 - val_loss: 0.1422 - val_mean_absolute_error: 0.1422 - val_mean_squared_error: 0.0425
Epoch 24/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1467 - mean_absolute_error: 0.1467 - mean_squared_error: 0.0434
Epoch 00024: val_loss did not improve from 0.14220
10471/10471 [=====] - 1s 74us/sample - loss: 0.1469 - mean_absolute_error: 0.1468 - mean_squared_error: 0.0439 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0448
Epoch 25/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1604 - mean_absolute_error: 0.1604 - mean_squared_error: 0.0490
Epoch 00025: val_loss did not improve from 0.14220
10471/10471 [=====] - 1s 72us/sample - loss: 0.1590 - mean_absolute_error: 0.1593 - mean_squared_error: 0.0486 - val_loss: 0.1468 - val_mean_absolute_error: 0.1468 - val_mean_squared_error: 0.0440
Epoch 26/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1508 - mean_absolute_error: 0.1508 - mean_squared_error: 0.0453
Epoch 00026: val_loss did not improve from 0.14220
10471/10471 [=====] - 1s 76us/sample - loss: 0.1506 - mean_absolute_error: 0.1508 - mean_squared_error: 0.0452 - val_loss: 0.1648 - val_mean_absolute_error: 0.1647 - val_mean_squared_error: 0.0535
Epoch 27/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1446 - mean_absolute_error: 0.1446 - mean_squared_error: 0.0435
Epoch 00027: val_loss improved from 0.14220 to 0.14136, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.1443 - mean_absolute_error: 0.1442 - mean_squared_error: 0.0432 - val_loss: 0.1414 - val_mean_absolute_error: 0.1413 - val_mean_squared_error: 0.0423
Epoch 28/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1440 - mean_absolute_error: 0.1440 - mean_squared_error: 0.0430
Epoch 00028: val_loss did not improve from 0.14136
10471/10471 [=====] - 1s 71us/sample - loss: 0.1442 - mean_absolute_error: 0.1441 - mean_squared_error: 0.0430 - val_loss: 0.1572 - val_mean_absolute_error: 0.1572 - val_mean_squared_error: 0.0473
Epoch 29/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1436 - mean_absolute_error: 0.1436 - mean_squared_error: 0.0436
Epoch 00029: val_loss did not improve from 0.14136
10471/10471 [=====] - 1s 71us/sample - loss: 0.1427 - mean_absolute_error: 0.1425 - mean_squared_error: 0.0428 - val_loss: 0.1414 - val_mean_absolute_error: 0.1414 - val_mean_squared_error: 0.0431
Epoch 30/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1512 - mean_absolute_error: 0.1512 - mean_squared_error: 0.0454
Epoch 00030: val_loss did not improve from 0.14136
10471/10471 [=====] - 1s 71us/sample - loss: 0.1504 - mean_absolute_error: 0.1504 - mean_squared_error: 0.0452 - val_loss: 0.1441 - val_mean_absolute_error: 0.1441 - val_mean_squared_error: 0.0451
Epoch 31/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1454 - mean_absolute_error: 0.1454 - mean_squared_error: 0.0435
Epoch 00031: val_loss did not improve from 0.14136
10471/10471 [=====] - 1s 72us/sample - loss: 0.1449 - mean_absolute_error: 0.1449 - mean_squared_error: 0.0431 - val_loss: 0.1580 - val_mean_absolute_error: 0.1579 - val_mean_squared_error: 0.0512
Epoch 32/500
```

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10048/10471 [=====>..] - ETA: 0s - loss: 0.1416 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0422
Epoch 00032: val_loss improved from 0.14136 to 0.14002, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1412 - mean_absolute_error: 0.1411 - mean_squared_error: 0.0417 - val_loss: 0.1400 - val_mean_absolute_error: 0.1400 - val_mean_squared_error: 0.0414
Epoch 33/500
    9760/10471 [=====>..] - ETA: 0s - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0412
Epoch 00033: val_loss did not improve from 0.14002
10471/10471 [=====] - 1s 73us/sample - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0407 - val_loss: 0.1404 - val_mean_absolute_error: 0.1404 - val_mean_squared_error: 0.0436
Epoch 34/500
    10432/10471 [=====>..] - ETA: 0s - loss: 0.1408 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0419
Epoch 00034: val_loss did not improve from 0.14002
10471/10471 [=====] - 1s 74us/sample - loss: 0.1407 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0418 - val_loss: 0.1716 - val_mean_absolute_error: 0.1716 - val_mean_squared_error: 0.0564
Epoch 35/500
    10368/10471 [=====>..] - ETA: 0s - loss: 0.1463 - mean_absolute_error: 0.1463 - mean_squared_error: 0.0433
Epoch 00035: val_loss did not improve from 0.14002
10471/10471 [=====] - 1s 74us/sample - loss: 0.1461 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0432 - val_loss: 0.1407 - val_mean_absolute_error: 0.1407 - val_mean_squared_error: 0.0416
Epoch 36/500
    9888/10471 [=====>..] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0396
Epoch 00036: val_loss did not improve from 0.14002
10471/10471 [=====] - 1s 72us/sample - loss: 0.1360 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0402 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0441
Epoch 37/500
    9856/10471 [=====>..] - ETA: 0s - loss: 0.1397 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0415
Epoch 00037: val_loss did not improve from 0.14002
10471/10471 [=====] - 1s 73us/sample - loss: 0.1396 - mean_absolute_error: 0.1398 - mean_squared_error: 0.0414 - val_loss: 0.1459 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0438
Epoch 38/500
    9920/10471 [=====>..] - ETA: 0s - loss: 0.1386 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0411
Epoch 00038: val_loss did not improve from 0.14002
10471/10471 [=====] - 1s 72us/sample - loss: 0.1383 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0408 - val_loss: 0.1628 - val_mean_absolute_error: 0.1628 - val_mean_squared_error: 0.0488
Epoch 39/500
    9984/10471 [=====>..] - ETA: 0s - loss: 0.1411 - mean_absolute_error: 0.1411 - mean_squared_error: 0.0417
Epoch 00039: val_loss did not improve from 0.14002
10471/10471 [=====] - 1s 71us/sample - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0418 - val_loss: 0.1409 - val_mean_absolute_error: 0.1408 - val_mean_squared_error: 0.0432
Epoch 40/500
    10144/10471 [=====>..] - ETA: 0s - loss: 0.1383 - mean_absolute_error: 0.1383 - mean_squared_error: 0.0407
Epoch 00040: val_loss did not improve from 0.14002
10471/10471 [=====] - 1s 75us/sample - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0411
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lute_error: 0.1379 - mean_squared_error: 0.0406 - val_loss: 0.1414 - val_mean_absolute_error: 0.1414 - val_mean_squared_error: 0.0434

Epoch 41/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1384 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0407

Epoch 00041: val_loss did not improve from 0.14002

10471/10471 [=====] - 1s 74us/sample - loss: 0.1386 - mean_absolute_error: 0.1389 - mean_squared_error: 0.0413 - val_loss: 0.2162 - val_mean_absolute_error: 0.2163 - val_mean_squared_error: 0.0700

Epoch 42/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1424 - mean_absolute_error: 0.1424 - mean_squared_error: 0.0421

Epoch 00042: val_loss did not improve from 0.14002

10471/10471 [=====] - 1s 73us/sample - loss: 0.1424 - mean_absolute_error: 0.1422 - mean_squared_error: 0.0420 - val_loss: 0.1406 - val_mean_absolute_error: 0.1406 - val_mean_squared_error: 0.0427

Epoch 43/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1386 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0401

Epoch 00043: val_loss improved from 0.14002 to 0.13851, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 75us/sample - loss: 0.1389 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0409 - val_loss: 0.1385 - val_mean_absolute_error: 0.1385 - val_mean_squared_error: 0.0427

Epoch 44/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1420 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0419

Epoch 00044: val_loss did not improve from 0.13851

10471/10471 [=====] - 1s 75us/sample - loss: 0.1420 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0421 - val_loss: 0.1418 - val_mean_absolute_error: 0.1419 - val_mean_squared_error: 0.0429

Epoch 45/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1361 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0398

Epoch 00045: val_loss did not improve from 0.13851

10471/10471 [=====] - 1s 72us/sample - loss: 0.1356 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0398 - val_loss: 0.1541 - val_mean_absolute_error: 0.1540 - val_mean_squared_error: 0.0464

Epoch 46/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1452 - mean_absolute_error: 0.1452 - mean_squared_error: 0.0432

Epoch 00046: val_loss did not improve from 0.13851

10471/10471 [=====] - 1s 72us/sample - loss: 0.1460 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0437 - val_loss: 0.1410 - val_mean_absolute_error: 0.1410 - val_mean_squared_error: 0.0429

Epoch 47/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0411

Epoch 00047: val_loss did not improve from 0.13851

10471/10471 [=====] - 1s 74us/sample - loss: 0.1391 - mean_absolute_error: 0.1389 - mean_squared_error: 0.0409 - val_loss: 0.1695 - val_mean_absolute_error: 0.1695 - val_mean_squared_error: 0.0514

Epoch 48/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1358 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0397

Epoch 00048: val_loss did not improve from 0.13851

10471/10471 [=====] - 1s 71us/sample - loss: 0.1360 - mean_absolute_error: 0.1359 - mean_squared_error: 0.0401 - val_loss: 0.1765 - val_mean_absolute_error: 0.1765 - val_mean_squared_error: 0.0564

Epoch 49/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1464 - mean_absolute_error:

```
ror: 0.1464 - mean_squared_error: 0.0430
Epoch 00049: val_loss improved from 0.13851 to 0.13792, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 73us/sample - loss: 0.1462 - mean_absolute_error: 0.1462 - mean_squared_error: 0.0435 - val_loss: 0.1379 - val_mean_absolute_error: 0.1379 - val_mean_squared_error: 0.0415
Epoch 50/500
    9952/10471 [=====>..] - ETA: 0s - loss: 0.1382 - mean_absolute_error: 0.1382 - mean_squared_error: 0.0411
Epoch 00050: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 72us/sample - loss: 0.1377 - mean_absolute_error: 0.1378 - mean_squared_error: 0.0408 - val_loss: 0.1657 - val_mean_absolute_error: 0.1657 - val_mean_squared_error: 0.0511
Epoch 51/500
    9920/10471 [=====>..] - ETA: 0s - loss: 0.1391 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0404
Epoch 00051: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 72us/sample - loss: 0.1396 - mean_absolute_error: 0.1398 - mean_squared_error: 0.0410 - val_loss: 0.1923 - val_mean_absolute_error: 0.1923 - val_mean_squared_error: 0.0625
Epoch 52/500
    9792/10471 [=====>..] - ETA: 0s - loss: 0.1383 - mean_absolute_error: 0.1383 - mean_squared_error: 0.0398
Epoch 00052: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 73us/sample - loss: 0.1384 - mean_absolute_error: 0.1383 - mean_squared_error: 0.0400 - val_loss: 0.1408 - val_mean_absolute_error: 0.1408 - val_mean_squared_error: 0.0431
Epoch 53/500
    10176/10471 [=====>..] - ETA: 0s - loss: 0.1404 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0411
Epoch 00053: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 75us/sample - loss: 0.1410 - mean_absolute_error: 0.1412 - mean_squared_error: 0.0417 - val_loss: 0.2011 - val_mean_absolute_error: 0.2010 - val_mean_squared_error: 0.0690
Epoch 54/500
    10144/10471 [=====>..] - ETA: 0s - loss: 0.1418 - mean_absolute_error: 0.1418 - mean_squared_error: 0.0415
Epoch 00054: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 75us/sample - loss: 0.1422 - mean_absolute_error: 0.1425 - mean_squared_error: 0.0418 - val_loss: 0.1508 - val_mean_absolute_error: 0.1507 - val_mean_squared_error: 0.0468
Epoch 55/500
    9760/10471 [=====>..] - ETA: 0s - loss: 0.1345 - mean_absolute_error: 0.1345 - mean_squared_error: 0.0389
Epoch 00055: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 72us/sample - loss: 0.1350 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0389 - val_loss: 0.1618 - val_mean_absolute_error: 0.1618 - val_mean_squared_error: 0.0478
Epoch 56/500
    10368/10471 [=====>..] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0406
Epoch 00056: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 75us/sample - loss: 0.1394 - mean_absolute_error: 0.1393 - mean_squared_error: 0.0405 - val_loss: 0.1500 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0442
Epoch 57/500
    9824/10471 [=====>..] - ETA: 0s - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0402
Epoch 00057: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 72us/sample - loss: 0.1359 - mean_absolute_error: 0.1359 - mean_squared_error: 0.0396 - val_loss: 0.1560 - val_mean_absolute_error: 0.1560 - val_mean_squared_error: 0.0511
```

```
rror: 0.1560 - val_mean_squared_error: 0.0464
Epoch 58/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0393
Epoch 00058: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 75us/sample - loss: 0.1345 - mean_absolute_error: 0.1345 - mean_squared_error: 0.0392 - val_loss: 0.1586 - val_mean_absolute_error: 0.1586 - val_mean_squared_error: 0.0489
Epoch 59/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1338 - mean_absolute_error: 0.1338 - mean_squared_error: 0.0389
Epoch 00059: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 75us/sample - loss: 0.1338 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0388 - val_loss: 0.1451 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0453
Epoch 60/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1336 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0383
Epoch 00060: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 72us/sample - loss: 0.1337 - mean_absolute_error: 0.1335 - mean_squared_error: 0.0384 - val_loss: 0.1411 - val_mean_absolute_error: 0.1410 - val_mean_squared_error: 0.0443
Epoch 61/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1302 - mean_absolute_error: 0.1302 - mean_squared_error: 0.0375
Epoch 00061: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 73us/sample - loss: 0.1302 - mean_absolute_error: 0.1303 - mean_squared_error: 0.0375 - val_loss: 0.1502 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0471
Epoch 62/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1371 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0397
Epoch 00062: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 75us/sample - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0396 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0437
Epoch 63/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1352 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0394
Epoch 00063: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 74us/sample - loss: 0.1352 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0393 - val_loss: 0.1401 - val_mean_absolute_error: 0.1401 - val_mean_squared_error: 0.0434
Epoch 64/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1336 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0388
Epoch 00064: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 74us/sample - loss: 0.1334 - mean_absolute_error: 0.1335 - mean_squared_error: 0.0388 - val_loss: 0.1777 - val_mean_absolute_error: 0.1777 - val_mean_squared_error: 0.0588
Epoch 65/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1338 - mean_absolute_error: 0.1338 - mean_squared_error: 0.0383
Epoch 00065: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 75us/sample - loss: 0.1337 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0381 - val_loss: 0.1450 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0433
Epoch 66/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1319 - mean_absolute_error: 0.1319 - mean_squared_error: 0.0378
Epoch 00066: val_loss did not improve from 0.13792
```

```
10471/10471 [=====] - 1s 73us/sample - loss: 0.1318 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0377 - val_loss: 0.1769 - val_mean_absolute_error: 0.1769 - val_mean_squared_error: 0.0547
Epoch 67/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1333 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0390
Epoch 00067: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 75us/sample - loss: 0.1343 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0393 - val_loss: 0.2318 - val_mean_absolute_error: 0.2318 - val_mean_squared_error: 0.0849
Epoch 68/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1393 - mean_absolute_error: 0.1393 - mean_squared_error: 0.0408
Epoch 00068: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 74us/sample - loss: 0.1398 - mean_absolute_error: 0.1399 - mean_squared_error: 0.0409 - val_loss: 0.2704 - val_mean_absolute_error: 0.2703 - val_mean_squared_error: 0.1077
Epoch 69/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1377 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0403
Epoch 00069: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 74us/sample - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0402 - val_loss: 0.1395 - val_mean_absolute_error: 0.1395 - val_mean_squared_error: 0.0428
Epoch 70/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1328 - mean_absolute_error: 0.1328 - mean_squared_error: 0.0381
Epoch 00070: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 75us/sample - loss: 0.1339 - mean_absolute_error: 0.1338 - mean_squared_error: 0.0386 - val_loss: 0.1524 - val_mean_absolute_error: 0.1524 - val_mean_squared_error: 0.0458
Epoch 71/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1292 - mean_absolute_error: 0.1292 - mean_squared_error: 0.0365
Epoch 00071: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 72us/sample - loss: 0.1295 - mean_absolute_error: 0.1294 - mean_squared_error: 0.0368 - val_loss: 0.1789 - val_mean_absolute_error: 0.1789 - val_mean_squared_error: 0.0598
Epoch 72/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1281 - mean_absolute_error: 0.1281 - mean_squared_error: 0.0364
Epoch 00072: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 71us/sample - loss: 0.1282 - mean_absolute_error: 0.1283 - mean_squared_error: 0.0367 - val_loss: 0.1449 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0443
Epoch 73/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1321 - mean_absolute_error: 0.1321 - mean_squared_error: 0.0381
Epoch 00073: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 72us/sample - loss: 0.1345 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0391 - val_loss: 0.1428 - val_mean_absolute_error: 0.1428 - val_mean_squared_error: 0.0435
Epoch 74/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0386Restoring model weights from the end of the best epoch.

Epoch 00074: val_loss did not improve from 0.13792
10471/10471 [=====] - 1s 72us/sample - loss: 0.1350 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0387 - val_loss: 0.1394 - val_mean_absolute_error: 0.1394 - val_mean_squared_error: 0.0425
```

```
Epoch 00074: early stopping
```

```
MAE: 0.13787203
```

```
RMSE: 0.20380002
```

```
In [168...]
```

```
# make data frame from our models dictionary
target = pd.DataFrame(neural_networks).reset_index(drop=True)

# sort data frame by mae and reset index
target.sort_values('mae', ascending=True).head(40)
```

```
Out[168...]
```

	model	r2	mae	rmse
3	Neural Net Baseline 4	None	0.137028	0.202084
23	Neural Net Baseline 24	None	0.137872	0.203800
5	Neural Net Baseline 6	None	0.138789	0.203796
2	Neural Net Baseline 3	None	0.139234	0.203894
0	Neural Net Baseline 1	None	0.139421	0.204523
22	Neural Net Baseline 23	None	0.140351	0.202624
7	Neural Net Baseline 8	None	0.140576	0.207187
20	Neural Net Baseline 21	None	0.140644	0.206346
4	Neural Net Baseline 5	None	0.140769	0.204007
11	Neural Net Baseline 12	None	0.141929	0.208810
19	Neural Net Baseline 20	None	0.141950	0.207592
18	Neural Net Baseline 19	None	0.142392	0.210638
6	Neural Net Baseline 7	None	0.142414	0.208745
17	Neural Net Baseline 18	None	0.144238	0.206390
8	Neural Net Baseline 9	None	0.144276	0.209614
21	Neural Net Baseline 22	None	0.144853	0.208853
1	Neural Net Baseline 2	None	0.145212	0.210517
13	Neural Net Baseline 14	None	0.146517	0.209558
10	Neural Net Baseline 11	None	0.147326	0.212999
12	Neural Net Baseline 13	None	0.147813	0.213890
15	Neural Net Baseline 16	None	0.148983	0.212308
9	Neural Net Baseline 10	None	0.149403	0.218330
16	Neural Net Baseline 17	None	0.149706	0.214967
14	Neural Net Baseline 15	None	0.153532	0.217341

```
In [169...]
```

```
# We're going to try the network now using batch normalization and dropout,
# so we pick some of our best scorers from the previous step,
# as well as add some new ones
layers_to_try = [
```

```
[64, 32, 16, 8, 4],
[1024, 512, 256, 128, 64, 32, 16, 8, 4],
[1024, 512, 256, 128, 64, 32, 16],
[512, 256, 128, 64, 32, 16, 8, 4],
[32, 32, 32, 32, 32],
[32, 32, 32, 32, 32, 32, 32],
[32, 32, 32, 32, 32, 32, 32, 32, 32, 32],
[64, 64, 64, 64, 64],
[64, 64, 64, 64, 64, 64, 64],
[64, 64, 64, 64, 64, 64, 64, 64, 64],
[128, 128, 128, 128, 128, 128, 128, 128],
[128, 128, 128, 128, 128],
[128, 128, 128, 128, 128, 128, 128, 128, 128, 128]
]
```

In [170...]

```
# Try the layers list with batch normalization

model_num = 0

for layer in layers_to_try:
    model_num += 1
    layers_list = layer
    label='Neural Net Baseline '+str(model_num) +'Batchnorm'
    neural_networks = mlp_test(X_train_tabular, y_train, X_val_tabular, y_val, label, n
```

Adding initial Dense layers with 64
 Adding Dense layer with 32
 Adding Dense layer with 16
 Adding Dense layer with 8
 Adding last layer with 4
 Outputting predictive model - Tabular
 Model: "model_78"

Layer (type)	Output Shape	Param #
<hr/>		
input_79 (InputLayer)	[(None, 61)]	0
batch_normalization_109 (BatchNormalization)	(None, 61)	244
dense_559 (Dense)	(None, 64)	3968
batch_normalization_110 (BatchNormalization)	(None, 64)	256
dense_560 (Dense)	(None, 32)	2080
batch_normalization_111 (BatchNormalization)	(None, 32)	128
dense_561 (Dense)	(None, 16)	528
batch_normalization_112 (BatchNormalization)	(None, 16)	64
dense_562 (Dense)	(None, 8)	136
batch_normalization_113 (BatchNormalization)	(None, 8)	32
dense_563 (Dense)	(None, 4)	36
dense_564 (Dense)	(None, 1)	5
<hr/>		

```
Total params: 7,477
Trainable params: 7,115
Non-trainable params: 362
```

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10208/10471 [=====>.] - ETA: 0s - loss: 2.9476 - mean_absolute_error: 2.9476 - mean_squared_error: 27.0818
Epoch 00001: val_loss improved from inf to 0.43041, saving model to best_basic_model.hdf5
10471/10471 [=====] - 3s 244us/sample - loss: 2.8859 - mean_absolute_error: 2.8807 - mean_squared_error: 26.3501 - val_loss: 0.4304 - val_mean_absolute_error: 0.4305 - val_mean_squared_error: 0.2885
Epoch 2/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.4051 - mean_absolute_error: 0.4051 - mean_squared_error: 0.2695
Epoch 00002: val_loss improved from 0.43041 to 0.37386, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 119us/sample - loss: 0.4050 - mean_absolute_error: 0.4048 - mean_squared_error: 0.2691 - val_loss: 0.3739 - val_mean_absolute_error: 0.3738 - val_mean_squared_error: 0.2821
Epoch 3/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.3261 - mean_absolute_error: 0.3261 - mean_squared_error: 0.1775
Epoch 00003: val_loss improved from 0.37386 to 0.28222, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 113us/sample - loss: 0.3266 - mean_absolute_error: 0.3268 - mean_squared_error: 0.1779 - val_loss: 0.2822 - val_mean_absolute_error: 0.2821 - val_mean_squared_error: 0.1410
Epoch 4/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2578 - mean_absolute_error: 0.2578 - mean_squared_error: 0.1119
Epoch 00004: val_loss did not improve from 0.28222
10471/10471 [=====] - 1s 110us/sample - loss: 0.2579 - mean_absolute_error: 0.2578 - mean_squared_error: 0.1118 - val_loss: 0.3965 - val_mean_absolute_error: 0.3967 - val_mean_squared_error: 0.2038
Epoch 5/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.2791 - mean_absolute_error: 0.2791 - mean_squared_error: 0.1268
Epoch 00005: val_loss improved from 0.28222 to 0.20633, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.2764 - mean_absolute_error: 0.2766 - mean_squared_error: 0.1249 - val_loss: 0.2063 - val_mean_absolute_error: 0.2063 - val_mean_squared_error: 0.0972
Epoch 6/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2396 - mean_absolute_error: 0.2396 - mean_squared_error: 0.0956
Epoch 00006: val_loss did not improve from 0.20633
10471/10471 [=====] - 1s 109us/sample - loss: 0.2394 - mean_absolute_error: 0.2394 - mean_squared_error: 0.0956 - val_loss: 0.2714 - val_mean_absolute_error: 0.2712 - val_mean_squared_error: 0.1159
Epoch 7/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2449 - mean_absolute_error: 0.2449 - mean_squared_error: 0.0995
Epoch 00007: val_loss improved from 0.20633 to 0.20535, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 112us/sample - loss: 0.2450 - mean_absolute_error: 0.2456 - mean_squared_error: 0.1000 - val_loss: 0.2053 - val_mean_absolute_error: 0.2054 - val_mean_squared_error: 0.0787
```

Epoch 8/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2329 - mean_absolute_error: 0.2329 - mean_squared_error: 0.0912
Epoch 00008: val_loss did not improve from 0.20535
10471/10471 [=====] - 1s 110us/sample - loss: 0.2332 - mean_absolute_error: 0.2335 - mean_squared_error: 0.0916 - val_loss: 0.2862 - val_mean_absolute_error: 0.2862 - val_mean_squared_error: 0.1261
Epoch 9/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.2237 - mean_absolute_error: 0.2237 - mean_squared_error: 0.0869
Epoch 00009: val_loss did not improve from 0.20535
10471/10471 [=====] - 1s 111us/sample - loss: 0.2250 - mean_absolute_error: 0.2257 - mean_squared_error: 0.0882 - val_loss: 0.3953 - val_mean_absolute_error: 0.3951 - val_mean_squared_error: 0.2089
Epoch 10/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.2230 - mean_absolute_error: 0.2230 - mean_squared_error: 0.0845
Epoch 00010: val_loss did not improve from 0.20535
10471/10471 [=====] - 1s 108us/sample - loss: 0.2258 - mean_absolute_error: 0.2259 - mean_squared_error: 0.0865 - val_loss: 0.4832 - val_mean_absolute_error: 0.4830 - val_mean_squared_error: 0.2889
Epoch 11/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2328 - mean_absolute_error: 0.2328 - mean_squared_error: 0.0917
Epoch 00011: val_loss improved from 0.20535 to 0.16554, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 113us/sample - loss: 0.2326 - mean_absolute_error: 0.2329 - mean_squared_error: 0.0916 - val_loss: 0.1655 - val_mean_absolute_error: 0.1656 - val_mean_squared_error: 0.0645
Epoch 12/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1957 - mean_absolute_error: 0.1957 - mean_squared_error: 0.0680
Epoch 00012: val_loss did not improve from 0.16554
10471/10471 [=====] - 1s 108us/sample - loss: 0.1943 - mean_absolute_error: 0.1942 - mean_squared_error: 0.0671 - val_loss: 0.3710 - val_mean_absolute_error: 0.3711 - val_mean_squared_error: 0.1779
Epoch 13/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2133 - mean_absolute_error: 0.2133 - mean_squared_error: 0.0794
Epoch 00013: val_loss did not improve from 0.16554
10471/10471 [=====] - 1s 106us/sample - loss: 0.2125 - mean_absolute_error: 0.2125 - mean_squared_error: 0.0788 - val_loss: 0.1855 - val_mean_absolute_error: 0.1854 - val_mean_squared_error: 0.0655
Epoch 14/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1989 - mean_absolute_error: 0.1989 - mean_squared_error: 0.0694
Epoch 00014: val_loss did not improve from 0.16554
10471/10471 [=====] - 1s 106us/sample - loss: 0.1988 - mean_absolute_error: 0.1989 - mean_squared_error: 0.0693 - val_loss: 0.1709 - val_mean_absolute_error: 0.1710 - val_mean_squared_error: 0.0558
Epoch 15/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2046 - mean_absolute_error: 0.2046 - mean_squared_error: 0.0722
Epoch 00015: val_loss did not improve from 0.16554
10471/10471 [=====] - 1s 105us/sample - loss: 0.2051 - mean_absolute_error: 0.2054 - mean_squared_error: 0.0728 - val_loss: 0.2420 - val_mean_absolute_error: 0.2419 - val_mean_squared_error: 0.0953
Epoch 16/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2102 - mean_absolute_error: 0.2102 - mean_squared_error: 0.0769
Epoch 00016: val_loss did not improve from 0.16554

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10471/10471 [=====] - 1s 114us/sample - loss: 0.2107 - mean_absolute_error: 0.2114 - mean_squared_error: 0.0775 - val_loss: 0.2838 - val_mean_absolute_error: 0.2839 - val_mean_squared_error: 0.1135
Epoch 17/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.2135 - mean_absolute_error: 0.2135 - mean_squared_error: 0.0778
Epoch 00017: val_loss improved from 0.16554 to 0.15440, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 114us/sample - loss: 0.2128 - mean_absolute_error: 0.2135 - mean_squared_error: 0.0782 - val_loss: 0.1544 - val_mean_absolute_error: 0.1544 - val_mean_squared_error: 0.0518
Epoch 18/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1905 - mean_absolute_error: 0.1905 - mean_squared_error: 0.0652
Epoch 00018: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 120us/sample - loss: 0.1904 - mean_absolute_error: 0.1904 - mean_squared_error: 0.0651 - val_loss: 0.1794 - val_mean_absolute_error: 0.1794 - val_mean_squared_error: 0.0652
Epoch 19/500
10016/10471 [=====.>..] - ETA: 0s - loss: 0.2012 - mean_absolute_error: 0.2012 - mean_squared_error: 0.0721
Epoch 00019: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 113us/sample - loss: 0.2005 - mean_absolute_error: 0.2008 - mean_squared_error: 0.0721 - val_loss: 0.1895 - val_mean_absolute_error: 0.1896 - val_mean_squared_error: 0.0635
Epoch 20/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1874 - mean_absolute_error: 0.1874 - mean_squared_error: 0.0636
Epoch 00020: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 114us/sample - loss: 0.1873 - mean_absolute_error: 0.1876 - mean_squared_error: 0.0636 - val_loss: 0.1647 - val_mean_absolute_error: 0.1647 - val_mean_squared_error: 0.0529
Epoch 21/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1932 - mean_absolute_error: 0.1932 - mean_squared_error: 0.0668
Epoch 00021: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 120us/sample - loss: 0.1928 - mean_absolute_error: 0.1926 - mean_squared_error: 0.0664 - val_loss: 0.1912 - val_mean_absolute_error: 0.1913 - val_mean_squared_error: 0.0634
Epoch 22/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1899 - mean_absolute_error: 0.1899 - mean_squared_error: 0.0638
Epoch 00022: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 114us/sample - loss: 0.1896 - mean_absolute_error: 0.1897 - mean_squared_error: 0.0636 - val_loss: 0.2068 - val_mean_absolute_error: 0.2068 - val_mean_squared_error: 0.0676
Epoch 23/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1845 - mean_absolute_error: 0.1845 - mean_squared_error: 0.0622
Epoch 00023: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 109us/sample - loss: 0.1844 - mean_absolute_error: 0.1843 - mean_squared_error: 0.0621 - val_loss: 0.2277 - val_mean_absolute_error: 0.2278 - val_mean_squared_error: 0.0756
Epoch 24/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1740 - mean_absolute_error: 0.1740 - mean_squared_error: 0.0560
Epoch 00024: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 108us/sample - loss: 0.1739 - mean_absolute_error: 0.1740 - mean_squared_error: 0.0559 - val_loss: 0.1695 - val_mean_absolute_error: 0.1695 - val_mean_squared_error: 0.0559
Epoch 25/500
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10240/10471 [=====>.] - ETA: 0s - loss: 0.1823 - mean_absolute_error: 0.1823 - mean_squared_error: 0.0603
Epoch 00025: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 111us/sample - loss: 0.1823 - mean_absolute_error: 0.1825 - mean_squared_error: 0.0603 - val_loss: 0.2690 - val_mean_absolute_error: 0.2689 - val_mean_squared_error: 0.1070
Epoch 26/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1834 - mean_absolute_error: 0.1834 - mean_squared_error: 0.0619
Epoch 00026: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 107us/sample - loss: 0.1846 - mean_absolute_error: 0.1849 - mean_squared_error: 0.0625 - val_loss: 0.1863 - val_mean_absolute_error: 0.1863 - val_mean_squared_error: 0.0632
Epoch 27/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1814 - mean_absolute_error: 0.1814 - mean_squared_error: 0.0596
Epoch 00027: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 107us/sample - loss: 0.1813 - mean_absolute_error: 0.1815 - mean_squared_error: 0.0597 - val_loss: 0.2044 - val_mean_absolute_error: 0.2045 - val_mean_squared_error: 0.0713
Epoch 28/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1852 - mean_absolute_error: 0.1852 - mean_squared_error: 0.0623
Epoch 00028: val_loss did not improve from 0.15440
10471/10471 [=====] - 1s 105us/sample - loss: 0.1853 - mean_absolute_error: 0.1851 - mean_squared_error: 0.0622 - val_loss: 0.2507 - val_mean_absolute_error: 0.2508 - val_mean_squared_error: 0.0882
Epoch 29/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1808 - mean_absolute_error: 0.1808 - mean_squared_error: 0.0601
Epoch 00029: val_loss improved from 0.15440 to 0.15432, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 109us/sample - loss: 0.1806 - mean_absolute_error: 0.1805 - mean_squared_error: 0.0599 - val_loss: 0.1543 - val_mean_absolute_error: 0.1544 - val_mean_squared_error: 0.0462
Epoch 30/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1820 - mean_absolute_error: 0.1820 - mean_squared_error: 0.0599
Epoch 00030: val_loss did not improve from 0.15432
10471/10471 [=====] - 1s 106us/sample - loss: 0.1825 - mean_absolute_error: 0.1826 - mean_squared_error: 0.0603 - val_loss: 0.1954 - val_mean_absolute_error: 0.1955 - val_mean_squared_error: 0.0680
Epoch 31/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1812 - mean_absolute_error: 0.1812 - mean_squared_error: 0.0598
Epoch 00031: val_loss did not improve from 0.15432
10471/10471 [=====] - 1s 110us/sample - loss: 0.1816 - mean_absolute_error: 0.1821 - mean_squared_error: 0.0604 - val_loss: 0.2370 - val_mean_absolute_error: 0.2369 - val_mean_squared_error: 0.0887
Epoch 32/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1739 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0565
Epoch 00032: val_loss did not improve from 0.15432
10471/10471 [=====] - 1s 106us/sample - loss: 0.1737 - mean_absolute_error: 0.1737 - mean_squared_error: 0.0564 - val_loss: 0.2378 - val_mean_absolute_error: 0.2376 - val_mean_squared_error: 0.0901
Epoch 33/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1794 - mean_absolute_error: 0.1794 - mean_squared_error: 0.0602
Epoch 00033: val_loss improved from 0.15432 to 0.15243, saving model to best_basic_mode1.hdf5
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10471/10471 [=====] - 1s 108us/sample - loss: 0.1795 - mean_absolute_error: 0.1797 - mean_squared_error: 0.0602 - val_loss: 0.1524 - val_mean_absolute_error: 0.1524 - val_mean_squared_error: 0.0473
Epoch 34/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1780 - mean_absolute_error: 0.1780 - mean_squared_error: 0.0588
Epoch 00034: val_loss did not improve from 0.15243
10471/10471 [=====] - 1s 106us/sample - loss: 0.1780 - mean_absolute_error: 0.1785 - mean_squared_error: 0.0590 - val_loss: 0.1703 - val_mean_absolute_error: 0.1704 - val_mean_squared_error: 0.0516
Epoch 35/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1752 - mean_absolute_error: 0.1752 - mean_squared_error: 0.0569
Epoch 00035: val_loss did not improve from 0.15243
10471/10471 [=====] - 1s 106us/sample - loss: 0.1750 - mean_absolute_error: 0.1754 - mean_squared_error: 0.0570 - val_loss: 0.1955 - val_mean_absolute_error: 0.1955 - val_mean_squared_error: 0.0672
Epoch 36/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1726 - mean_absolute_error: 0.1726 - mean_squared_error: 0.0559
Epoch 00036: val_loss did not improve from 0.15243
10471/10471 [=====] - 1s 106us/sample - loss: 0.1730 - mean_absolute_error: 0.1731 - mean_squared_error: 0.0563 - val_loss: 0.1615 - val_mean_absolute_error: 0.1614 - val_mean_squared_error: 0.0511
Epoch 37/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1801 - mean_absolute_error: 0.1801 - mean_squared_error: 0.0596
Epoch 00037: val_loss did not improve from 0.15243
10471/10471 [=====] - 1s 107us/sample - loss: 0.1796 - mean_absolute_error: 0.1795 - mean_squared_error: 0.0592 - val_loss: 0.1896 - val_mean_absolute_error: 0.1896 - val_mean_squared_error: 0.0606
Epoch 38/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1809 - mean_absolute_error: 0.1809 - mean_squared_error: 0.0592
Epoch 00038: val_loss did not improve from 0.15243
10471/10471 [=====] - 1s 106us/sample - loss: 0.1806 - mean_absolute_error: 0.1806 - mean_squared_error: 0.0590 - val_loss: 0.2180 - val_mean_absolute_error: 0.2181 - val_mean_squared_error: 0.0706
Epoch 39/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1777 - mean_absolute_error: 0.1777 - mean_squared_error: 0.0581
Epoch 00039: val_loss did not improve from 0.15243
10471/10471 [=====] - 1s 110us/sample - loss: 0.1780 - mean_absolute_error: 0.1781 - mean_squared_error: 0.0583 - val_loss: 0.1747 - val_mean_absolute_error: 0.1747 - val_mean_squared_error: 0.0585
Epoch 40/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1744 - mean_absolute_error: 0.1744 - mean_squared_error: 0.0566
Epoch 00040: val_loss improved from 0.15243 to 0.14962, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.1746 - mean_absolute_error: 0.1746 - mean_squared_error: 0.0567 - val_loss: 0.1496 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0450
Epoch 41/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1739 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0564
Epoch 00041: val_loss improved from 0.14962 to 0.14814, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.1737 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0562 - val_loss: 0.1481 - val_mean_absolute_error: 0.1481 - val_mean_squared_error: 0.0455
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Epoch 42/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1790 - mean_absolute_error: 0.1790 - mean_squared_error: 0.0587
Epoch 00042: val_loss did not improve from 0.14814
10471/10471 [=====] - 1s 106us/sample - loss: 0.1798 - mean_absolute_error: 0.1805 - mean_squared_error: 0.0594 - val_loss: 0.2098 - val_mean_absolute_error: 0.2099 - val_mean_squared_error: 0.0664
Epoch 43/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1737 - mean_absolute_error: 0.1737 - mean_squared_error: 0.0560
Epoch 00043: val_loss did not improve from 0.14814
10471/10471 [=====] - 1s 107us/sample - loss: 0.1740 - mean_absolute_error: 0.1740 - mean_squared_error: 0.0562 - val_loss: 0.1607 - val_mean_absolute_error: 0.1607 - val_mean_squared_error: 0.0508
Epoch 44/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1739 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0567
Epoch 00044: val_loss did not improve from 0.14814
10471/10471 [=====] - 1s 106us/sample - loss: 0.1739 - mean_absolute_error: 0.1742 - mean_squared_error: 0.0570 - val_loss: 0.1596 - val_mean_absolute_error: 0.1597 - val_mean_squared_error: 0.0474
Epoch 45/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1736 - mean_absolute_error: 0.1736 - mean_squared_error: 0.0566
Epoch 00045: val_loss improved from 0.14814 to 0.14667, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.1730 - mean_absolute_error: 0.1730 - mean_squared_error: 0.0561 - val_loss: 0.1467 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0438
Epoch 46/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1686 - mean_absolute_error: 0.1686 - mean_squared_error: 0.0529
Epoch 00046: val_loss did not improve from 0.14667
10471/10471 [=====] - 1s 108us/sample - loss: 0.1679 - mean_absolute_error: 0.1679 - mean_squared_error: 0.0523 - val_loss: 0.1646 - val_mean_absolute_error: 0.1646 - val_mean_squared_error: 0.0525
Epoch 47/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1707 - mean_absolute_error: 0.1707 - mean_squared_error: 0.0549
Epoch 00047: val_loss did not improve from 0.14667
10471/10471 [=====] - 1s 106us/sample - loss: 0.1703 - mean_absolute_error: 0.1703 - mean_squared_error: 0.0548 - val_loss: 0.1939 - val_mean_absolute_error: 0.1939 - val_mean_squared_error: 0.0593
Epoch 48/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1720 - mean_absolute_error: 0.1720 - mean_squared_error: 0.0550
Epoch 00048: val_loss did not improve from 0.14667
10471/10471 [=====] - 1s 108us/sample - loss: 0.1714 - mean_absolute_error: 0.1715 - mean_squared_error: 0.0548 - val_loss: 0.1522 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0461
Epoch 49/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1672 - mean_absolute_error: 0.1672 - mean_squared_error: 0.0535
Epoch 00049: val_loss did not improve from 0.14667
10471/10471 [=====] - 1s 107us/sample - loss: 0.1670 - mean_absolute_error: 0.1676 - mean_squared_error: 0.0537 - val_loss: 0.1475 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0444
Epoch 50/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1632 - mean_absolute_error: 0.1632 - mean_squared_error: 0.0515
Epoch 00050: val_loss did not improve from 0.14667

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10471/10471 [=====] - 1s 106us/sample - loss: 0.1642 - mean_absolute_error: 0.1642 - mean_squared_error: 0.0523 - val_loss: 0.1759 - val_mean_absolute_error: 0.1758 - val_mean_squared_error: 0.0585
Epoch 51/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1644 - mean_absolute_error: 0.1644 - mean_squared_error: 0.0517
Epoch 00051: val_loss improved from 0.14667 to 0.14654, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.1646 - mean_absolute_error: 0.1646 - mean_squared_error: 0.0518 - val_loss: 0.1465 - val_mean_absolute_error: 0.1465 - val_mean_squared_error: 0.0455
Epoch 52/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1870 - mean_absolute_error: 0.1870 - mean_squared_error: 0.0622
Epoch 00052: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 106us/sample - loss: 0.1877 - mean_absolute_error: 0.1878 - mean_squared_error: 0.0625 - val_loss: 0.1474 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0447
Epoch 53/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1640 - mean_absolute_error: 0.1640 - mean_squared_error: 0.0513
Epoch 00053: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 107us/sample - loss: 0.1639 - mean_absolute_error: 0.1643 - mean_squared_error: 0.0517 - val_loss: 0.1492 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0454
Epoch 54/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1629 - mean_absolute_error: 0.1629 - mean_squared_error: 0.0510
Epoch 00054: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 106us/sample - loss: 0.1626 - mean_absolute_error: 0.1625 - mean_squared_error: 0.0506 - val_loss: 0.1471 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0434
Epoch 55/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1726 - mean_absolute_error: 0.1726 - mean_squared_error: 0.0560
Epoch 00055: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 106us/sample - loss: 0.1733 - mean_absolute_error: 0.1734 - mean_squared_error: 0.0562 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0462
Epoch 56/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1727 - mean_absolute_error: 0.1727 - mean_squared_error: 0.0559
Epoch 00056: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 105us/sample - loss: 0.1724 - mean_absolute_error: 0.1727 - mean_squared_error: 0.0559 - val_loss: 0.1470 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0440
Epoch 57/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1675 - mean_absolute_error: 0.1675 - mean_squared_error: 0.0525
Epoch 00057: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 110us/sample - loss: 0.1673 - mean_absolute_error: 0.1677 - mean_squared_error: 0.0529 - val_loss: 0.1727 - val_mean_absolute_error: 0.1728 - val_mean_squared_error: 0.0522
Epoch 58/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1653 - mean_absolute_error: 0.1653 - mean_squared_error: 0.0515
Epoch 00058: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 107us/sample - loss: 0.1665 - mean_absolute_error: 0.1668 - mean_squared_error: 0.0522 - val_loss: 0.2161 - val_mean_absolute_error: 0.2162 - val_mean_squared_error: 0.0697
Epoch 59/500
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10272/10471 [=====>.] - ETA: 0s - loss: 0.1667 - mean_absolute_error: 0.1667 - mean_squared_error: 0.0520
Epoch 00059: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 106us/sample - loss: 0.1663 - mean_absolute_error: 0.1663 - mean_squared_error: 0.0519 - val_loss: 0.1498 - val_mean_absolute_error: 0.1498 - val_mean_squared_error: 0.0463
Epoch 60/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1720 - mean_absolute_error: 0.1720 - mean_squared_error: 0.0552
Epoch 00060: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 106us/sample - loss: 0.1713 - mean_absolute_error: 0.1714 - mean_squared_error: 0.0547 - val_loss: 0.1726 - val_mean_absolute_error: 0.1726 - val_mean_squared_error: 0.0553
Epoch 61/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1660 - mean_absolute_error: 0.1660 - mean_squared_error: 0.0528
Epoch 00061: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 106us/sample - loss: 0.1659 - mean_absolute_error: 0.1659 - mean_squared_error: 0.0527 - val_loss: 0.1584 - val_mean_absolute_error: 0.1585 - val_mean_squared_error: 0.0515
Epoch 62/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1671 - mean_absolute_error: 0.1671 - mean_squared_error: 0.0524
Epoch 00062: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 107us/sample - loss: 0.1670 - mean_absolute_error: 0.1673 - mean_squared_error: 0.0525 - val_loss: 0.1713 - val_mean_absolute_error: 0.1714 - val_mean_squared_error: 0.0513
Epoch 63/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1677 - mean_absolute_error: 0.1677 - mean_squared_error: 0.0535
Epoch 00063: val_loss did not improve from 0.14654
10471/10471 [=====] - 1s 106us/sample - loss: 0.1675 - mean_absolute_error: 0.1675 - mean_squared_error: 0.0533 - val_loss: 0.1524 - val_mean_absolute_error: 0.1524 - val_mean_squared_error: 0.0462
Epoch 64/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1640 - mean_absolute_error: 0.1640 - mean_squared_error: 0.0512
Epoch 00064: val_loss improved from 0.14654 to 0.14245, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.1635 - mean_absolute_error: 0.1635 - mean_squared_error: 0.0508 - val_loss: 0.1424 - val_mean_absolute_error: 0.1425 - val_mean_squared_error: 0.0420
Epoch 65/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1617 - mean_absolute_error: 0.1617 - mean_squared_error: 0.0506
Epoch 00065: val_loss improved from 0.14245 to 0.14214, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.1613 - mean_absolute_error: 0.1615 - mean_squared_error: 0.0505 - val_loss: 0.1421 - val_mean_absolute_error: 0.1421 - val_mean_squared_error: 0.0423
Epoch 66/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1640 - mean_absolute_error: 0.1640 - mean_squared_error: 0.0508
Epoch 00066: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 107us/sample - loss: 0.1639 - mean_absolute_error: 0.1643 - mean_squared_error: 0.0513 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0424
Epoch 67/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1606 - mean_absolute_error: 0.1606 - mean_squared_error: 0.0496
Epoch 00067: val_loss did not improve from 0.14214
```

```
10471/10471 [=====] - 1s 107us/sample - loss: 0.1608 - mean_absolute_error: 0.1613 - mean_squared_error: 0.0501 - val_loss: 0.1541 - val_mean_absolute_error: 0.1540 - val_mean_squared_error: 0.0483
Epoch 68/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1644 - mean_absolute_error: 0.1644 - mean_squared_error: 0.0514
Epoch 00068: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 106us/sample - loss: 0.1646 - mean_absolute_error: 0.1646 - mean_squared_error: 0.0517 - val_loss: 0.1526 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0474
Epoch 69/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1680 - mean_absolute_error: 0.1680 - mean_squared_error: 0.0526
Epoch 00069: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 106us/sample - loss: 0.1683 - mean_absolute_error: 0.1690 - mean_squared_error: 0.0542 - val_loss: 0.1479 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0451
Epoch 70/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1605 - mean_absolute_error: 0.1605 - mean_squared_error: 0.0496
Epoch 00070: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 106us/sample - loss: 0.1605 - mean_absolute_error: 0.1609 - mean_squared_error: 0.0501 - val_loss: 0.1444 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0424
Epoch 71/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1589 - mean_absolute_error: 0.1589 - mean_squared_error: 0.0496
Epoch 00071: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 108us/sample - loss: 0.1593 - mean_absolute_error: 0.1591 - mean_squared_error: 0.0497 - val_loss: 0.1469 - val_mean_absolute_error: 0.1468 - val_mean_squared_error: 0.0434
Epoch 72/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1611 - mean_absolute_error: 0.1611 - mean_squared_error: 0.0497
Epoch 00072: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 110us/sample - loss: 0.1614 - mean_absolute_error: 0.1614 - mean_squared_error: 0.0498 - val_loss: 0.1627 - val_mean_absolute_error: 0.1626 - val_mean_squared_error: 0.0520
Epoch 73/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1674 - mean_absolute_error: 0.1674 - mean_squared_error: 0.0532
Epoch 00073: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 107us/sample - loss: 0.1670 - mean_absolute_error: 0.1675 - mean_squared_error: 0.0534 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0436
Epoch 74/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1692 - mean_absolute_error: 0.1692 - mean_squared_error: 0.0539
Epoch 00074: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 105us/sample - loss: 0.1690 - mean_absolute_error: 0.1690 - mean_squared_error: 0.0536 - val_loss: 0.2528 - val_mean_absolute_error: 0.2528 - val_mean_squared_error: 0.0879
Epoch 75/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1676 - mean_absolute_error: 0.1676 - mean_squared_error: 0.0531
Epoch 00075: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 108us/sample - loss: 0.1683 - mean_absolute_error: 0.1683 - mean_squared_error: 0.0537 - val_loss: 0.1469 - val_mean_absolute_error: 0.1469 - val_mean_squared_error: 0.0428
Epoch 76/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1630 - mean_absolute_error:
```

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ror: 0.1630 - mean_squared_error: 0.0510
Epoch 00076: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 108us/sample - loss: 0.1629 - mean_absolute_error: 0.1629 - mean_squared_error: 0.0510 - val_loss: 0.1525 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0477
Epoch 77/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1560 - mean_absolute_error: 0.1560 - mean_squared_error: 0.0484
Epoch 00077: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 106us/sample - loss: 0.1561 - mean_absolute_error: 0.1563 - mean_squared_error: 0.0485 - val_loss: 0.1553 - val_mean_absolute_error: 0.1553 - val_mean_squared_error: 0.0459
Epoch 78/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1629 - mean_absolute_error: 0.1629 - mean_squared_error: 0.0509
Epoch 00078: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 105us/sample - loss: 0.1626 - mean_absolute_error: 0.1625 - mean_squared_error: 0.0506 - val_loss: 0.1440 - val_mean_absolute_error: 0.1440 - val_mean_squared_error: 0.0438
Epoch 79/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1619 - mean_absolute_error: 0.1619 - mean_squared_error: 0.0504
Epoch 00079: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 107us/sample - loss: 0.1621 - mean_absolute_error: 0.1625 - mean_squared_error: 0.0506 - val_loss: 0.1673 - val_mean_absolute_error: 0.1672 - val_mean_squared_error: 0.0548
Epoch 80/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1635 - mean_absolute_error: 0.1635 - mean_squared_error: 0.0514
Epoch 00080: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 106us/sample - loss: 0.1643 - mean_absolute_error: 0.1652 - mean_squared_error: 0.0523 - val_loss: 0.3029 - val_mean_absolute_error: 0.3031 - val_mean_squared_error: 0.1170
Epoch 81/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1605 - mean_absolute_error: 0.1605 - mean_squared_error: 0.0503
Epoch 00081: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 106us/sample - loss: 0.1617 - mean_absolute_error: 0.1617 - mean_squared_error: 0.0510 - val_loss: 0.1734 - val_mean_absolute_error: 0.1734 - val_mean_squared_error: 0.0583
Epoch 82/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1626 - mean_absolute_error: 0.1626 - mean_squared_error: 0.0507
Epoch 00082: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 107us/sample - loss: 0.1623 - mean_absolute_error: 0.1625 - mean_squared_error: 0.0505 - val_loss: 0.1524 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0446
Epoch 83/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1615 - mean_absolute_error: 0.1615 - mean_squared_error: 0.0502
Epoch 00083: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 106us/sample - loss: 0.1619 - mean_absolute_error: 0.1621 - mean_squared_error: 0.0509 - val_loss: 0.1481 - val_mean_absolute_error: 0.1481 - val_mean_squared_error: 0.0446
Epoch 84/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1545 - mean_absolute_error: 0.1545 - mean_squared_error: 0.0472
Epoch 00084: val_loss did not improve from 0.14214
10471/10471 [=====] - 1s 105us/sample - loss: 0.1544 - mean_absolute_error: 0.1547 - mean_squared_error: 0.0473 - val_loss: 0.1966 - val_mean_absolute_error: 0.1967 - val_mean_squared_error: 0.0611
```

Epoch 85/500
 10080/10471 [=====>..] - ETA: 0s - loss: 0.1562 - mean_absolute_error: 0.1562 - mean_squared_error: 0.0477
 Epoch 00085: val_loss did not improve from 0.14214
 10471/10471 [=====] - 1s 107us/sample - loss: 0.1565 - mean_absolute_error: 0.1568 - mean_squared_error: 0.0482 - val_loss: 0.1545 - val_mean_absolute_error: 0.1545 - val_mean_squared_error: 0.0489
 Epoch 86/500
 10144/10471 [=====>.] - ETA: 0s - loss: 0.1587 - mean_absolute_error: 0.1587 - mean_squared_error: 0.0497
 Epoch 00086: val_loss did not improve from 0.14214
 10471/10471 [=====] - 1s 106us/sample - loss: 0.1585 - mean_absolute_error: 0.1587 - mean_squared_error: 0.0497 - val_loss: 0.1479 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0443
 Epoch 87/500
 10208/10471 [=====>.] - ETA: 0s - loss: 0.1600 - mean_absolute_error: 0.1600 - mean_squared_error: 0.0495
 Epoch 00087: val_loss did not improve from 0.14214
 10471/10471 [=====] - 1s 107us/sample - loss: 0.1597 - mean_absolute_error: 0.1598 - mean_squared_error: 0.0493 - val_loss: 0.1615 - val_mean_absolute_error: 0.1615 - val_mean_squared_error: 0.0513
 Epoch 88/500
 10176/10471 [=====>.] - ETA: 0s - loss: 0.1661 - mean_absolute_error: 0.1661 - mean_squared_error: 0.0526
 Epoch 00088: val_loss did not improve from 0.14214
 10471/10471 [=====] - 1s 107us/sample - loss: 0.1659 - mean_absolute_error: 0.1660 - mean_squared_error: 0.0524 - val_loss: 0.1460 - val_mean_absolute_error: 0.1461 - val_mean_squared_error: 0.0426
 Epoch 89/500
 10048/10471 [=====>..] - ETA: 0s - loss: 0.1562 - mean_absolute_error: 0.1562 - mean_squared_error: 0.0475
 Epoch 00089: val_loss did not improve from 0.14214
 10471/10471 [=====] - 1s 107us/sample - loss: 0.1561 - mean_absolute_error: 0.1563 - mean_squared_error: 0.0475 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0451
 Epoch 90/500
 10272/10471 [=====>.] - ETA: 0s - loss: 0.1612 - mean_absolute_error: 0.1612 - mean_squared_error: 0.0489 Restoring model weights from the end of the best epoch.

 Epoch 00090: val_loss did not improve from 0.14214
 10471/10471 [=====] - 1s 105us/sample - loss: 0.1610 - mean_absolute_error: 0.1608 - mean_squared_error: 0.0488 - val_loss: 0.1474 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0436
 Epoch 00090: early stopping
 MAE: 0.14213361
 RMSE: 0.20558544
 Adding initial Dense layers with 1024
 Adding Dense layer with 512
 Adding Dense layer with 256
 Adding Dense layer with 128
 Adding Dense layer with 64
 Adding Dense layer with 32
 Adding Dense layer with 16
 Adding Dense layer with 8
 Adding last layer with 4
 Outputting predictive model - Tabular
 Model: "model_79"

Layer (type)	Output Shape	Param #
<hr/>		

input_80 (InputLayer)	[(None, 61)]	0
batch_normalization_114 (BatchNorm)	(None, 61)	244
dense_565 (Dense)	(None, 1024)	63488
batch_normalization_115 (BatchNorm)	(None, 1024)	4096
dense_566 (Dense)	(None, 512)	524800
batch_normalization_116 (BatchNorm)	(None, 512)	2048
dense_567 (Dense)	(None, 256)	131328
batch_normalization_117 (BatchNorm)	(None, 256)	1024
dense_568 (Dense)	(None, 128)	32896
batch_normalization_118 (BatchNorm)	(None, 128)	512
dense_569 (Dense)	(None, 64)	8256
batch_normalization_119 (BatchNorm)	(None, 64)	256
dense_570 (Dense)	(None, 32)	2080
batch_normalization_120 (BatchNorm)	(None, 32)	128
dense_571 (Dense)	(None, 16)	528
batch_normalization_121 (BatchNorm)	(None, 16)	64
dense_572 (Dense)	(None, 8)	136
batch_normalization_122 (BatchNorm)	(None, 8)	32
dense_573 (Dense)	(None, 4)	36
dense_574 (Dense)	(None, 1)	5
<hr/>		
Total params: 771,957		
Trainable params: 767,755		
Non-trainable params: 4,202		

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10432/10471 [=====>.] - ETA: 0s - loss: 2.3408 - mean_absolute_error: 2.3408 - mean_squared_error: 23.1522

Epoch 00001: val_loss improved from inf to 0.66221, saving model to best_basic_model.hdf5

10471/10471 [=====] - 3s 321us/sample - loss: 2.3332 - mean_absolute_error: 2.3282 - mean_squared_error: 23.0116 - val_loss: 0.6622 - val_mean_absolute_error: 0.6620 - val_mean_squared_error: 0.5378

Epoch 2/500

10368/10471 [=====>.] - ETA: 0s - loss: 0.2610 - mean_absolute_error: 0.2610 - mean_squared_error: 0.1148

Epoch 00002: val_loss improved from 0.66221 to 0.20083, saving model to best_basic_model.hdf5

10471/10471 [=====] - 2s 174us/sample - loss: 0.2602 - mean_absolute_error: 0.2602 - mean_squared_error: 0.1148

```
olute_error: 0.2600 - mean_squared_error: 0.1141 - val_loss: 0.2008 - val_mean_absolute_
error: 0.2010 - val_mean_squared_error: 0.0736
Epoch 3/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2446 - mean_absolute_er
ror: 0.2446 - mean_squared_error: 0.1016
Epoch 00003: val_loss did not improve from 0.20083
10471/10471 [=====] - 2s 167us/sample - loss: 0.2443 - mean_abs
olute_error: 0.2444 - mean_squared_error: 0.1015 - val_loss: 0.2252 - val_mean_absolute_
error: 0.2253 - val_mean_squared_error: 0.0848
Epoch 4/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2372 - mean_absolute_er
ror: 0.2372 - mean_squared_error: 0.0956
Epoch 00004: val_loss improved from 0.20083 to 0.18518, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 172us/sample - loss: 0.2372 - mean_abs
olute_error: 0.2371 - mean_squared_error: 0.0955 - val_loss: 0.1852 - val_mean_absolute_
error: 0.1852 - val_mean_squared_error: 0.0626
Epoch 5/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2512 - mean_absolute_er
ror: 0.2512 - mean_squared_error: 0.1044
Epoch 00005: val_loss did not improve from 0.18518
10471/10471 [=====] - 2s 165us/sample - loss: 0.2512 - mean_abs
olute_error: 0.2511 - mean_squared_error: 0.1043 - val_loss: 0.4209 - val_mean_absolute_
error: 0.4210 - val_mean_squared_error: 0.2140
Epoch 6/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2354 - mean_absolute_er
ror: 0.2354 - mean_squared_error: 0.0963
Epoch 00006: val_loss did not improve from 0.18518
10471/10471 [=====] - 2s 164us/sample - loss: 0.2367 - mean_abs
olute_error: 0.2372 - mean_squared_error: 0.0975 - val_loss: 0.3424 - val_mean_absolute_
error: 0.3423 - val_mean_squared_error: 0.1747
Epoch 7/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2207 - mean_absolute_er
ror: 0.2207 - mean_squared_error: 0.0833
Epoch 00007: val_loss did not improve from 0.18518
10471/10471 [=====] - 2s 165us/sample - loss: 0.2209 - mean_abs
olute_error: 0.2215 - mean_squared_error: 0.0839 - val_loss: 0.2027 - val_mean_absolute_
error: 0.2028 - val_mean_squared_error: 0.0662
Epoch 8/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.2446 - mean_absolute_er
ror: 0.2446 - mean_squared_error: 0.0982
Epoch 00008: val_loss improved from 0.18518 to 0.16527, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 170us/sample - loss: 0.2446 - mean_abs
olute_error: 0.2447 - mean_squared_error: 0.0982 - val_loss: 0.1653 - val_mean_absolute_
error: 0.1653 - val_mean_squared_error: 0.0523
Epoch 9/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2100 - mean_absolute_er
ror: 0.2100 - mean_squared_error: 0.0779
Epoch 00009: val_loss did not improve from 0.16527
10471/10471 [=====] - 2s 167us/sample - loss: 0.2098 - mean_abs
olute_error: 0.2099 - mean_squared_error: 0.0778 - val_loss: 0.1921 - val_mean_absolute_
error: 0.1922 - val_mean_squared_error: 0.0664
Epoch 10/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2193 - mean_absolute_er
ror: 0.2193 - mean_squared_error: 0.0819
Epoch 00010: val_loss did not improve from 0.16527
10471/10471 [=====] - 2s 165us/sample - loss: 0.2191 - mean_abs
olute_error: 0.2191 - mean_squared_error: 0.0818 - val_loss: 0.1678 - val_mean_absolute_
error: 0.1678 - val_mean_squared_error: 0.0536
Epoch 11/500
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10368/10471 [=====>.] - ETA: 0s - loss: 0.2110 - mean_absolute_error: 0.2110 - mean_squared_error: 0.0761
Epoch 00011: val_loss did not improve from 0.16527
10471/10471 [=====] - 2s 163us/sample - loss: 0.2108 - mean_absolute_error: 0.2111 - mean_squared_error: 0.0761 - val_loss: 0.2606 - val_mean_absolute_error: 0.2605 - val_mean_squared_error: 0.1042
Epoch 12/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2372 - mean_absolute_error: 0.2372 - mean_squared_error: 0.0935
Epoch 00012: val_loss improved from 0.16527 to 0.15478, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 171us/sample - loss: 0.2366 - mean_absolute_error: 0.2368 - mean_squared_error: 0.0933 - val_loss: 0.1548 - val_mean_absolute_error: 0.1548 - val_mean_squared_error: 0.0490
Epoch 13/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1956 - mean_absolute_error: 0.1956 - mean_squared_error: 0.0685
Epoch 00013: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 167us/sample - loss: 0.1955 - mean_absolute_error: 0.1956 - mean_squared_error: 0.0685 - val_loss: 0.1571 - val_mean_absolute_error: 0.1571 - val_mean_squared_error: 0.0519
Epoch 14/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2218 - mean_absolute_error: 0.2218 - mean_squared_error: 0.0834
Epoch 00014: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 164us/sample - loss: 0.2218 - mean_absolute_error: 0.2219 - mean_squared_error: 0.0832 - val_loss: 0.2712 - val_mean_absolute_error: 0.2712 - val_mean_squared_error: 0.1035
Epoch 15/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2060 - mean_absolute_error: 0.2060 - mean_squared_error: 0.0732
Epoch 00015: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 165us/sample - loss: 0.2060 - mean_absolute_error: 0.2061 - mean_squared_error: 0.0732 - val_loss: 0.5028 - val_mean_absolute_error: 0.5030 - val_mean_squared_error: 0.2909
Epoch 16/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2245 - mean_absolute_error: 0.2245 - mean_squared_error: 0.0860
Epoch 00016: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 165us/sample - loss: 0.2244 - mean_absolute_error: 0.2241 - mean_squared_error: 0.0858 - val_loss: 0.2115 - val_mean_absolute_error: 0.2115 - val_mean_squared_error: 0.0753
Epoch 17/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2001 - mean_absolute_error: 0.2001 - mean_squared_error: 0.0696
Epoch 00017: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 166us/sample - loss: 0.2001 - mean_absolute_error: 0.2003 - mean_squared_error: 0.0697 - val_loss: 0.2586 - val_mean_absolute_error: 0.2586 - val_mean_squared_error: 0.0950
Epoch 18/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2008 - mean_absolute_error: 0.2008 - mean_squared_error: 0.0698
Epoch 00018: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 164us/sample - loss: 0.2049 - mean_absolute_error: 0.2052 - mean_squared_error: 0.0728 - val_loss: 0.1641 - val_mean_absolute_error: 0.1640 - val_mean_squared_error: 0.0537
Epoch 19/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2156 - mean_absolute_error: 0.2156 - mean_squared_error: 0.0787
Epoch 00019: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 163us/sample - loss: 0.2154 - mean_absolute_error:

olute_error: 0.2156 - mean_squared_error: 0.0785 - val_loss: 0.2274 - val_mean_absolute_error: 0.2273 - val_mean_squared_error: 0.0858
Epoch 20/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2043 - mean_absolute_error: 0.2043 - mean_squared_error: 0.0726
Epoch 00020: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 165us/sample - loss: 0.2043 - mean_absolute_error: 0.2045 - mean_squared_error: 0.0727 - val_loss: 0.2745 - val_mean_absolute_error: 0.2746 - val_mean_squared_error: 0.1043
Epoch 21/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2003 - mean_absolute_error: 0.2003 - mean_squared_error: 0.0710
Epoch 00021: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 163us/sample - loss: 0.1995 - mean_absolute_error: 0.1994 - mean_squared_error: 0.0703 - val_loss: 0.1735 - val_mean_absolute_error: 0.1736 - val_mean_squared_error: 0.0529
Epoch 22/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2088 - mean_absolute_error: 0.2088 - mean_squared_error: 0.0754
Epoch 00022: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 165us/sample - loss: 0.2086 - mean_absolute_error: 0.2085 - mean_squared_error: 0.0752 - val_loss: 0.1874 - val_mean_absolute_error: 0.1875 - val_mean_squared_error: 0.0602
Epoch 23/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1786 - mean_absolute_error: 0.1786 - mean_squared_error: 0.0576
Epoch 00023: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 164us/sample - loss: 0.1787 - mean_absolute_error: 0.1790 - mean_squared_error: 0.0580 - val_loss: 0.1578 - val_mean_absolute_error: 0.1578 - val_mean_squared_error: 0.0492
Epoch 24/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1929 - mean_absolute_error: 0.1929 - mean_squared_error: 0.0647
Epoch 00024: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 164us/sample - loss: 0.1929 - mean_absolute_error: 0.1934 - mean_squared_error: 0.0651 - val_loss: 0.2725 - val_mean_absolute_error: 0.2727 - val_mean_squared_error: 0.1010
Epoch 25/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1939 - mean_absolute_error: 0.1939 - mean_squared_error: 0.0665
Epoch 00025: val_loss did not improve from 0.15478
10471/10471 [=====] - 2s 163us/sample - loss: 0.1931 - mean_absolute_error: 0.1930 - mean_squared_error: 0.0660 - val_loss: 0.1773 - val_mean_absolute_error: 0.1773 - val_mean_squared_error: 0.0553
Epoch 26/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1943 - mean_absolute_error: 0.1943 - mean_squared_error: 0.0656
Epoch 00026: val_loss improved from 0.15478 to 0.15048, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 172us/sample - loss: 0.1944 - mean_absolute_error: 0.1942 - mean_squared_error: 0.0655 - val_loss: 0.1505 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0471
Epoch 27/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1739 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0559
Epoch 00027: val_loss did not improve from 0.15048
10471/10471 [=====] - 2s 168us/sample - loss: 0.1743 - mean_absolute_error: 0.1752 - mean_squared_error: 0.0569 - val_loss: 0.2506 - val_mean_absolute_error: 0.2507 - val_mean_squared_error: 0.0887
Epoch 28/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1950 - mean_absolute_error:

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ror: 0.1950 - mean_squared_error: 0.0659
Epoch 00028: val_loss did not improve from 0.15048
10471/10471 [=====] - 2s 167us/sample - loss: 0.1948 - mean_absolute_error: 0.1949 - mean_squared_error: 0.0659 - val_loss: 0.1698 - val_mean_absolute_error: 0.1697 - val_mean_squared_error: 0.0583
Epoch 29/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1828 - mean_absolute_error: 0.1828 - mean_squared_error: 0.0593
Epoch 00029: val_loss did not improve from 0.15048
10471/10471 [=====] - 2s 164us/sample - loss: 0.1829 - mean_absolute_error: 0.1830 - mean_squared_error: 0.0595 - val_loss: 0.1526 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0469
Epoch 30/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1876 - mean_absolute_error: 0.1876 - mean_squared_error: 0.0616
Epoch 00030: val_loss did not improve from 0.15048
10471/10471 [=====] - 2s 165us/sample - loss: 0.1873 - mean_absolute_error: 0.1875 - mean_squared_error: 0.0615 - val_loss: 0.3236 - val_mean_absolute_error: 0.3235 - val_mean_squared_error: 0.1414
Epoch 31/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1819 - mean_absolute_error: 0.1819 - mean_squared_error: 0.0596
Epoch 00031: val_loss improved from 0.15048 to 0.15042, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 169us/sample - loss: 0.1817 - mean_absolute_error: 0.1817 - mean_squared_error: 0.0594 - val_loss: 0.1504 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0466
Epoch 32/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1712 - mean_absolute_error: 0.1712 - mean_squared_error: 0.0537
Epoch 00032: val_loss did not improve from 0.15042
10471/10471 [=====] - 2s 166us/sample - loss: 0.1713 - mean_absolute_error: 0.1714 - mean_squared_error: 0.0537 - val_loss: 0.1635 - val_mean_absolute_error: 0.1635 - val_mean_squared_error: 0.0538
Epoch 33/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1733 - mean_absolute_error: 0.1733 - mean_squared_error: 0.0544
Epoch 00033: val_loss improved from 0.15042 to 0.14848, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 172us/sample - loss: 0.1728 - mean_absolute_error: 0.1731 - mean_squared_error: 0.0542 - val_loss: 0.1485 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0461
Epoch 34/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1730 - mean_absolute_error: 0.1730 - mean_squared_error: 0.0548
Epoch 00034: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 165us/sample - loss: 0.1724 - mean_absolute_error: 0.1724 - mean_squared_error: 0.0545 - val_loss: 0.1513 - val_mean_absolute_error: 0.1513 - val_mean_squared_error: 0.0481
Epoch 35/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1799 - mean_absolute_error: 0.1799 - mean_squared_error: 0.0585
Epoch 00035: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 168us/sample - loss: 0.1794 - mean_absolute_error: 0.1794 - mean_squared_error: 0.0581 - val_loss: 0.1916 - val_mean_absolute_error: 0.1916 - val_mean_squared_error: 0.0621
Epoch 36/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1680 - mean_absolute_error: 0.1680 - mean_squared_error: 0.0522
Epoch 00036: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 166us/sample - loss: 0.1679 - mean_absolute_error:
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olute_error: 0.1682 - mean_squared_error: 0.0524 - val_loss: 0.1511 - val_mean_absolute_error: 0.1511 - val_mean_squared_error: 0.0473
Epoch 37/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1595 - mean_absolute_error: 0.1595 - mean_squared_error: 0.0484
Epoch 00037: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 166us/sample - loss: 0.1593 - mean_absolute_error: 0.1593 - mean_squared_error: 0.0481 - val_loss: 0.1607 - val_mean_absolute_error: 0.1607 - val_mean_squared_error: 0.0532
Epoch 38/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1681 - mean_absolute_error: 0.1681 - mean_squared_error: 0.0522
Epoch 00038: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 165us/sample - loss: 0.1680 - mean_absolute_error: 0.1685 - mean_squared_error: 0.0525 - val_loss: 0.1547 - val_mean_absolute_error: 0.1547 - val_mean_squared_error: 0.0499
Epoch 39/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1704 - mean_absolute_error: 0.1704 - mean_squared_error: 0.0523
Epoch 00039: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 166us/sample - loss: 0.1702 - mean_absolute_error: 0.1707 - mean_squared_error: 0.0532 - val_loss: 0.2013 - val_mean_absolute_error: 0.2013 - val_mean_squared_error: 0.0680
Epoch 40/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1633 - mean_absolute_error: 0.1633 - mean_squared_error: 0.0500
Epoch 00040: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 164us/sample - loss: 0.1633 - mean_absolute_error: 0.1633 - mean_squared_error: 0.0499 - val_loss: 0.2448 - val_mean_absolute_error: 0.2446 - val_mean_squared_error: 0.0929
Epoch 41/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1731 - mean_absolute_error: 0.1731 - mean_squared_error: 0.0537
Epoch 00041: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 165us/sample - loss: 0.1737 - mean_absolute_error: 0.1738 - mean_squared_error: 0.0539 - val_loss: 0.1618 - val_mean_absolute_error: 0.1618 - val_mean_squared_error: 0.0515
Epoch 42/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1624 - mean_absolute_error: 0.1624 - mean_squared_error: 0.0484
Epoch 00042: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 164us/sample - loss: 0.1625 - mean_absolute_error: 0.1628 - mean_squared_error: 0.0486 - val_loss: 0.1610 - val_mean_absolute_error: 0.1610 - val_mean_squared_error: 0.0530
Epoch 43/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1646 - mean_absolute_error: 0.1646 - mean_squared_error: 0.0494
Epoch 00043: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 162us/sample - loss: 0.1654 - mean_absolute_error: 0.1652 - mean_squared_error: 0.0499 - val_loss: 0.1821 - val_mean_absolute_error: 0.1821 - val_mean_squared_error: 0.0566
Epoch 44/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1677 - mean_absolute_error: 0.1677 - mean_squared_error: 0.0510
Epoch 00044: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 163us/sample - loss: 0.1681 - mean_absolute_error: 0.1682 - mean_squared_error: 0.0512 - val_loss: 0.2640 - val_mean_absolute_error: 0.2640 - val_mean_squared_error: 0.0964
Epoch 45/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1775 - mean_absolute_error: 0.1775 - mean_squared_error: 0.0565

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Epoch 00045: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 165us/sample - loss: 0.1769 - mean_absolute_error: 0.1768 - mean_squared_error: 0.0562 - val_loss: 0.1556 - val_mean_absolute_error: 0.1555 - val_mean_squared_error: 0.0531
Epoch 46/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1617 - mean_absolute_error: 0.1617 - mean_squared_error: 0.0489
Epoch 00046: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 165us/sample - loss: 0.1618 - mean_absolute_error: 0.1621 - mean_squared_error: 0.0490 - val_loss: 0.1709 - val_mean_absolute_error: 0.1709 - val_mean_squared_error: 0.0534
Epoch 47/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1744 - mean_absolute_error: 0.1744 - mean_squared_error: 0.0542
Epoch 00047: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 169us/sample - loss: 0.1742 - mean_absolute_error: 0.1742 - mean_squared_error: 0.0540 - val_loss: 0.1793 - val_mean_absolute_error: 0.1792 - val_mean_squared_error: 0.0618
Epoch 48/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1629 - mean_absolute_error: 0.1629 - mean_squared_error: 0.0481
Epoch 00048: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 165us/sample - loss: 0.1627 - mean_absolute_error: 0.1629 - mean_squared_error: 0.0482 - val_loss: 0.1519 - val_mean_absolute_error: 0.1519 - val_mean_squared_error: 0.0487
Epoch 49/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1595 - mean_absolute_error: 0.1595 - mean_squared_error: 0.0466
Epoch 00049: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 168us/sample - loss: 0.1594 - mean_absolute_error: 0.1596 - mean_squared_error: 0.0468 - val_loss: 0.2414 - val_mean_absolute_error: 0.2415 - val_mean_squared_error: 0.0841
Epoch 50/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1861 - mean_absolute_error: 0.1861 - mean_squared_error: 0.0599
Epoch 00050: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 165us/sample - loss: 0.1860 - mean_absolute_error: 0.1864 - mean_squared_error: 0.0602 - val_loss: 0.1699 - val_mean_absolute_error: 0.1698 - val_mean_squared_error: 0.0560
Epoch 51/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1603 - mean_absolute_error: 0.1603 - mean_squared_error: 0.0475
Epoch 00051: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 164us/sample - loss: 0.1604 - mean_absolute_error: 0.1604 - mean_squared_error: 0.0475 - val_loss: 0.1921 - val_mean_absolute_error: 0.1922 - val_mean_squared_error: 0.0629
Epoch 52/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1534 - mean_absolute_error: 0.1534 - mean_squared_error: 0.0439
Epoch 00052: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 165us/sample - loss: 0.1536 - mean_absolute_error: 0.1543 - mean_squared_error: 0.0444 - val_loss: 0.1631 - val_mean_absolute_error: 0.1631 - val_mean_squared_error: 0.0521
Epoch 53/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1608 - mean_absolute_error: 0.1608 - mean_squared_error: 0.0476
Epoch 00053: val_loss did not improve from 0.14848
10471/10471 [=====] - 2s 165us/sample - loss: 0.1605 - mean_absolute_error: 0.1605 - mean_squared_error: 0.0475 - val_loss: 0.1674 - val_mean_absolute_error: 0.1674 - val_mean_squared_error: 0.0543
Epoch 54/500
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10272/10471 [=====>.] - ETA: 0s - loss: 0.1653 - mean_absolute_error: 0.1653 - mean_squared_error: 0.0495
 Epoch 00054: val_loss did not improve from 0.14848
 10471/10471 [=====] - 2s 164us/sample - loss: 0.1654 - mean_absolute_error: 0.1655 - mean_squared_error: 0.0496 - val_loss: 0.1522 - val_mean_absolute_error: 0.1522 - val_mean_squared_error: 0.0455
 Epoch 55/500
 10240/10471 [=====>.] - ETA: 0s - loss: 0.1562 - mean_absolute_error: 0.1562 - mean_squared_error: 0.0448
 Epoch 00055: val_loss did not improve from 0.14848
 10471/10471 [=====] - 2s 164us/sample - loss: 0.1560 - mean_absolute_error: 0.1559 - mean_squared_error: 0.0445 - val_loss: 0.1515 - val_mean_absolute_error: 0.1514 - val_mean_squared_error: 0.0478
 Epoch 56/500
 10176/10471 [=====>.] - ETA: 0s - loss: 0.1704 - mean_absolute_error: 0.1704 - mean_squared_error: 0.0524
 Epoch 00056: val_loss did not improve from 0.14848
 10471/10471 [=====] - 2s 165us/sample - loss: 0.1705 - mean_absolute_error: 0.1705 - mean_squared_error: 0.0524 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0461
 Epoch 57/500
 10144/10471 [=====>.] - ETA: 0s - loss: 0.1639 - mean_absolute_error: 0.1639 - mean_squared_error: 0.0481
 Epoch 00057: val_loss did not improve from 0.14848
 10471/10471 [=====] - 2s 166us/sample - loss: 0.1664 - mean_absolute_error: 0.1667 - mean_squared_error: 0.0497 - val_loss: 0.1660 - val_mean_absolute_error: 0.1660 - val_mean_squared_error: 0.0515
 Epoch 58/500
 10432/10471 [=====>.] - ETA: 0s - loss: 0.1620 - mean_absolute_error: 0.1620 - mean_squared_error: 0.0479 Restoring model weights from the end of the best epoch.
 Epoch 00058: val_loss did not improve from 0.14848
 10471/10471 [=====] - 2s 167us/sample - loss: 0.1621 - mean_absolute_error: 0.1622 - mean_squared_error: 0.0480 - val_loss: 0.2063 - val_mean_absolute_error: 0.2063 - val_mean_squared_error: 0.0687
 Epoch 00058: early stopping
 MAE: 0.14848246
 RMSE: 0.21470134
 Adding initial Dense layers with 1024
 Adding Dense layer with 512
 Adding Dense layer with 256
 Adding Dense layer with 128
 Adding Dense layer with 64
 Adding Dense layer with 32
 Adding last layer with 16
 Outputting predictive model - Tabular
 Model: "model_80"

Layer (type)	Output Shape	Param #
<hr/>		
input_81 (InputLayer)	[(None, 61)]	0
batch_normalization_123 (Batch Normalization)	(None, 61)	244
dense_575 (Dense)	(None, 1024)	63488
batch_normalization_124 (Batch Normalization)	(None, 1024)	4096
dense_576 (Dense)	(None, 512)	524800

batch_normalization_125	(Batch (None, 512)	2048
dense_577	(Dense) (None, 256)	131328
batch_normalization_126	(Batch (None, 256)	1024
dense_578	(Dense) (None, 128)	32896
batch_normalization_127	(Batch (None, 128)	512
dense_579	(Dense) (None, 64)	8256
batch_normalization_128	(Batch (None, 64)	256
dense_580	(Dense) (None, 32)	2080
batch_normalization_129	(Batch (None, 32)	128
dense_581	(Dense) (None, 16)	528
dense_582	(Dense) (None, 1)	17
<hr/>		
Total params: 771,701		
Trainable params: 767,547		
Non-trainable params: 4,154		

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10112/10471 [=====>..] - ETA: 0s - loss: 1.8419 - mean_absolute_error: 1.8419 - mean_squared_error: 12.0686

Epoch 00001: val_loss improved from inf to 0.76328, saving model to best_basic_model.hdf5

10471/10471 [=====] - 3s 297us/sample - loss: 1.7978 - mean_absolute_error: 1.7960 - mean_squared_error: 11.6473 - val_loss: 0.7633 - val_mean_absolute_error: 0.7631 - val_mean_squared_error: 0.8596

Epoch 2/500

10240/10471 [=====>.] - ETA: 0s - loss: 0.4388 - mean_absolute_error: 0.4388 - mean_squared_error: 0.3113

Epoch 00002: val_loss improved from 0.76328 to 0.44006, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 2s 143us/sample - loss: 0.4398 - mean_absolute_error: 0.4398 - mean_squared_error: 0.3122 - val_loss: 0.4401 - val_mean_absolute_error: 0.4398 - val_mean_squared_error: 0.3633

Epoch 3/500

10144/10471 [=====>.] - ETA: 0s - loss: 0.3820 - mean_absolute_error: 0.3820 - mean_squared_error: 0.2331

Epoch 00003: val_loss improved from 0.44006 to 0.36682, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 2s 144us/sample - loss: 0.3816 - mean_absolute_error: 0.3817 - mean_squared_error: 0.2323 - val_loss: 0.3668 - val_mean_absolute_error: 0.3666 - val_mean_squared_error: 0.2043

Epoch 4/500

10112/10471 [=====>..] - ETA: 0s - loss: 0.3212 - mean_absolute_error: 0.3212 - mean_squared_error: 0.1662

Epoch 00004: val_loss improved from 0.36682 to 0.29975, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 2s 144us/sample - loss: 0.3204 - mean_absolute_error: 0.3207 - mean_squared_error: 0.1654 - val_loss: 0.2997 - val_mean_absolute_error: 0.2998 - val_mean_squared_error: 0.1478

Epoch 5/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2927 - mean_absolute_error: 0.2927 - mean_squared_error: 0.1385
Epoch 00005: val_loss improved from 0.29975 to 0.22685, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 144us/sample - loss: 0.2902 - mean_absolute_error: 0.2902 - mean_squared_error: 0.1363 - val_loss: 0.2268 - val_mean_absolute_error: 0.2269 - val_mean_squared_error: 0.0845
Epoch 6/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2719 - mean_absolute_error: 0.2719 - mean_squared_error: 0.1205
Epoch 00006: val_loss did not improve from 0.22685
10471/10471 [=====] - 1s 137us/sample - loss: 0.2729 - mean_absolute_error: 0.2727 - mean_squared_error: 0.1214 - val_loss: 0.3767 - val_mean_absolute_error: 0.3769 - val_mean_squared_error: 0.1903
Epoch 7/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.2683 - mean_absolute_error: 0.2683 - mean_squared_error: 0.1183
Epoch 00007: val_loss did not improve from 0.22685
10471/10471 [=====] - 1s 140us/sample - loss: 0.2677 - mean_absolute_error: 0.2681 - mean_squared_error: 0.1181 - val_loss: 0.5098 - val_mean_absolute_error: 0.5101 - val_mean_squared_error: 0.3269
Epoch 8/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.2513 - mean_absolute_error: 0.2513 - mean_squared_error: 0.1061
Epoch 00008: val_loss improved from 0.22685 to 0.18689, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 143us/sample - loss: 0.2522 - mean_absolute_error: 0.2523 - mean_squared_error: 0.1065 - val_loss: 0.1869 - val_mean_absolute_error: 0.1868 - val_mean_squared_error: 0.0641
Epoch 9/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2370 - mean_absolute_error: 0.2370 - mean_squared_error: 0.0949
Epoch 00009: val_loss did not improve from 0.18689
10471/10471 [=====] - 1s 141us/sample - loss: 0.2370 - mean_absolute_error: 0.2371 - mean_squared_error: 0.0949 - val_loss: 0.2011 - val_mean_absolute_error: 0.2010 - val_mean_squared_error: 0.0713
Epoch 10/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2368 - mean_absolute_error: 0.2368 - mean_squared_error: 0.0941
Epoch 00010: val_loss did not improve from 0.18689
10471/10471 [=====] - 1s 140us/sample - loss: 0.2368 - mean_absolute_error: 0.2372 - mean_squared_error: 0.0943 - val_loss: 0.2423 - val_mean_absolute_error: 0.2422 - val_mean_squared_error: 0.1023
Epoch 11/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2158 - mean_absolute_error: 0.2158 - mean_squared_error: 0.0787
Epoch 00011: val_loss improved from 0.18689 to 0.17783, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 143us/sample - loss: 0.2174 - mean_absolute_error: 0.2179 - mean_squared_error: 0.0799 - val_loss: 0.1778 - val_mean_absolute_error: 0.1777 - val_mean_squared_error: 0.0596
Epoch 12/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2181 - mean_absolute_error: 0.2181 - mean_squared_error: 0.0813
Epoch 00012: val_loss did not improve from 0.17783
10471/10471 [=====] - 1s 140us/sample - loss: 0.2183 - mean_absolute_error: 0.2184 - mean_squared_error: 0.0815 - val_loss: 0.1973 - val_mean_absolute_error: 0.1973 - val_mean_squared_error: 0.0689
Epoch 13/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2242 - mean_absolute_error:

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ror: 0.2242 - mean_squared_error: 0.0849
Epoch 00013: val_loss did not improve from 0.17783
10471/10471 [=====] - 1s 139us/sample - loss: 0.2242 - mean_absolute_error: 0.2244 - mean_squared_error: 0.0851 - val_loss: 0.1831 - val_mean_absolute_error: 0.1832 - val_mean_squared_error: 0.0623
Epoch 14/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.2203 - mean_absolute_error: 0.2203 - mean_squared_error: 0.0837
Epoch 00014: val_loss improved from 0.17783 to 0.15635, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 143us/sample - loss: 0.2198 - mean_absolute_error: 0.2198 - mean_squared_error: 0.0835 - val_loss: 0.1564 - val_mean_absolute_error: 0.1564 - val_mean_squared_error: 0.0461
Epoch 15/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.2090 - mean_absolute_error: 0.2090 - mean_squared_error: 0.0747
Epoch 00015: val_loss improved from 0.15635 to 0.15110, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 144us/sample - loss: 0.2097 - mean_absolute_error: 0.2096 - mean_squared_error: 0.0749 - val_loss: 0.1511 - val_mean_absolute_error: 0.1511 - val_mean_squared_error: 0.0454
Epoch 16/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.2011 - mean_absolute_error: 0.2011 - mean_squared_error: 0.0698
Epoch 00016: val_loss did not improve from 0.15110
10471/10471 [=====] - 1s 141us/sample - loss: 0.2012 - mean_absolute_error: 0.2013 - mean_squared_error: 0.0698 - val_loss: 0.2281 - val_mean_absolute_error: 0.2281 - val_mean_squared_error: 0.0788
Epoch 17/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.2010 - mean_absolute_error: 0.2010 - mean_squared_error: 0.0692
Epoch 00017: val_loss did not improve from 0.15110
10471/10471 [=====] - 1s 139us/sample - loss: 0.2015 - mean_absolute_error: 0.2018 - mean_squared_error: 0.0696 - val_loss: 0.1954 - val_mean_absolute_error: 0.1955 - val_mean_squared_error: 0.0637
Epoch 18/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1795 - mean_absolute_error: 0.1795 - mean_squared_error: 0.0579
Epoch 00018: val_loss did not improve from 0.15110
10471/10471 [=====] - 1s 137us/sample - loss: 0.1791 - mean_absolute_error: 0.1793 - mean_squared_error: 0.0576 - val_loss: 0.1578 - val_mean_absolute_error: 0.1578 - val_mean_squared_error: 0.0474
Epoch 19/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1778 - mean_absolute_error: 0.1778 - mean_squared_error: 0.0580
Epoch 00019: val_loss improved from 0.15110 to 0.14569, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 143us/sample - loss: 0.1786 - mean_absolute_error: 0.1785 - mean_squared_error: 0.0584 - val_loss: 0.1457 - val_mean_absolute_error: 0.1457 - val_mean_squared_error: 0.0423
Epoch 20/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1811 - mean_absolute_error: 0.1811 - mean_squared_error: 0.0586
Epoch 00020: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 139us/sample - loss: 0.1813 - mean_absolute_error: 0.1817 - mean_squared_error: 0.0589 - val_loss: 0.1665 - val_mean_absolute_error: 0.1665 - val_mean_squared_error: 0.0503
Epoch 21/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1982 - mean_absolute_error: 0.1982 - mean_squared_error: 0.0689
Epoch 00021: val_loss did not improve from 0.14569
```

```
10471/10471 [=====] - 1s 141us/sample - loss: 0.1983 - mean_absolute_error: 0.1984 - mean_squared_error: 0.0691 - val_loss: 0.2211 - val_mean_absolute_error: 0.2209 - val_mean_squared_error: 0.0802
Epoch 22/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1850 - mean_absolute_error: 0.1850 - mean_squared_error: 0.0608
Epoch 00022: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 138us/sample - loss: 0.1842 - mean_absolute_error: 0.1844 - mean_squared_error: 0.0605 - val_loss: 0.1815 - val_mean_absolute_error: 0.1814 - val_mean_squared_error: 0.0591
Epoch 23/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1766 - mean_absolute_error: 0.1766 - mean_squared_error: 0.0569
Epoch 00023: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 138us/sample - loss: 0.1765 - mean_absolute_error: 0.1764 - mean_squared_error: 0.0566 - val_loss: 0.1982 - val_mean_absolute_error: 0.1981 - val_mean_squared_error: 0.0678
Epoch 24/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1854 - mean_absolute_error: 0.1854 - mean_squared_error: 0.0610
Epoch 00024: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 140us/sample - loss: 0.1851 - mean_absolute_error: 0.1852 - mean_squared_error: 0.0608 - val_loss: 0.1531 - val_mean_absolute_error: 0.1531 - val_mean_squared_error: 0.0446
Epoch 25/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1807 - mean_absolute_error: 0.1807 - mean_squared_error: 0.0583
Epoch 00025: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 140us/sample - loss: 0.1807 - mean_absolute_error: 0.1808 - mean_squared_error: 0.0582 - val_loss: 0.2834 - val_mean_absolute_error: 0.2835 - val_mean_squared_error: 0.1054
Epoch 26/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1796 - mean_absolute_error: 0.1796 - mean_squared_error: 0.0579
Epoch 00026: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 139us/sample - loss: 0.1801 - mean_absolute_error: 0.1806 - mean_squared_error: 0.0584 - val_loss: 0.2392 - val_mean_absolute_error: 0.2393 - val_mean_squared_error: 0.0821
Epoch 27/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1771 - mean_absolute_error: 0.1771 - mean_squared_error: 0.0562
Epoch 00027: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 138us/sample - loss: 0.1771 - mean_absolute_error: 0.1774 - mean_squared_error: 0.0563 - val_loss: 0.1828 - val_mean_absolute_error: 0.1828 - val_mean_squared_error: 0.0564
Epoch 28/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1689 - mean_absolute_error: 0.1689 - mean_squared_error: 0.0526
Epoch 00028: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 139us/sample - loss: 0.1689 - mean_absolute_error: 0.1692 - mean_squared_error: 0.0528 - val_loss: 0.1542 - val_mean_absolute_error: 0.1542 - val_mean_squared_error: 0.0466
Epoch 29/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1690 - mean_absolute_error: 0.1690 - mean_squared_error: 0.0521
Epoch 00029: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 138us/sample - loss: 0.1691 - mean_absolute_error: 0.1694 - mean_squared_error: 0.0522 - val_loss: 0.2023 - val_mean_absolute_error: 0.2022 - val_mean_squared_error: 0.0705
Epoch 30/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1719 - mean_absolute_error:
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ror: 0.1719 - mean_squared_error: 0.0537
Epoch 00030: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 137us/sample - loss: 0.1715 - mean_absolute_error: 0.1714 - mean_squared_error: 0.0535 - val_loss: 0.1585 - val_mean_absolute_error: 0.1585 - val_mean_squared_error: 0.0487
Epoch 31/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1700 - mean_absolute_error: 0.1700 - mean_squared_error: 0.0521
Epoch 00031: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 139us/sample - loss: 0.1700 - mean_absolute_error: 0.1702 - mean_squared_error: 0.0522 - val_loss: 0.1829 - val_mean_absolute_error: 0.1829 - val_mean_squared_error: 0.0583
Epoch 32/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1758 - mean_absolute_error: 0.1758 - mean_squared_error: 0.0555
Epoch 00032: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 138us/sample - loss: 0.1756 - mean_absolute_error: 0.1756 - mean_squared_error: 0.0553 - val_loss: 0.2116 - val_mean_absolute_error: 0.2118 - val_mean_squared_error: 0.0696
Epoch 33/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1591 - mean_absolute_error: 0.1591 - mean_squared_error: 0.0480
Epoch 00033: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 139us/sample - loss: 0.1591 - mean_absolute_error: 0.1589 - mean_squared_error: 0.0480 - val_loss: 0.1762 - val_mean_absolute_error: 0.1763 - val_mean_squared_error: 0.0550
Epoch 34/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1701 - mean_absolute_error: 0.1701 - mean_squared_error: 0.0524
Epoch 00034: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 137us/sample - loss: 0.1702 - mean_absolute_error: 0.1701 - mean_squared_error: 0.0524 - val_loss: 0.1513 - val_mean_absolute_error: 0.1513 - val_mean_squared_error: 0.0462
Epoch 35/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1693 - mean_absolute_error: 0.1693 - mean_squared_error: 0.0517
Epoch 00035: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 138us/sample - loss: 0.1691 - mean_absolute_error: 0.1692 - mean_squared_error: 0.0516 - val_loss: 0.1525 - val_mean_absolute_error: 0.1524 - val_mean_squared_error: 0.0449
Epoch 36/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1611 - mean_absolute_error: 0.1611 - mean_squared_error: 0.0480
Epoch 00036: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 138us/sample - loss: 0.1611 - mean_absolute_error: 0.1613 - mean_squared_error: 0.0481 - val_loss: 0.1484 - val_mean_absolute_error: 0.1484 - val_mean_squared_error: 0.0449
Epoch 37/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1539 - mean_absolute_error: 0.1539 - mean_squared_error: 0.0447
Epoch 00037: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 138us/sample - loss: 0.1535 - mean_absolute_error: 0.1536 - mean_squared_error: 0.0445 - val_loss: 0.2105 - val_mean_absolute_error: 0.2104 - val_mean_squared_error: 0.0737
Epoch 38/500
10080/10471 [=====.>..] - ETA: 0s - loss: 0.1566 - mean_absolute_error: 0.1566 - mean_squared_error: 0.0457
Epoch 00038: val_loss did not improve from 0.14569
10471/10471 [=====] - 1s 139us/sample - loss: 0.1563 - mean_absolute_error: 0.1565 - mean_squared_error: 0.0456 - val_loss: 0.1496 - val_mean_absolute_error: 0.1495 - val_mean_squared_error: 0.0458
```

Epoch 39/500
 10176/10471 [=====>.] - ETA: 0s - loss: 0.1561 - mean_absolute_error: 0.1561 - mean_squared_error: 0.0456
 Epoch 00039: val_loss did not improve from 0.14569
 10471/10471 [=====] - 1s 138us/sample - loss: 0.1562 - mean_absolute_error: 0.1564 - mean_squared_error: 0.0459 - val_loss: 0.1629 - val_mean_absolute_error: 0.1628 - val_mean_squared_error: 0.0485
 Epoch 40/500
 10240/10471 [=====>.] - ETA: 0s - loss: 0.1682 - mean_absolute_error: 0.1682 - mean_squared_error: 0.0513
 Epoch 00040: val_loss did not improve from 0.14569
 10471/10471 [=====] - 1s 137us/sample - loss: 0.1686 - mean_absolute_error: 0.1686 - mean_squared_error: 0.0514 - val_loss: 0.1651 - val_mean_absolute_error: 0.1651 - val_mean_squared_error: 0.0483
 Epoch 41/500
 10240/10471 [=====>.] - ETA: 0s - loss: 0.1640 - mean_absolute_error: 0.1640 - mean_squared_error: 0.0491
 Epoch 00041: val_loss did not improve from 0.14569
 10471/10471 [=====] - 1s 137us/sample - loss: 0.1646 - mean_absolute_error: 0.1650 - mean_squared_error: 0.0495 - val_loss: 0.1596 - val_mean_absolute_error: 0.1595 - val_mean_squared_error: 0.0500
 Epoch 42/500
 10208/10471 [=====>.] - ETA: 0s - loss: 0.1697 - mean_absolute_error: 0.1697 - mean_squared_error: 0.0513
 Epoch 00042: val_loss did not improve from 0.14569
 10471/10471 [=====] - 1s 137us/sample - loss: 0.1697 - mean_absolute_error: 0.1696 - mean_squared_error: 0.0512 - val_loss: 0.1491 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0453
 Epoch 43/500
 10240/10471 [=====>.] - ETA: 0s - loss: 0.1528 - mean_absolute_error: 0.1528 - mean_squared_error: 0.0436
 Epoch 00043: val_loss did not improve from 0.14569
 10471/10471 [=====] - 1s 143us/sample - loss: 0.1529 - mean_absolute_error: 0.1533 - mean_squared_error: 0.0439 - val_loss: 0.1645 - val_mean_absolute_error: 0.1645 - val_mean_squared_error: 0.0496
 Epoch 44/500
 10240/10471 [=====>.] - ETA: 0s - loss: 0.1682 - mean_absolute_error: 0.1682 - mean_squared_error: 0.0509 Restoring model weights from the end of the best epoch.

 Epoch 00044: val_loss did not improve from 0.14569
 10471/10471 [=====] - 1s 138us/sample - loss: 0.1679 - mean_absolute_error: 0.1679 - mean_squared_error: 0.0508 - val_loss: 0.1818 - val_mean_absolute_error: 0.1818 - val_mean_squared_error: 0.0562
 Epoch 00044: early stopping
 MAE: 0.14571796
 RMSE: 0.20574296
 Adding initial Dense layers with 512
 Adding Dense layer with 256
 Adding Dense layer with 128
 Adding Dense layer with 64
 Adding Dense layer with 32
 Adding Dense layer with 16
 Adding Dense layer with 8
 Adding last layer with 4
 Outputting predictive model - Tabular
 Model: "model_81"

Layer (type)	Output Shape	Param #
input_82 (InputLayer)	[(None, 61)]	0

batch_normalization_130	(Batch (None, 61)	244
dense_583	(Dense) (None, 512)	31744
batch_normalization_131	(Batch (None, 512)	2048
dense_584	(Dense) (None, 256)	131328
batch_normalization_132	(Batch (None, 256)	1024
dense_585	(Dense) (None, 128)	32896
batch_normalization_133	(Batch (None, 128)	512
dense_586	(Dense) (None, 64)	8256
batch_normalization_134	(Batch (None, 64)	256
dense_587	(Dense) (None, 32)	2080
batch_normalization_135	(Batch (None, 32)	128
dense_588	(Dense) (None, 16)	528
batch_normalization_136	(Batch (None, 16)	64
dense_589	(Dense) (None, 8)	136
batch_normalization_137	(Batch (None, 8)	32
dense_590	(Dense) (None, 4)	36
dense_591	(Dense) (None, 1)	5

=====

Total params: 211,317
Trainable params: 209,163
Non-trainable params: 2,154

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10272/10471 [=====>.] - ETA: 0s - loss: 3.1360 - mean_absolute_error: 3.1360 - mean_squared_error: 32.0904

Epoch 00001: val_loss improved from inf to 0.34703, saving model to best_basic_model.hdf5

10471/10471 [=====] - 3s 292us/sample - loss: 3.0820 - mean_absolute_error: 3.0757 - mean_squared_error: 31.4089 - val_loss: 0.3470 - val_mean_absolute_error: 0.3470 - val_mean_squared_error: 0.2330

Epoch 2/500

10432/10471 [=====>.] - ETA: 0s - loss: 0.2791 - mean_absolute_error: 0.2791 - mean_squared_error: 0.1276

Epoch 00002: val_loss improved from 0.34703 to 0.30006, saving model to best_basic_model.hdf5

10471/10471 [=====] - 2s 167us/sample - loss: 0.2791 - mean_absolute_error: 0.2795 - mean_squared_error: 0.1281 - val_loss: 0.3001 - val_mean_absolute_error: 0.3001 - val_mean_squared_error: 0.1457

Epoch 3/500

10240/10471 [=====>.] - ETA: 0s - loss: 0.2678 - mean_absolute_error: 0.2678 - mean_squared_error: 0.1179

```
Epoch 00003: val_loss improved from 0.30006 to 0.23586, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 165us/sample - loss: 0.2668 - mean_absolute_error: 0.2667 - mean_squared_error: 0.1172 - val_loss: 0.2359 - val_mean_absolute_error: 0.2358 - val_mean_squared_error: 0.0951
Epoch 4/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2503 - mean_absolute_error: 0.2503 - mean_squared_error: 0.1051
Epoch 00004: val_loss improved from 0.23586 to 0.20432, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 168us/sample - loss: 0.2493 - mean_absolute_error: 0.2496 - mean_squared_error: 0.1047 - val_loss: 0.2043 - val_mean_absolute_error: 0.2043 - val_mean_squared_error: 0.0757
Epoch 5/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.2504 - mean_absolute_error: 0.2504 - mean_squared_error: 0.1060
Epoch 00005: val_loss did not improve from 0.20432
10471/10471 [=====] - 2s 160us/sample - loss: 0.2509 - mean_absolute_error: 0.2513 - mean_squared_error: 0.1065 - val_loss: 0.2234 - val_mean_absolute_error: 0.2234 - val_mean_squared_error: 0.0824
Epoch 6/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.2417 - mean_absolute_error: 0.2417 - mean_squared_error: 0.0967
Epoch 00006: val_loss did not improve from 0.20432
10471/10471 [=====] - 2s 161us/sample - loss: 0.2439 - mean_absolute_error: 0.2444 - mean_squared_error: 0.0988 - val_loss: 0.5068 - val_mean_absolute_error: 0.5066 - val_mean_squared_error: 0.3075
Epoch 7/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.2219 - mean_absolute_error: 0.2219 - mean_squared_error: 0.0851
Epoch 00007: val_loss did not improve from 0.20432
10471/10471 [=====] - 2s 162us/sample - loss: 0.2224 - mean_absolute_error: 0.2222 - mean_squared_error: 0.0854 - val_loss: 0.2123 - val_mean_absolute_error: 0.2123 - val_mean_squared_error: 0.0731
Epoch 8/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.2302 - mean_absolute_error: 0.2302 - mean_squared_error: 0.0890
Epoch 00008: val_loss did not improve from 0.20432
10471/10471 [=====] - 2s 162us/sample - loss: 0.2302 - mean_absolute_error: 0.2306 - mean_squared_error: 0.0894 - val_loss: 0.2221 - val_mean_absolute_error: 0.2221 - val_mean_squared_error: 0.0828
Epoch 9/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.2307 - mean_absolute_error: 0.2307 - mean_squared_error: 0.0892
Epoch 00009: val_loss improved from 0.20432 to 0.18606, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 168us/sample - loss: 0.2307 - mean_absolute_error: 0.2306 - mean_squared_error: 0.0891 - val_loss: 0.1861 - val_mean_absolute_error: 0.1860 - val_mean_squared_error: 0.0651
Epoch 10/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.2189 - mean_absolute_error: 0.2189 - mean_squared_error: 0.0822
Epoch 00010: val_loss did not improve from 0.18606
10471/10471 [=====] - 2s 162us/sample - loss: 0.2191 - mean_absolute_error: 0.2192 - mean_squared_error: 0.0822 - val_loss: 0.2985 - val_mean_absolute_error: 0.2984 - val_mean_squared_error: 0.1309
Epoch 11/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.2302 - mean_absolute_error: 0.2302 - mean_squared_error: 0.0890
Epoch 00011: val_loss did not improve from 0.18606
10471/10471 [=====] - 2s 160us/sample - loss: 0.2295 - mean_absolute_error:
```

```
olute_error: 0.2293 - mean_squared_error: 0.0884 - val_loss: 0.3104 - val_mean_absolute_error: 0.3105 - val_mean_squared_error: 0.1277
Epoch 12/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2081 - mean_absolute_error: 0.2081 - mean_squared_error: 0.0753
Epoch 00012: val_loss did not improve from 0.18606
10471/10471 [=====] - 2s 161us/sample - loss: 0.2080 - mean_absolute_error: 0.2077 - mean_squared_error: 0.0749 - val_loss: 0.2953 - val_mean_absolute_error: 0.2952 - val_mean_squared_error: 0.1267
Epoch 13/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2353 - mean_absolute_error: 0.2353 - mean_squared_error: 0.0900
Epoch 00013: val_loss improved from 0.18606 to 0.16170, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 166us/sample - loss: 0.2337 - mean_absolute_error: 0.2336 - mean_squared_error: 0.0892 - val_loss: 0.1617 - val_mean_absolute_error: 0.1617 - val_mean_squared_error: 0.0477
Epoch 14/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2009 - mean_absolute_error: 0.2009 - mean_squared_error: 0.0709
Epoch 00014: val_loss did not improve from 0.16170
10471/10471 [=====] - 2s 163us/sample - loss: 0.2003 - mean_absolute_error: 0.2004 - mean_squared_error: 0.0706 - val_loss: 0.1795 - val_mean_absolute_error: 0.1794 - val_mean_squared_error: 0.0608
Epoch 15/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1932 - mean_absolute_error: 0.1932 - mean_squared_error: 0.0665
Epoch 00015: val_loss did not improve from 0.16170
10471/10471 [=====] - 2s 159us/sample - loss: 0.1928 - mean_absolute_error: 0.1927 - mean_squared_error: 0.0663 - val_loss: 0.1810 - val_mean_absolute_error: 0.1811 - val_mean_squared_error: 0.0542
Epoch 16/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1883 - mean_absolute_error: 0.1883 - mean_squared_error: 0.0629
Epoch 00016: val_loss improved from 0.16170 to 0.14733, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 164us/sample - loss: 0.1887 - mean_absolute_error: 0.1890 - mean_squared_error: 0.0633 - val_loss: 0.1473 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0441
Epoch 17/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1958 - mean_absolute_error: 0.1958 - mean_squared_error: 0.0671
Epoch 00017: val_loss did not improve from 0.14733
10471/10471 [=====] - 2s 163us/sample - loss: 0.1961 - mean_absolute_error: 0.1961 - mean_squared_error: 0.0671 - val_loss: 0.1930 - val_mean_absolute_error: 0.1930 - val_mean_squared_error: 0.0607
Epoch 18/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1827 - mean_absolute_error: 0.1827 - mean_squared_error: 0.0607
Epoch 00018: val_loss improved from 0.14733 to 0.14565, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 154us/sample - loss: 0.1826 - mean_absolute_error: 0.1825 - mean_squared_error: 0.0605 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0423
Epoch 19/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1735 - mean_absolute_error: 0.1735 - mean_squared_error: 0.0554
Epoch 00019: val_loss did not improve from 0.14565
10471/10471 [=====] - 2s 161us/sample - loss: 0.1736 - mean_absolute_error: 0.1738 - mean_squared_error: 0.0558 - val_loss: 0.1492 - val_mean_absolute_error: 0.1492 - val_mean_squared_error: 0.0442
```

Epoch 20/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1925 - mean_absolute_error: 0.1925 - mean_squared_error: 0.0656
Epoch 00020: val_loss did not improve from 0.14565
10471/10471 [=====] - 2s 161us/sample - loss: 0.1921 - mean_absolute_error: 0.1923 - mean_squared_error: 0.0654 - val_loss: 0.1981 - val_mean_absolute_error: 0.1980 - val_mean_squared_error: 0.0684
Epoch 21/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1763 - mean_absolute_error: 0.1763 - mean_squared_error: 0.0568
Epoch 00021: val_loss did not improve from 0.14565
10471/10471 [=====] - 2s 163us/sample - loss: 0.1781 - mean_absolute_error: 0.1783 - mean_squared_error: 0.0579 - val_loss: 0.1990 - val_mean_absolute_error: 0.1990 - val_mean_squared_error: 0.0613
Epoch 22/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1801 - mean_absolute_error: 0.1801 - mean_squared_error: 0.0585
Epoch 00022: val_loss did not improve from 0.14565
10471/10471 [=====] - 2s 162us/sample - loss: 0.1799 - mean_absolute_error: 0.1798 - mean_squared_error: 0.0584 - val_loss: 0.1485 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0426
Epoch 23/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1740 - mean_absolute_error: 0.1740 - mean_squared_error: 0.0551
Epoch 00023: val_loss did not improve from 0.14565
10471/10471 [=====] - 2s 162us/sample - loss: 0.1739 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0550 - val_loss: 0.3172 - val_mean_absolute_error: 0.3173 - val_mean_squared_error: 0.1265
Epoch 24/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1781 - mean_absolute_error: 0.1781 - mean_squared_error: 0.0573
Epoch 00024: val_loss did not improve from 0.14565
10471/10471 [=====] - 2s 160us/sample - loss: 0.1785 - mean_absolute_error: 0.1787 - mean_squared_error: 0.0577 - val_loss: 0.1538 - val_mean_absolute_error: 0.1538 - val_mean_squared_error: 0.0439
Epoch 25/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1795 - mean_absolute_error: 0.1795 - mean_squared_error: 0.0573
Epoch 00025: val_loss did not improve from 0.14565
10471/10471 [=====] - 2s 160us/sample - loss: 0.1801 - mean_absolute_error: 0.1801 - mean_squared_error: 0.0575 - val_loss: 0.2363 - val_mean_absolute_error: 0.2364 - val_mean_squared_error: 0.0827
Epoch 26/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1830 - mean_absolute_error: 0.1830 - mean_squared_error: 0.0595
Epoch 00026: val_loss improved from 0.14565 to 0.14263, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 166us/sample - loss: 0.1831 - mean_absolute_error: 0.1836 - mean_squared_error: 0.0599 - val_loss: 0.1426 - val_mean_absolute_error: 0.1426 - val_mean_squared_error: 0.0413
Epoch 27/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1803 - mean_absolute_error: 0.1803 - mean_squared_error: 0.0583
Epoch 00027: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 162us/sample - loss: 0.1810 - mean_absolute_error: 0.1810 - mean_squared_error: 0.0586 - val_loss: 0.1928 - val_mean_absolute_error: 0.1927 - val_mean_squared_error: 0.0646
Epoch 28/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1816 - mean_absolute_error: 0.1816 - mean_squared_error: 0.0583
Epoch 00028: val_loss did not improve from 0.14263

10471/10471 [=====] - 2s 162us/sample - loss: 0.1808 - mean_absolute_error: 0.1810 - mean_squared_error: 0.0579 - val_loss: 0.1478 - val_mean_absolute_error: 0.1477 - val_mean_squared_error: 0.0441
Epoch 29/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1631 - mean_absolute_error: 0.1631 - mean_squared_error: 0.0497
Epoch 00029: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 166us/sample - loss: 0.1631 - mean_absolute_error: 0.1632 - mean_squared_error: 0.0496 - val_loss: 0.1681 - val_mean_absolute_error: 0.1682 - val_mean_squared_error: 0.0504
Epoch 30/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1749 - mean_absolute_error: 0.1749 - mean_squared_error: 0.0554
Epoch 00030: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 162us/sample - loss: 0.1751 - mean_absolute_error: 0.1757 - mean_squared_error: 0.0559 - val_loss: 0.2235 - val_mean_absolute_error: 0.2235 - val_mean_squared_error: 0.0723
Epoch 31/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1830 - mean_absolute_error: 0.1830 - mean_squared_error: 0.0586
Epoch 00031: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 161us/sample - loss: 0.1833 - mean_absolute_error: 0.1833 - mean_squared_error: 0.0587 - val_loss: 0.1909 - val_mean_absolute_error: 0.1909 - val_mean_squared_error: 0.0623
Epoch 32/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1759 - mean_absolute_error: 0.1759 - mean_squared_error: 0.0556
Epoch 00032: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 158us/sample - loss: 0.1756 - mean_absolute_error: 0.1757 - mean_squared_error: 0.0554 - val_loss: 0.1501 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0432
Epoch 33/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1652 - mean_absolute_error: 0.1652 - mean_squared_error: 0.0510
Epoch 00033: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 162us/sample - loss: 0.1650 - mean_absolute_error: 0.1647 - mean_squared_error: 0.0510 - val_loss: 0.1473 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0422
Epoch 34/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1834 - mean_absolute_error: 0.1834 - mean_squared_error: 0.0607
Epoch 00034: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 160us/sample - loss: 0.1826 - mean_absolute_error: 0.1824 - mean_squared_error: 0.0601 - val_loss: 0.1644 - val_mean_absolute_error: 0.1644 - val_mean_squared_error: 0.0480
Epoch 35/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1756 - mean_absolute_error: 0.1756 - mean_squared_error: 0.0558
Epoch 00035: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 159us/sample - loss: 0.1755 - mean_absolute_error: 0.1757 - mean_squared_error: 0.0559 - val_loss: 0.1666 - val_mean_absolute_error: 0.1665 - val_mean_squared_error: 0.0521
Epoch 36/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1752 - mean_absolute_error: 0.1752 - mean_squared_error: 0.0552
Epoch 00036: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 161us/sample - loss: 0.1751 - mean_absolute_error: 0.1752 - mean_squared_error: 0.0551 - val_loss: 0.1572 - val_mean_absolute_error: 0.1571 - val_mean_squared_error: 0.0482
Epoch 37/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1670 - mean_absolute_error:

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ror: 0.1670 - mean_squared_error: 0.0505
Epoch 00037: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 151us/sample - loss: 0.1668 - mean_absolute_error: 0.1670 - mean_squared_error: 0.0505 - val_loss: 0.1493 - val_mean_absolute_error: 0.1492 - val_mean_squared_error: 0.0444
Epoch 38/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1668 - mean_absolute_error: 0.1668 - mean_squared_error: 0.0507
Epoch 00038: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 158us/sample - loss: 0.1661 - mean_absolute_error: 0.1660 - mean_squared_error: 0.0503 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0444
Epoch 39/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1682 - mean_absolute_error: 0.1682 - mean_squared_error: 0.0514
Epoch 00039: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 162us/sample - loss: 0.1680 - mean_absolute_error: 0.1679 - mean_squared_error: 0.0511 - val_loss: 0.1561 - val_mean_absolute_error: 0.1561 - val_mean_squared_error: 0.0452
Epoch 40/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1621 - mean_absolute_error: 0.1621 - mean_squared_error: 0.0487
Epoch 00040: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 162us/sample - loss: 0.1621 - mean_absolute_error: 0.1623 - mean_squared_error: 0.0487 - val_loss: 0.1874 - val_mean_absolute_error: 0.1874 - val_mean_squared_error: 0.0570
Epoch 41/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1676 - mean_absolute_error: 0.1676 - mean_squared_error: 0.0504
Epoch 00041: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 162us/sample - loss: 0.1674 - mean_absolute_error: 0.1675 - mean_squared_error: 0.0504 - val_loss: 0.1537 - val_mean_absolute_error: 0.1536 - val_mean_squared_error: 0.0464
Epoch 42/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1599 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0471
Epoch 00042: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 160us/sample - loss: 0.1599 - mean_absolute_error: 0.1601 - mean_squared_error: 0.0474 - val_loss: 0.1471 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0424
Epoch 43/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1635 - mean_absolute_error: 0.1635 - mean_squared_error: 0.0487
Epoch 00043: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 163us/sample - loss: 0.1637 - mean_absolute_error: 0.1643 - mean_squared_error: 0.0493 - val_loss: 0.1993 - val_mean_absolute_error: 0.1994 - val_mean_squared_error: 0.0626
Epoch 44/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1742 - mean_absolute_error: 0.1742 - mean_squared_error: 0.0543
Epoch 00044: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 161us/sample - loss: 0.1736 - mean_absolute_error: 0.1734 - mean_squared_error: 0.0538 - val_loss: 0.1558 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0473
Epoch 45/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1636 - mean_absolute_error: 0.1636 - mean_squared_error: 0.0486
Epoch 00045: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 163us/sample - loss: 0.1635 - mean_absolute_error: 0.1634 - mean_squared_error: 0.0485 - val_loss: 0.2189 - val_mean_absolute_error: 0.2188 - val_mean_squared_error: 0.0774
```

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Epoch 46/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1648 - mean_absolute_error: 0.1648 - mean_squared_error: 0.0488
Epoch 00046: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 160us/sample - loss: 0.1643 - mean_absolute_error: 0.1646 - mean_squared_error: 0.0487 - val_loss: 0.1585 - val_mean_absolute_error: 0.1584 - val_mean_squared_error: 0.0488
Epoch 47/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1561 - mean_absolute_error: 0.1561 - mean_squared_error: 0.0460
Epoch 00047: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 162us/sample - loss: 0.1558 - mean_absolute_error: 0.1558 - mean_squared_error: 0.0459 - val_loss: 0.1793 - val_mean_absolute_error: 0.1793 - val_mean_squared_error: 0.0546
Epoch 48/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1787 - mean_absolute_error: 0.1787 - mean_squared_error: 0.0561
Epoch 00048: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 159us/sample - loss: 0.1787 - mean_absolute_error: 0.1791 - mean_squared_error: 0.0562 - val_loss: 0.1531 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0465
Epoch 49/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1618 - mean_absolute_error: 0.1618 - mean_squared_error: 0.0473
Epoch 00049: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 160us/sample - loss: 0.1622 - mean_absolute_error: 0.1623 - mean_squared_error: 0.0476 - val_loss: 0.1547 - val_mean_absolute_error: 0.1546 - val_mean_squared_error: 0.0466
Epoch 50/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1735 - mean_absolute_error: 0.1735 - mean_squared_error: 0.0531
Epoch 00050: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 161us/sample - loss: 0.1739 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0533 - val_loss: 0.1745 - val_mean_absolute_error: 0.1745 - val_mean_squared_error: 0.0530
Epoch 51/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1606 - mean_absolute_error: 0.1606 - mean_squared_error: 0.0473Restoring model weights from the end of the best epoch.

Epoch 00051: val_loss did not improve from 0.14263
10471/10471 [=====] - 2s 163us/sample - loss: 0.1607 - mean_absolute_error: 0.1610 - mean_squared_error: 0.0476 - val_loss: 0.1751 - val_mean_absolute_error: 0.1751 - val_mean_squared_error: 0.0539
Epoch 00051: early stopping
MAE: 0.14258863
RMSE: 0.20330955
Adding initial Dense layers with 32
Adding Dense layer with 32
Adding Dense layer with 32
Adding Dense layer with 32
Adding last layer with 32
Outputting predictive model - Tabular
Model: "model_82"

```

Layer (type)	Output Shape	Param #
input_83 (InputLayer)	[(None, 61)]	0
batch_normalization_138 (Batch Normalization)	(None, 61)	244

dense_592 (Dense)	(None, 32)	1984
batch_normalization_139 (Batch Normalization)	(None, 32)	128
dense_593 (Dense)	(None, 32)	1056
batch_normalization_140 (Batch Normalization)	(None, 32)	128
dense_594 (Dense)	(None, 32)	1056
batch_normalization_141 (Batch Normalization)	(None, 32)	128
dense_595 (Dense)	(None, 32)	1056
batch_normalization_142 (Batch Normalization)	(None, 32)	128
dense_596 (Dense)	(None, 32)	1056
dense_597 (Dense)	(None, 1)	33
<hr/>		
Total params:	6,997	
Trainable params:	6,619	
Non-trainable params:	378	

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10336/10471 [=====>.] - ETA: 0s - loss: 1.9309 - mean_absolute_error: 1.9309 - mean_squared_error: 13.7855

Epoch 00001: val_loss improved from inf to 0.68210, saving model to best_basic_model.hdf5

10471/10471 [=====] - 2s 217us/sample - loss: 1.9135 - mean_absolute_error: 1.9103 - mean_squared_error: 13.5837 - val_loss: 0.6821 - val_mean_absolute_error: 0.6821 - val_mean_squared_error: 0.7111

Epoch 2/500

10208/10471 [=====>.] - ETA: 0s - loss: 0.4392 - mean_absolute_error: 0.4392 - mean_squared_error: 0.3143

Epoch 00002: val_loss improved from 0.68210 to 0.44089, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 121us/sample - loss: 0.4382 - mean_absolute_error: 0.4382 - mean_squared_error: 0.3127 - val_loss: 0.4409 - val_mean_absolute_error: 0.4416 - val_mean_squared_error: 0.3244

Epoch 3/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.3955 - mean_absolute_error: 0.3955 - mean_squared_error: 0.2489

Epoch 00003: val_loss did not improve from 0.44089

10471/10471 [=====] - 1s 116us/sample - loss: 0.3963 - mean_absolute_error: 0.3964 - mean_squared_error: 0.2503 - val_loss: 0.5409 - val_mean_absolute_error: 0.5414 - val_mean_squared_error: 0.4272

Epoch 4/500

10208/10471 [=====>.] - ETA: 0s - loss: 0.3373 - mean_absolute_error: 0.3373 - mean_squared_error: 0.1839

Epoch 00004: val_loss improved from 0.44089 to 0.24303, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 121us/sample - loss: 0.3385 - mean_absolute_error: 0.3385 - mean_squared_error: 0.1849 - val_loss: 0.2430 - val_mean_absolute_error: 0.2431 - val_mean_squared_error: 0.0988

Epoch 5/500

10208/10471 [=====>.] - ETA: 0s - loss: 0.3144 - mean_absolute_error: 0.3144 - mean_squared_error: 0.1594

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Epoch 00005: val_loss did not improve from 0.24303
10471/10471 [=====] - 1s 116us/sample - loss: 0.3145 - mean_absolute_error: 0.3146 - mean_squared_error: 0.1596 - val_loss: 0.2790 - val_mean_absolute_error: 0.2793 - val_mean_squared_error: 0.1497
Epoch 6/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2786 - mean_absolute_error: 0.2786 - mean_squared_error: 0.1267
Epoch 00006: val_loss did not improve from 0.24303
10471/10471 [=====] - 1s 106us/sample - loss: 0.2777 - mean_absolute_error: 0.2778 - mean_squared_error: 0.1262 - val_loss: 0.3193 - val_mean_absolute_error: 0.3191 - val_mean_squared_error: 0.1523
Epoch 7/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2952 - mean_absolute_error: 0.2952 - mean_squared_error: 0.1410
Epoch 00007: val_loss did not improve from 0.24303
10471/10471 [=====] - 1s 110us/sample - loss: 0.2949 - mean_absolute_error: 0.2951 - mean_squared_error: 0.1408 - val_loss: 0.2480 - val_mean_absolute_error: 0.2480 - val_mean_squared_error: 0.1044
Epoch 8/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.2665 - mean_absolute_error: 0.2665 - mean_squared_error: 0.1164
Epoch 00008: val_loss improved from 0.24303 to 0.23669, saving model to best_basic_mode_1.hdf5
10471/10471 [=====] - 1s 119us/sample - loss: 0.2660 - mean_absolute_error: 0.2663 - mean_squared_error: 0.1162 - val_loss: 0.2367 - val_mean_absolute_error: 0.2366 - val_mean_squared_error: 0.0923
Epoch 9/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2540 - mean_absolute_error: 0.2540 - mean_squared_error: 0.1097
Epoch 00009: val_loss did not improve from 0.23669
10471/10471 [=====] - 1s 115us/sample - loss: 0.2537 - mean_absolute_error: 0.2538 - mean_squared_error: 0.1094 - val_loss: 0.3094 - val_mean_absolute_error: 0.3092 - val_mean_squared_error: 0.1393
Epoch 10/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2590 - mean_absolute_error: 0.2590 - mean_squared_error: 0.1088
Epoch 00010: val_loss improved from 0.23669 to 0.17254, saving model to best_basic_mode_1.hdf5
10471/10471 [=====] - 1s 120us/sample - loss: 0.2579 - mean_absolute_error: 0.2577 - mean_squared_error: 0.1078 - val_loss: 0.1725 - val_mean_absolute_error: 0.1725 - val_mean_squared_error: 0.0543
Epoch 11/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2321 - mean_absolute_error: 0.2321 - mean_squared_error: 0.0910
Epoch 00011: val_loss did not improve from 0.17254
10471/10471 [=====] - 1s 118us/sample - loss: 0.2345 - mean_absolute_error: 0.2344 - mean_squared_error: 0.0927 - val_loss: 0.1856 - val_mean_absolute_error: 0.1856 - val_mean_squared_error: 0.0618
Epoch 12/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2318 - mean_absolute_error: 0.2318 - mean_squared_error: 0.0899
Epoch 00012: val_loss did not improve from 0.17254
10471/10471 [=====] - 1s 117us/sample - loss: 0.2313 - mean_absolute_error: 0.2313 - mean_squared_error: 0.0894 - val_loss: 0.3813 - val_mean_absolute_error: 0.3812 - val_mean_squared_error: 0.1905
Epoch 13/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2391 - mean_absolute_error: 0.2391 - mean_squared_error: 0.0947
Epoch 00013: val_loss improved from 0.17254 to 0.16867, saving model to best_basic_mode_1.hdf5
10471/10471 [=====] - 1s 118us/sample - loss: 0.2392 - mean_absolute_error:
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olute_error: 0.2394 - mean_squared_error: 0.0949 - val_loss: 0.1687 - val_mean_absolute_error: 0.1687 - val_mean_squared_error: 0.0498
Epoch 14/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.2061 - mean_absolute_error: 0.2061 - mean_squared_error: 0.0731
Epoch 00014: val_loss did not improve from 0.16867
10471/10471 [=====] - 1s 117us/sample - loss: 0.2061 - mean_absolute_error: 0.2060 - mean_squared_error: 0.0730 - val_loss: 0.2209 - val_mean_absolute_error: 0.2210 - val_mean_squared_error: 0.0735
Epoch 15/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2026 - mean_absolute_error: 0.2026 - mean_squared_error: 0.0708
Epoch 00015: val_loss did not improve from 0.16867
10471/10471 [=====] - 1s 116us/sample - loss: 0.2028 - mean_absolute_error: 0.2028 - mean_squared_error: 0.0709 - val_loss: 0.1786 - val_mean_absolute_error: 0.1786 - val_mean_squared_error: 0.0593
Epoch 16/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2021 - mean_absolute_error: 0.2021 - mean_squared_error: 0.0715
Epoch 00016: val_loss improved from 0.16867 to 0.15336, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 120us/sample - loss: 0.2014 - mean_absolute_error: 0.2016 - mean_squared_error: 0.0711 - val_loss: 0.1534 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0454
Epoch 17/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1960 - mean_absolute_error: 0.1960 - mean_squared_error: 0.0680
Epoch 00017: val_loss did not improve from 0.15336
10471/10471 [=====] - 1s 116us/sample - loss: 0.1968 - mean_absolute_error: 0.1974 - mean_squared_error: 0.0691 - val_loss: 0.2247 - val_mean_absolute_error: 0.2249 - val_mean_squared_error: 0.0755
Epoch 18/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.2046 - mean_absolute_error: 0.2046 - mean_squared_error: 0.0733
Epoch 00018: val_loss did not improve from 0.15336
10471/10471 [=====] - 1s 118us/sample - loss: 0.2034 - mean_absolute_error: 0.2035 - mean_squared_error: 0.0725 - val_loss: 0.2322 - val_mean_absolute_error: 0.2323 - val_mean_squared_error: 0.0773
Epoch 19/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2048 - mean_absolute_error: 0.2048 - mean_squared_error: 0.0733
Epoch 00019: val_loss did not improve from 0.15336
10471/10471 [=====] - 1s 118us/sample - loss: 0.2042 - mean_absolute_error: 0.2043 - mean_squared_error: 0.0730 - val_loss: 0.1537 - val_mean_absolute_error: 0.1537 - val_mean_squared_error: 0.0457
Epoch 20/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1898 - mean_absolute_error: 0.1898 - mean_squared_error: 0.0644
Epoch 00020: val_loss did not improve from 0.15336
10471/10471 [=====] - 1s 116us/sample - loss: 0.1900 - mean_absolute_error: 0.1899 - mean_squared_error: 0.0645 - val_loss: 0.2308 - val_mean_absolute_error: 0.2310 - val_mean_squared_error: 0.0800
Epoch 21/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1925 - mean_absolute_error: 0.1925 - mean_squared_error: 0.0659
Epoch 00021: val_loss did not improve from 0.15336
10471/10471 [=====] - 1s 115us/sample - loss: 0.1926 - mean_absolute_error: 0.1930 - mean_squared_error: 0.0663 - val_loss: 0.2839 - val_mean_absolute_error: 0.2841 - val_mean_squared_error: 0.1059
Epoch 22/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1927 - mean_absolute_error:

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ror: 0.1927 - mean_squared_error: 0.0670
Epoch 00022: val_loss improved from 0.15336 to 0.15329, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 118us/sample - loss: 0.1928 - mean_absolute_error: 0.1930 - mean_squared_error: 0.0672 - val_loss: 0.1533 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0463
Epoch 23/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1971 - mean_absolute_error: 0.1971 - mean_squared_error: 0.0691
Epoch 00023: val_loss improved from 0.15329 to 0.14623, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 119us/sample - loss: 0.1970 - mean_absolute_error: 0.1972 - mean_squared_error: 0.0691 - val_loss: 0.1462 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0432
Epoch 24/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1930 - mean_absolute_error: 0.1930 - mean_squared_error: 0.0657
Epoch 00024: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 118us/sample - loss: 0.1924 - mean_absolute_error: 0.1924 - mean_squared_error: 0.0656 - val_loss: 0.1593 - val_mean_absolute_error: 0.1593 - val_mean_squared_error: 0.0494
Epoch 25/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1881 - mean_absolute_error: 0.1881 - mean_squared_error: 0.0648
Epoch 00025: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 116us/sample - loss: 0.1883 - mean_absolute_error: 0.1883 - mean_squared_error: 0.0648 - val_loss: 0.1887 - val_mean_absolute_error: 0.1888 - val_mean_squared_error: 0.0591
Epoch 26/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1859 - mean_absolute_error: 0.1859 - mean_squared_error: 0.0622
Epoch 00026: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 116us/sample - loss: 0.1863 - mean_absolute_error: 0.1867 - mean_squared_error: 0.0626 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0452
Epoch 27/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1797 - mean_absolute_error: 0.1797 - mean_squared_error: 0.0593
Epoch 00027: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 115us/sample - loss: 0.1803 - mean_absolute_error: 0.1805 - mean_squared_error: 0.0600 - val_loss: 0.1467 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0437
Epoch 28/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1846 - mean_absolute_error: 0.1846 - mean_squared_error: 0.0611
Epoch 00028: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 117us/sample - loss: 0.1849 - mean_absolute_error: 0.1851 - mean_squared_error: 0.0614 - val_loss: 0.1851 - val_mean_absolute_error: 0.1850 - val_mean_squared_error: 0.0609
Epoch 29/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1826 - mean_absolute_error: 0.1826 - mean_squared_error: 0.0605
Epoch 00029: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 117us/sample - loss: 0.1823 - mean_absolute_error: 0.1824 - mean_squared_error: 0.0606 - val_loss: 0.1546 - val_mean_absolute_error: 0.1546 - val_mean_squared_error: 0.0477
Epoch 30/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1878 - mean_absolute_error: 0.1878 - mean_squared_error: 0.0638
Epoch 00030: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 116us/sample - loss: 0.1876 - mean_absolute_error:
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olute_error: 0.1879 - mean_squared_error: 0.0639 - val_loss: 0.1770 - val_mean_absolute_error: 0.1770 - val_mean_squared_error: 0.0530
Epoch 31/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1849 - mean_absolute_error: 0.1849 - mean_squared_error: 0.0621
Epoch 00031: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 115us/sample - loss: 0.1852 - mean_absolute_error: 0.1853 - mean_squared_error: 0.0626 - val_loss: 0.1996 - val_mean_absolute_error: 0.1997 - val_mean_squared_error: 0.0618
Epoch 32/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1912 - mean_absolute_error: 0.1912 - mean_squared_error: 0.0660
Epoch 00032: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 107us/sample - loss: 0.1901 - mean_absolute_error: 0.1901 - mean_squared_error: 0.0655 - val_loss: 0.1820 - val_mean_absolute_error: 0.1820 - val_mean_squared_error: 0.0558
Epoch 33/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1858 - mean_absolute_error: 0.1858 - mean_squared_error: 0.0621
Epoch 00033: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 104us/sample - loss: 0.1858 - mean_absolute_error: 0.1859 - mean_squared_error: 0.0621 - val_loss: 0.1575 - val_mean_absolute_error: 0.1575 - val_mean_squared_error: 0.0461
Epoch 34/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1822 - mean_absolute_error: 0.1822 - mean_squared_error: 0.0601
Epoch 00034: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 112us/sample - loss: 0.1816 - mean_absolute_error: 0.1815 - mean_squared_error: 0.0596 - val_loss: 0.4012 - val_mean_absolute_error: 0.4013 - val_mean_squared_error: 0.1911
Epoch 35/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1885 - mean_absolute_error: 0.1885 - mean_squared_error: 0.0650
Epoch 00035: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 116us/sample - loss: 0.1885 - mean_absolute_error: 0.1885 - mean_squared_error: 0.0649 - val_loss: 0.3303 - val_mean_absolute_error: 0.3302 - val_mean_squared_error: 0.1454
Epoch 36/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1870 - mean_absolute_error: 0.1870 - mean_squared_error: 0.0621
Epoch 00036: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 113us/sample - loss: 0.1860 - mean_absolute_error: 0.1860 - mean_squared_error: 0.0616 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0439
Epoch 37/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1887 - mean_absolute_error: 0.1887 - mean_squared_error: 0.0646
Epoch 00037: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 118us/sample - loss: 0.1908 - mean_absolute_error: 0.1920 - mean_squared_error: 0.0669 - val_loss: 0.3404 - val_mean_absolute_error: 0.3406 - val_mean_squared_error: 0.1455
Epoch 38/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1922 - mean_absolute_error: 0.1922 - mean_squared_error: 0.0654
Epoch 00038: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 118us/sample - loss: 0.1912 - mean_absolute_error: 0.1914 - mean_squared_error: 0.0648 - val_loss: 0.1670 - val_mean_absolute_error: 0.1671 - val_mean_squared_error: 0.0507
Epoch 39/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1828 - mean_absolute_error: 0.1828 - mean_squared_error: 0.0604

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Epoch 00039: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 115us/sample - loss: 0.1827 - mean_absolute_error: 0.1828 - mean_squared_error: 0.0604 - val_loss: 0.1480 - val_mean_absolute_error: 0.1481 - val_mean_squared_error: 0.0449
Epoch 40/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1894 - mean_absolute_error: 0.1894 - mean_squared_error: 0.0646
Epoch 00040: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 115us/sample - loss: 0.1894 - mean_absolute_error: 0.1893 - mean_squared_error: 0.0647 - val_loss: 0.1564 - val_mean_absolute_error: 0.1564 - val_mean_squared_error: 0.0503
Epoch 41/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1832 - mean_absolute_error: 0.1832 - mean_squared_error: 0.0603
Epoch 00041: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 116us/sample - loss: 0.1833 - mean_absolute_error: 0.1834 - mean_squared_error: 0.0605 - val_loss: 0.1469 - val_mean_absolute_error: 0.1469 - val_mean_squared_error: 0.0434
Epoch 42/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1817 - mean_absolute_error: 0.1817 - mean_squared_error: 0.0596
Epoch 00042: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 116us/sample - loss: 0.1821 - mean_absolute_error: 0.1820 - mean_squared_error: 0.0600 - val_loss: 0.1622 - val_mean_absolute_error: 0.1622 - val_mean_squared_error: 0.0507
Epoch 43/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1820 - mean_absolute_error: 0.1820 - mean_squared_error: 0.0602
Epoch 00043: val_loss did not improve from 0.14623
10471/10471 [=====] - 1s 116us/sample - loss: 0.1825 - mean_absolute_error: 0.1827 - mean_squared_error: 0.0605 - val_loss: 0.1580 - val_mean_absolute_error: 0.1579 - val_mean_squared_error: 0.0509
Epoch 44/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1786 - mean_absolute_error: 0.1786 - mean_squared_error: 0.0583
Epoch 00044: val_loss improved from 0.14623 to 0.14602, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 121us/sample - loss: 0.1810 - mean_absolute_error: 0.1812 - mean_squared_error: 0.0597 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0428
Epoch 45/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1830 - mean_absolute_error: 0.1830 - mean_squared_error: 0.0607
Epoch 00045: val_loss did not improve from 0.14602
10471/10471 [=====] - 1s 117us/sample - loss: 0.1828 - mean_absolute_error: 0.1828 - mean_squared_error: 0.0605 - val_loss: 0.1469 - val_mean_absolute_error: 0.1469 - val_mean_squared_error: 0.0443
Epoch 46/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1833 - mean_absolute_error: 0.1833 - mean_squared_error: 0.0601
Epoch 00046: val_loss did not improve from 0.14602
10471/10471 [=====] - 1s 115us/sample - loss: 0.1835 - mean_absolute_error: 0.1839 - mean_squared_error: 0.0606 - val_loss: 0.1703 - val_mean_absolute_error: 0.1703 - val_mean_squared_error: 0.0508
Epoch 47/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1772 - mean_absolute_error: 0.1772 - mean_squared_error: 0.0581
Epoch 00047: val_loss did not improve from 0.14602
10471/10471 [=====] - 1s 116us/sample - loss: 0.1774 - mean_absolute_error: 0.1777 - mean_squared_error: 0.0583 - val_loss: 0.1714 - val_mean_absolute_error: 0.1714 - val_mean_squared_error: 0.0526
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Epoch 48/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1829 - mean_absolute_error: 0.1829 - mean_squared_error: 0.0610
Epoch 00048: val_loss did not improve from 0.14602
10471/10471 [=====] - 1s 118us/sample - loss: 0.1819 - mean_absolute_error: 0.1819 - mean_squared_error: 0.0603 - val_loss: 0.1602 - val_mean_absolute_error: 0.1601 - val_mean_squared_error: 0.0509
Epoch 49/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1845 - mean_absolute_error: 0.1845 - mean_squared_error: 0.0604
Epoch 00049: val_loss did not improve from 0.14602
10471/10471 [=====] - 1s 115us/sample - loss: 0.1843 - mean_absolute_error: 0.1843 - mean_squared_error: 0.0603 - val_loss: 0.1498 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0457
Epoch 50/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1752 - mean_absolute_error: 0.1752 - mean_squared_error: 0.0570
Epoch 00050: val_loss did not improve from 0.14602
10471/10471 [=====] - 1s 115us/sample - loss: 0.1759 - mean_absolute_error: 0.1761 - mean_squared_error: 0.0575 - val_loss: 0.2470 - val_mean_absolute_error: 0.2471 - val_mean_squared_error: 0.0858
Epoch 51/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1844 - mean_absolute_error: 0.1844 - mean_squared_error: 0.0612
Epoch 00051: val_loss did not improve from 0.14602
10471/10471 [=====] - 1s 116us/sample - loss: 0.1843 - mean_absolute_error: 0.1844 - mean_squared_error: 0.0611 - val_loss: 0.2175 - val_mean_absolute_error: 0.2174 - val_mean_squared_error: 0.0776
Epoch 52/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1804 - mean_absolute_error: 0.1804 - mean_squared_error: 0.0601
Epoch 00052: val_loss did not improve from 0.14602
10471/10471 [=====] - 1s 114us/sample - loss: 0.1808 - mean_absolute_error: 0.1811 - mean_squared_error: 0.0605 - val_loss: 0.1522 - val_mean_absolute_error: 0.1522 - val_mean_squared_error: 0.0454
Epoch 53/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1728 - mean_absolute_error: 0.1728 - mean_squared_error: 0.0550
Epoch 00053: val_loss did not improve from 0.14602
10471/10471 [=====] - 1s 121us/sample - loss: 0.1728 - mean_absolute_error: 0.1730 - mean_squared_error: 0.0552 - val_loss: 0.1606 - val_mean_absolute_error: 0.1606 - val_mean_squared_error: 0.0473
Epoch 54/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1737 - mean_absolute_error: 0.1737 - mean_squared_error: 0.0566
Epoch 00054: val_loss did not improve from 0.14602
10471/10471 [=====] - 1s 119us/sample - loss: 0.1732 - mean_absolute_error: 0.1731 - mean_squared_error: 0.0564 - val_loss: 0.1746 - val_mean_absolute_error: 0.1747 - val_mean_squared_error: 0.0543
Epoch 55/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1743 - mean_absolute_error: 0.1743 - mean_squared_error: 0.0566
Epoch 00055: val_loss improved from 0.14602 to 0.14417, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 120us/sample - loss: 0.1742 - mean_absolute_error: 0.1746 - mean_squared_error: 0.0568 - val_loss: 0.1442 - val_mean_absolute_error: 0.1441 - val_mean_squared_error: 0.0429
Epoch 56/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1697 - mean_absolute_error: 0.1697 - mean_squared_error: 0.0545
Epoch 00056: val_loss did not improve from 0.14417

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10471/10471 [=====] - 1s 117us/sample - loss: 0.1696 - mean_absolute_error: 0.1697 - mean_squared_error: 0.0544 - val_loss: 0.1673 - val_mean_absolute_error: 0.1673 - val_mean_squared_error: 0.0525
Epoch 57/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1711 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0547
Epoch 00057: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 118us/sample - loss: 0.1714 - mean_absolute_error: 0.1720 - mean_squared_error: 0.0552 - val_loss: 0.1777 - val_mean_absolute_error: 0.1777 - val_mean_squared_error: 0.0554
Epoch 58/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1791 - mean_absolute_error: 0.1791 - mean_squared_error: 0.0588
Epoch 00058: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 117us/sample - loss: 0.1792 - mean_absolute_error: 0.1791 - mean_squared_error: 0.0587 - val_loss: 0.1770 - val_mean_absolute_error: 0.1769 - val_mean_squared_error: 0.0589
Epoch 59/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1729 - mean_absolute_error: 0.1729 - mean_squared_error: 0.0555
Epoch 00059: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 107us/sample - loss: 0.1722 - mean_absolute_error: 0.1722 - mean_squared_error: 0.0552 - val_loss: 0.1533 - val_mean_absolute_error: 0.1533 - val_mean_squared_error: 0.0467
Epoch 60/500
10048/10471 [=====.>..] - ETA: 0s - loss: 0.1698 - mean_absolute_error: 0.1698 - mean_squared_error: 0.0540
Epoch 00060: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 108us/sample - loss: 0.1698 - mean_absolute_error: 0.1700 - mean_squared_error: 0.0542 - val_loss: 0.1509 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0462
Epoch 61/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1661 - mean_absolute_error: 0.1661 - mean_squared_error: 0.0528
Epoch 00061: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 116us/sample - loss: 0.1661 - mean_absolute_error: 0.1661 - mean_squared_error: 0.0527 - val_loss: 0.1562 - val_mean_absolute_error: 0.1562 - val_mean_squared_error: 0.0451
Epoch 62/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1700 - mean_absolute_error: 0.1700 - mean_squared_error: 0.0546
Epoch 00062: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 114us/sample - loss: 0.1700 - mean_absolute_error: 0.1700 - mean_squared_error: 0.0545 - val_loss: 0.1573 - val_mean_absolute_error: 0.1572 - val_mean_squared_error: 0.0500
Epoch 63/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1696 - mean_absolute_error: 0.1696 - mean_squared_error: 0.0540
Epoch 00063: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 118us/sample - loss: 0.1717 - mean_absolute_error: 0.1719 - mean_squared_error: 0.0551 - val_loss: 0.2714 - val_mean_absolute_error: 0.2712 - val_mean_squared_error: 0.1074
Epoch 64/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1733 - mean_absolute_error: 0.1733 - mean_squared_error: 0.0562
Epoch 00064: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 115us/sample - loss: 0.1735 - mean_absolute_error: 0.1736 - mean_squared_error: 0.0563 - val_loss: 0.2360 - val_mean_absolute_error: 0.2359 - val_mean_squared_error: 0.0871
Epoch 65/500
10016/10471 [=====.>..] - ETA: 0s - loss: 0.1633 - mean_absolute_error:
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ror: 0.1633 - mean_squared_error: 0.0513
Epoch 00065: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 114us/sample - loss: 0.1643 - mean_absolute_error: 0.1645 - mean_squared_error: 0.0519 - val_loss: 0.1699 - val_mean_absolute_error: 0.1698 - val_mean_squared_error: 0.0543
Epoch 66/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1705 - mean_absolute_error: 0.1705 - mean_squared_error: 0.0547
Epoch 00066: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 116us/sample - loss: 0.1701 - mean_absolute_error: 0.1701 - mean_squared_error: 0.0545 - val_loss: 0.1524 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0481
Epoch 67/500
10112/10471 [=====.>..] - ETA: 0s - loss: 0.1734 - mean_absolute_error: 0.1734 - mean_squared_error: 0.0561
Epoch 00067: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 120us/sample - loss: 0.1738 - mean_absolute_error: 0.1740 - mean_squared_error: 0.0563 - val_loss: 0.1839 - val_mean_absolute_error: 0.1838 - val_mean_squared_error: 0.0614
Epoch 68/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1687 - mean_absolute_error: 0.1687 - mean_squared_error: 0.0546
Epoch 00068: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 117us/sample - loss: 0.1686 - mean_absolute_error: 0.1692 - mean_squared_error: 0.0549 - val_loss: 0.2034 - val_mean_absolute_error: 0.2035 - val_mean_squared_error: 0.0639
Epoch 69/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1708 - mean_absolute_error: 0.1708 - mean_squared_error: 0.0550
Epoch 00069: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 116us/sample - loss: 0.1705 - mean_absolute_error: 0.1706 - mean_squared_error: 0.0547 - val_loss: 0.1984 - val_mean_absolute_error: 0.1982 - val_mean_squared_error: 0.0698
Epoch 70/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1676 - mean_absolute_error: 0.1676 - mean_squared_error: 0.0537
Epoch 00070: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 115us/sample - loss: 0.1684 - mean_absolute_error: 0.1683 - mean_squared_error: 0.0541 - val_loss: 0.1611 - val_mean_absolute_error: 0.1611 - val_mean_squared_error: 0.0473
Epoch 71/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1703 - mean_absolute_error: 0.1703 - mean_squared_error: 0.0539
Epoch 00071: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 115us/sample - loss: 0.1704 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0546 - val_loss: 0.1552 - val_mean_absolute_error: 0.1552 - val_mean_squared_error: 0.0460
Epoch 72/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1639 - mean_absolute_error: 0.1639 - mean_squared_error: 0.0516
Epoch 00072: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 116us/sample - loss: 0.1639 - mean_absolute_error: 0.1637 - mean_squared_error: 0.0514 - val_loss: 0.1521 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0449
Epoch 73/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1696 - mean_absolute_error: 0.1696 - mean_squared_error: 0.0538
Epoch 00073: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 117us/sample - loss: 0.1695 - mean_absolute_error: 0.1696 - mean_squared_error: 0.0538 - val_loss: 0.1719 - val_mean_absolute_error: 0.1718 - val_mean_squared_error: 0.0559
```

Epoch 74/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1744 - mean_absolute_error: 0.1744 - mean_squared_error: 0.0557
Epoch 00074: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 117us/sample - loss: 0.1741 - mean_absolute_error: 0.1743 - mean_squared_error: 0.0558 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0446
Epoch 75/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1597 - mean_absolute_error: 0.1597 - mean_squared_error: 0.0502
Epoch 00075: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 117us/sample - loss: 0.1597 - mean_absolute_error: 0.1597 - mean_squared_error: 0.0501 - val_loss: 0.1492 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0444
Epoch 76/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1609 - mean_absolute_error: 0.1609 - mean_squared_error: 0.0504
Epoch 00076: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 115us/sample - loss: 0.1612 - mean_absolute_error: 0.1612 - mean_squared_error: 0.0505 - val_loss: 0.1559 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0462
Epoch 77/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1619 - mean_absolute_error: 0.1619 - mean_squared_error: 0.0504
Epoch 00077: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 115us/sample - loss: 0.1622 - mean_absolute_error: 0.1624 - mean_squared_error: 0.0508 - val_loss: 0.1592 - val_mean_absolute_error: 0.1592 - val_mean_squared_error: 0.0464
Epoch 78/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1631 - mean_absolute_error: 0.1631 - mean_squared_error: 0.0516
Epoch 00078: val_loss did not improve from 0.14417
10471/10471 [=====] - 1s 117us/sample - loss: 0.1631 - mean_absolute_error: 0.1631 - mean_squared_error: 0.0513 - val_loss: 0.1663 - val_mean_absolute_error: 0.1663 - val_mean_squared_error: 0.0555
Epoch 79/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1603 - mean_absolute_error: 0.1603 - mean_squared_error: 0.0496
Epoch 00079: val_loss improved from 0.14417 to 0.13774, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 118us/sample - loss: 0.1602 - mean_absolute_error: 0.1603 - mean_squared_error: 0.0496 - val_loss: 0.1377 - val_mean_absolute_error: 0.1377 - val_mean_squared_error: 0.0410
Epoch 80/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1704 - mean_absolute_error: 0.1704 - mean_squared_error: 0.0539
Epoch 00080: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 118us/sample - loss: 0.1704 - mean_absolute_error: 0.1712 - mean_squared_error: 0.0549 - val_loss: 0.1416 - val_mean_absolute_error: 0.1416 - val_mean_squared_error: 0.0430
Epoch 81/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1614 - mean_absolute_error: 0.1614 - mean_squared_error: 0.0499
Epoch 00081: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 116us/sample - loss: 0.1612 - mean_absolute_error: 0.1611 - mean_squared_error: 0.0496 - val_loss: 0.1992 - val_mean_absolute_error: 0.1990 - val_mean_squared_error: 0.0688
Epoch 82/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1603 - mean_absolute_error: 0.1603 - mean_squared_error: 0.0501
Epoch 00082: val_loss did not improve from 0.13774

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10471/10471 [=====] - 1s 117us/sample - loss: 0.1602 - mean_absolute_error: 0.1605 - mean_squared_error: 0.0502 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0438
Epoch 83/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1596 - mean_absolute_error: 0.1596 - mean_squared_error: 0.0499
Epoch 00083: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 117us/sample - loss: 0.1599 - mean_absolute_error: 0.1601 - mean_squared_error: 0.0502 - val_loss: 0.1743 - val_mean_absolute_error: 0.1744 - val_mean_squared_error: 0.0518
Epoch 84/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1592 - mean_absolute_error: 0.1592 - mean_squared_error: 0.0495
Epoch 00084: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 115us/sample - loss: 0.1594 - mean_absolute_error: 0.1598 - mean_squared_error: 0.0500 - val_loss: 0.1407 - val_mean_absolute_error: 0.1406 - val_mean_squared_error: 0.0421
Epoch 85/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1604 - mean_absolute_error: 0.1604 - mean_squared_error: 0.0501
Epoch 00085: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 111us/sample - loss: 0.1604 - mean_absolute_error: 0.1605 - mean_squared_error: 0.0501 - val_loss: 0.1605 - val_mean_absolute_error: 0.1605 - val_mean_squared_error: 0.0535
Epoch 86/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1687 - mean_absolute_error: 0.1687 - mean_squared_error: 0.0540
Epoch 00086: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 106us/sample - loss: 0.1683 - mean_absolute_error: 0.1683 - mean_squared_error: 0.0537 - val_loss: 0.1650 - val_mean_absolute_error: 0.1649 - val_mean_squared_error: 0.0535
Epoch 87/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1573 - mean_absolute_error: 0.1573 - mean_squared_error: 0.0483
Epoch 00087: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 110us/sample - loss: 0.1574 - mean_absolute_error: 0.1575 - mean_squared_error: 0.0487 - val_loss: 0.1499 - val_mean_absolute_error: 0.1499 - val_mean_squared_error: 0.0432
Epoch 88/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1561 - mean_absolute_error: 0.1561 - mean_squared_error: 0.0481
Epoch 00088: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 116us/sample - loss: 0.1559 - mean_absolute_error: 0.1564 - mean_squared_error: 0.0484 - val_loss: 0.1447 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0431
Epoch 89/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1614 - mean_absolute_error: 0.1614 - mean_squared_error: 0.0503
Epoch 00089: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 117us/sample - loss: 0.1612 - mean_absolute_error: 0.1613 - mean_squared_error: 0.0502 - val_loss: 0.1474 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0458
Epoch 90/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1607 - mean_absolute_error: 0.1607 - mean_squared_error: 0.0495
Epoch 00090: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 116us/sample - loss: 0.1601 - mean_absolute_error: 0.1601 - mean_squared_error: 0.0492 - val_loss: 0.1426 - val_mean_absolute_error: 0.1426 - val_mean_squared_error: 0.0426
Epoch 91/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1572 - mean_absolute_error:
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ror: 0.1572 - mean_squared_error: 0.0484
Epoch 00091: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 117us/sample - loss: 0.1569 - mean_absolute_error: 0.1569 - mean_squared_error: 0.0485 - val_loss: 0.1459 - val_mean_absolute_error: 0.1459 - val_mean_squared_error: 0.0441
Epoch 92/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1630 - mean_absolute_error: 0.1630 - mean_squared_error: 0.0508
Epoch 00092: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 119us/sample - loss: 0.1628 - mean_absolute_error: 0.1630 - mean_squared_error: 0.0507 - val_loss: 0.1694 - val_mean_absolute_error: 0.1695 - val_mean_squared_error: 0.0522
Epoch 93/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1587 - mean_absolute_error: 0.1587 - mean_squared_error: 0.0490
Epoch 00093: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 117us/sample - loss: 0.1587 - mean_absolute_error: 0.1588 - mean_squared_error: 0.0491 - val_loss: 0.1479 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0455
Epoch 94/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1586 - mean_absolute_error: 0.1586 - mean_squared_error: 0.0493
Epoch 00094: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 118us/sample - loss: 0.1583 - mean_absolute_error: 0.1585 - mean_squared_error: 0.0491 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0426
Epoch 95/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1604 - mean_absolute_error: 0.1604 - mean_squared_error: 0.0498
Epoch 00095: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 117us/sample - loss: 0.1607 - mean_absolute_error: 0.1614 - mean_squared_error: 0.0504 - val_loss: 0.1843 - val_mean_absolute_error: 0.1844 - val_mean_squared_error: 0.0579
Epoch 96/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1563 - mean_absolute_error: 0.1563 - mean_squared_error: 0.0482
Epoch 00096: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 117us/sample - loss: 0.1563 - mean_absolute_error: 0.1562 - mean_squared_error: 0.0481 - val_loss: 0.1436 - val_mean_absolute_error: 0.1436 - val_mean_squared_error: 0.0427
Epoch 97/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1578 - mean_absolute_error: 0.1578 - mean_squared_error: 0.0488
Epoch 00097: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 115us/sample - loss: 0.1579 - mean_absolute_error: 0.1582 - mean_squared_error: 0.0490 - val_loss: 0.1559 - val_mean_absolute_error: 0.1558 - val_mean_squared_error: 0.0486
Epoch 98/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1606 - mean_absolute_error: 0.1606 - mean_squared_error: 0.0498
Epoch 00098: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 116us/sample - loss: 0.1603 - mean_absolute_error: 0.1604 - mean_squared_error: 0.0499 - val_loss: 0.1558 - val_mean_absolute_error: 0.1558 - val_mean_squared_error: 0.0460
Epoch 99/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1552 - mean_absolute_error: 0.1552 - mean_squared_error: 0.0475
Epoch 00099: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 117us/sample - loss: 0.1552 - mean_absolute_error: 0.1554 - mean_squared_error: 0.0475 - val_loss: 0.1575 - val_mean_absolute_error: 0.1574 - val_mean_squared_error: 0.0491
```

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Epoch 100/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1534 - mean_absolute_error: 0.1534 - mean_squared_error: 0.0471
Epoch 00100: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 116us/sample - loss: 0.1533 - mean_absolute_error: 0.1537 - mean_squared_error: 0.0472 - val_loss: 0.1562 - val_mean_absolute_error: 0.1561 - val_mean_squared_error: 0.0507
Epoch 101/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1599 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0494
Epoch 00101: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 115us/sample - loss: 0.1597 - mean_absolute_error: 0.1596 - mean_squared_error: 0.0493 - val_loss: 0.1465 - val_mean_absolute_error: 0.1465 - val_mean_squared_error: 0.0450
Epoch 102/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1527 - mean_absolute_error: 0.1527 - mean_squared_error: 0.0468
Epoch 00102: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 115us/sample - loss: 0.1527 - mean_absolute_error: 0.1529 - mean_squared_error: 0.0468 - val_loss: 0.1406 - val_mean_absolute_error: 0.1406 - val_mean_squared_error: 0.0421
Epoch 103/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1553 - mean_absolute_error: 0.1553 - mean_squared_error: 0.0472
Epoch 00103: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 116us/sample - loss: 0.1552 - mean_absolute_error: 0.1552 - mean_squared_error: 0.0472 - val_loss: 0.1414 - val_mean_absolute_error: 0.1414 - val_mean_squared_error: 0.0430
Epoch 104/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1524 - mean_absolute_error: 0.1524 - mean_squared_error: 0.0463Restoring model weights from the end of the best epoch.

Epoch 00104: val_loss did not improve from 0.13774
10471/10471 [=====] - 1s 117us/sample - loss: 0.1525 - mean_absolute_error: 0.1525 - mean_squared_error: 0.0462 - val_loss: 0.1639 - val_mean_absolute_error: 0.1640 - val_mean_squared_error: 0.0486
Epoch 00104: early stopping
MAE: 0.1377311
RMSE: 0.2025712
Adding initial Dense layers with 32
Adding Dense layer with 32
Adding last layer with 32
Outputting predictive model - Tabular
Model: "model_83"

```

Layer (type)	Output Shape	Param #
input_84 (InputLayer)	[(None, 61)]	0
batch_normalization_143 (BatchNormalization)	(None, 61)	244
dense_598 (Dense)	(None, 32)	1984
batch_normalization_144 (BatchNormalization)	(None, 32)	128

dense_599 (Dense)	(None, 32)	1056
batch_normalization_145 (Batch Normalization)	(None, 32)	128
dense_600 (Dense)	(None, 32)	1056
batch_normalization_146 (Batch Normalization)	(None, 32)	128
dense_601 (Dense)	(None, 32)	1056
batch_normalization_147 (Batch Normalization)	(None, 32)	128
dense_602 (Dense)	(None, 32)	1056
batch_normalization_148 (Batch Normalization)	(None, 32)	128
dense_603 (Dense)	(None, 32)	1056
batch_normalization_149 (Batch Normalization)	(None, 32)	128
dense_604 (Dense)	(None, 32)	1056
batch_normalization_150 (Batch Normalization)	(None, 32)	128
dense_605 (Dense)	(None, 32)	1056
dense_606 (Dense)	(None, 1)	33
<hr/>		

Total params: 10,549

Trainable params: 9,979

Non-trainable params: 570

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10432/10471 [=====>.] - ETA: 0s - loss: 2.0507 - mean_absolute_error: 2.0507 - mean_squared_error: 15.3044

Epoch 00001: val_loss improved from inf to 0.55744, saving model to best_basic_model.hdf5

10471/10471 [=====] - 3s 306us/sample - loss: 2.0454 - mean_absolute_error: 2.0427 - mean_squared_error: 15.2165 - val_loss: 0.5574 - val_mean_absolute_error: 0.5577 - val_mean_squared_error: 0.6130

Epoch 2/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.4867 - mean_absolute_error: 0.4867 - mean_squared_error: 0.3806

Epoch 00002: val_loss improved from 0.55744 to 0.53596, saving model to best_basic_model.hdf5

10471/10471 [=====] - 2s 165us/sample - loss: 0.4872 - mean_absolute_error: 0.4874 - mean_squared_error: 0.3810 - val_loss: 0.5360 - val_mean_absolute_error: 0.5365 - val_mean_squared_error: 0.5690

Epoch 3/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.3893 - mean_absolute_error: 0.3893 - mean_squared_error: 0.2446

Epoch 00003: val_loss improved from 0.53596 to 0.42032, saving model to best_basic_model.hdf5

10471/10471 [=====] - 2s 165us/sample - loss: 0.3894 - mean_absolute_error: 0.3893 - mean_squared_error: 0.2442 - val_loss: 0.4203 - val_mean_absolute_error: 0.4204 - val_mean_squared_error: 0.3264

Epoch 4/500

10432/10471 [=====>.] - ETA: 0s - loss: 0.3340 - mean_absolute_error:

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ror: 0.3340 - mean_squared_error: 0.1824
Epoch 00004: val_loss improved from 0.42032 to 0.41067, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 167us/sample - loss: 0.3345 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1842 - val_loss: 0.4107 - val_mean_absolute_error: 0.4108 - val_mean_squared_error: 0.2561
Epoch 5/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.3361 - mean_absolute_error: 0.3361 - mean_squared_error: 0.1851
Epoch 00005: val_loss did not improve from 0.41067
10471/10471 [=====] - 2s 149us/sample - loss: 0.3349 - mean_absolute_error: 0.3350 - mean_squared_error: 0.1843 - val_loss: 0.6099 - val_mean_absolute_error: 0.6101 - val_mean_squared_error: 0.4773
Epoch 6/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.3186 - mean_absolute_error: 0.3186 - mean_squared_error: 0.1640
Epoch 00006: val_loss improved from 0.41067 to 0.24100, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 162us/sample - loss: 0.3182 - mean_absolute_error: 0.3180 - mean_squared_error: 0.1633 - val_loss: 0.2410 - val_mean_absolute_error: 0.2410 - val_mean_squared_error: 0.0964
Epoch 7/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.2757 - mean_absolute_error: 0.2757 - mean_squared_error: 0.1254
Epoch 00007: val_loss did not improve from 0.24100
10471/10471 [=====] - 2s 159us/sample - loss: 0.2752 - mean_absolute_error: 0.2751 - mean_squared_error: 0.1250 - val_loss: 0.3539 - val_mean_absolute_error: 0.3541 - val_mean_squared_error: 0.1871
Epoch 8/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.2731 - mean_absolute_error: 0.2731 - mean_squared_error: 0.1239
Epoch 00008: val_loss did not improve from 0.24100
10471/10471 [=====] - 2s 160us/sample - loss: 0.2718 - mean_absolute_error: 0.2716 - mean_squared_error: 0.1228 - val_loss: 0.4167 - val_mean_absolute_error: 0.4168 - val_mean_squared_error: 0.2348
Epoch 9/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.2644 - mean_absolute_error: 0.2644 - mean_squared_error: 0.1142
Epoch 00009: val_loss improved from 0.24100 to 0.19816, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 165us/sample - loss: 0.2634 - mean_absolute_error: 0.2635 - mean_squared_error: 0.1135 - val_loss: 0.1982 - val_mean_absolute_error: 0.1983 - val_mean_squared_error: 0.0700
Epoch 10/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.2447 - mean_absolute_error: 0.2447 - mean_squared_error: 0.1013
Epoch 00010: val_loss improved from 0.19816 to 0.17551, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 163us/sample - loss: 0.2440 - mean_absolute_error: 0.2440 - mean_squared_error: 0.1008 - val_loss: 0.1755 - val_mean_absolute_error: 0.1755 - val_mean_squared_error: 0.0600
Epoch 11/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.2418 - mean_absolute_error: 0.2418 - mean_squared_error: 0.0967
Epoch 00011: val_loss did not improve from 0.17551
10471/10471 [=====] - 2s 159us/sample - loss: 0.2418 - mean_absolute_error: 0.2419 - mean_squared_error: 0.0968 - val_loss: 0.2361 - val_mean_absolute_error: 0.2362 - val_mean_squared_error: 0.0964
Epoch 12/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.2434 - mean_absolute_error: 0.2434 - mean_squared_error: 0.0992
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Epoch 00012: val_loss did not improve from 0.17551
10471/10471 [=====] - 2s 162us/sample - loss: 0.2435 - mean_absolute_error: 0.2437 - mean_squared_error: 0.0992 - val_loss: 0.2191 - val_mean_absolute_error: 0.2191 - val_mean_squared_error: 0.0843
Epoch 13/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2327 - mean_absolute_error: 0.2327 - mean_squared_error: 0.0911
Epoch 00013: val_loss did not improve from 0.17551
10471/10471 [=====] - 2s 159us/sample - loss: 0.2332 - mean_absolute_error: 0.2338 - mean_squared_error: 0.0922 - val_loss: 0.2513 - val_mean_absolute_error: 0.2513 - val_mean_squared_error: 0.0981
Epoch 14/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2202 - mean_absolute_error: 0.2202 - mean_squared_error: 0.0825
Epoch 00014: val_loss did not improve from 0.17551
10471/10471 [=====] - 2s 158us/sample - loss: 0.2196 - mean_absolute_error: 0.2198 - mean_squared_error: 0.0822 - val_loss: 0.1980 - val_mean_absolute_error: 0.1979 - val_mean_squared_error: 0.0717
Epoch 15/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.2121 - mean_absolute_error: 0.2121 - mean_squared_error: 0.0787
Epoch 00015: val_loss did not improve from 0.17551
10471/10471 [=====] - 2s 162us/sample - loss: 0.2122 - mean_absolute_error: 0.2123 - mean_squared_error: 0.0786 - val_loss: 0.2255 - val_mean_absolute_error: 0.2255 - val_mean_squared_error: 0.0849
Epoch 16/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.2025 - mean_absolute_error: 0.2025 - mean_squared_error: 0.0718
Epoch 00016: val_loss improved from 0.17551 to 0.16230, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 166us/sample - loss: 0.2021 - mean_absolute_error: 0.2023 - mean_squared_error: 0.0715 - val_loss: 0.1623 - val_mean_absolute_error: 0.1623 - val_mean_squared_error: 0.0522
Epoch 17/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.2043 - mean_absolute_error: 0.2043 - mean_squared_error: 0.0721
Epoch 00017: val_loss improved from 0.16230 to 0.16112, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 168us/sample - loss: 0.2042 - mean_absolute_error: 0.2040 - mean_squared_error: 0.0719 - val_loss: 0.1611 - val_mean_absolute_error: 0.1611 - val_mean_squared_error: 0.0525
Epoch 18/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2266 - mean_absolute_error: 0.2266 - mean_squared_error: 0.0853
Epoch 00018: val_loss did not improve from 0.16112
10471/10471 [=====] - 2s 159us/sample - loss: 0.2270 - mean_absolute_error: 0.2272 - mean_squared_error: 0.0857 - val_loss: 0.1692 - val_mean_absolute_error: 0.1691 - val_mean_squared_error: 0.0580
Epoch 19/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2062 - mean_absolute_error: 0.2062 - mean_squared_error: 0.0738
Epoch 00019: val_loss did not improve from 0.16112
10471/10471 [=====] - 2s 160us/sample - loss: 0.2075 - mean_absolute_error: 0.2078 - mean_squared_error: 0.0747 - val_loss: 0.1647 - val_mean_absolute_error: 0.1648 - val_mean_squared_error: 0.0546
Epoch 20/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1870 - mean_absolute_error: 0.1870 - mean_squared_error: 0.0622
Epoch 00020: val_loss improved from 0.16112 to 0.15496, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 163us/sample - loss: 0.1866 - mean_absolute_error:
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olute_error: 0.1869 - mean_squared_error: 0.0623 - val_loss: 0.1550 - val_mean_absolute_error: 0.1549 - val_mean_squared_error: 0.0502
Epoch 21/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1888 - mean_absolute_error: 0.1888 - mean_squared_error: 0.0640
Epoch 00021: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 161us/sample - loss: 0.1886 - mean_absolute_error: 0.1892 - mean_squared_error: 0.0642 - val_loss: 0.1552 - val_mean_absolute_error: 0.1552 - val_mean_squared_error: 0.0489
Epoch 22/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1957 - mean_absolute_error: 0.1957 - mean_squared_error: 0.0683
Epoch 00022: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 163us/sample - loss: 0.1954 - mean_absolute_error: 0.1954 - mean_squared_error: 0.0681 - val_loss: 0.1767 - val_mean_absolute_error: 0.1767 - val_mean_squared_error: 0.0607
Epoch 23/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2010 - mean_absolute_error: 0.2010 - mean_squared_error: 0.0716
Epoch 00023: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 159us/sample - loss: 0.2003 - mean_absolute_error: 0.2005 - mean_squared_error: 0.0714 - val_loss: 0.1729 - val_mean_absolute_error: 0.1729 - val_mean_squared_error: 0.0583
Epoch 24/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1904 - mean_absolute_error: 0.1904 - mean_squared_error: 0.0645
Epoch 00024: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 147us/sample - loss: 0.1913 - mean_absolute_error: 0.1917 - mean_squared_error: 0.0653 - val_loss: 0.2596 - val_mean_absolute_error: 0.2596 - val_mean_squared_error: 0.0983
Epoch 25/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1926 - mean_absolute_error: 0.1926 - mean_squared_error: 0.0667
Epoch 00025: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 154us/sample - loss: 0.1942 - mean_absolute_error: 0.1943 - mean_squared_error: 0.0677 - val_loss: 0.2649 - val_mean_absolute_error: 0.2648 - val_mean_squared_error: 0.1085
Epoch 26/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1934 - mean_absolute_error: 0.1934 - mean_squared_error: 0.0670
Epoch 00026: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 160us/sample - loss: 0.1935 - mean_absolute_error: 0.1939 - mean_squared_error: 0.0675 - val_loss: 0.2080 - val_mean_absolute_error: 0.2080 - val_mean_squared_error: 0.0768
Epoch 27/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1832 - mean_absolute_error: 0.1832 - mean_squared_error: 0.0610
Epoch 00027: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 159us/sample - loss: 0.1829 - mean_absolute_error: 0.1829 - mean_squared_error: 0.0607 - val_loss: 0.1651 - val_mean_absolute_error: 0.1651 - val_mean_squared_error: 0.0546
Epoch 28/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1916 - mean_absolute_error: 0.1916 - mean_squared_error: 0.0654
Epoch 00028: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 163us/sample - loss: 0.1915 - mean_absolute_error: 0.1915 - mean_squared_error: 0.0654 - val_loss: 0.3012 - val_mean_absolute_error: 0.3013 - val_mean_squared_error: 0.1197
Epoch 29/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1983 - mean_absolute_error: 0.1983 - mean_squared_error: 0.0693

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Epoch 00029: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 161us/sample - loss: 0.1978 - mean_absolute_error: 0.1977 - mean_squared_error: 0.0689 - val_loss: 0.1643 - val_mean_absolute_error: 0.1643 - val_mean_squared_error: 0.0519
Epoch 30/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1868 - mean_absolute_error: 0.1868 - mean_squared_error: 0.0633
Epoch 00030: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 162us/sample - loss: 0.1859 - mean_absolute_error: 0.1861 - mean_squared_error: 0.0627 - val_loss: 0.1922 - val_mean_absolute_error: 0.1922 - val_mean_squared_error: 0.0642
Epoch 31/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1889 - mean_absolute_error: 0.1889 - mean_squared_error: 0.0641
Epoch 00031: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 158us/sample - loss: 0.1890 - mean_absolute_error: 0.1889 - mean_squared_error: 0.0640 - val_loss: 0.1913 - val_mean_absolute_error: 0.1913 - val_mean_squared_error: 0.0615
Epoch 32/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1902 - mean_absolute_error: 0.1902 - mean_squared_error: 0.0647
Epoch 00032: val_loss did not improve from 0.15496
10471/10471 [=====] - 2s 158us/sample - loss: 0.1906 - mean_absolute_error: 0.1909 - mean_squared_error: 0.0653 - val_loss: 0.1885 - val_mean_absolute_error: 0.1885 - val_mean_squared_error: 0.0627
Epoch 33/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1843 - mean_absolute_error: 0.1843 - mean_squared_error: 0.0613
Epoch 00033: val_loss improved from 0.15496 to 0.14871, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 165us/sample - loss: 0.1841 - mean_absolute_error: 0.1845 - mean_squared_error: 0.0619 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0468
Epoch 34/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1856 - mean_absolute_error: 0.1856 - mean_squared_error: 0.0627
Epoch 00034: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 162us/sample - loss: 0.1858 - mean_absolute_error: 0.1862 - mean_squared_error: 0.0632 - val_loss: 0.1677 - val_mean_absolute_error: 0.1678 - val_mean_squared_error: 0.0534
Epoch 35/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1863 - mean_absolute_error: 0.1863 - mean_squared_error: 0.0634
Epoch 00035: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 159us/sample - loss: 0.1857 - mean_absolute_error: 0.1857 - mean_squared_error: 0.0629 - val_loss: 0.2133 - val_mean_absolute_error: 0.2133 - val_mean_squared_error: 0.0788
Epoch 36/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1822 - mean_absolute_error: 0.1822 - mean_squared_error: 0.0606
Epoch 00036: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 159us/sample - loss: 0.1827 - mean_absolute_error: 0.1825 - mean_squared_error: 0.0608 - val_loss: 0.1529 - val_mean_absolute_error: 0.1529 - val_mean_squared_error: 0.0501
Epoch 37/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1841 - mean_absolute_error: 0.1841 - mean_squared_error: 0.0626
Epoch 00037: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 161us/sample - loss: 0.1841 - mean_absolute_error: 0.1844 - mean_squared_error: 0.0627 - val_loss: 0.1701 - val_mean_absolute_error: 0.1701 - val_mean_squared_error: 0.0566
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Epoch 38/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1918 - mean_absolute_error: 0.1918 - mean_squared_error: 0.0650
Epoch 00038: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 158us/sample - loss: 0.1928 - mean_absolute_error: 0.1932 - mean_squared_error: 0.0658 - val_loss: 0.1615 - val_mean_absolute_error: 0.1615 - val_mean_squared_error: 0.0503
Epoch 39/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1922 - mean_absolute_error: 0.1922 - mean_squared_error: 0.0656
Epoch 00039: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 161us/sample - loss: 0.1918 - mean_absolute_error: 0.1921 - mean_squared_error: 0.0658 - val_loss: 0.1683 - val_mean_absolute_error: 0.1684 - val_mean_squared_error: 0.0545
Epoch 40/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1762 - mean_absolute_error: 0.1762 - mean_squared_error: 0.0575
Epoch 00040: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 159us/sample - loss: 0.1764 - mean_absolute_error: 0.1766 - mean_squared_error: 0.0578 - val_loss: 0.1867 - val_mean_absolute_error: 0.1868 - val_mean_squared_error: 0.0640
Epoch 41/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1863 - mean_absolute_error: 0.1863 - mean_squared_error: 0.0632
Epoch 00041: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 159us/sample - loss: 0.1866 - mean_absolute_error: 0.1868 - mean_squared_error: 0.0633 - val_loss: 0.1697 - val_mean_absolute_error: 0.1697 - val_mean_squared_error: 0.0565
Epoch 42/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1738 - mean_absolute_error: 0.1738 - mean_squared_error: 0.0566
Epoch 00042: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 158us/sample - loss: 0.1738 - mean_absolute_error: 0.1738 - mean_squared_error: 0.0565 - val_loss: 0.1512 - val_mean_absolute_error: 0.1512 - val_mean_squared_error: 0.0474
Epoch 43/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1816 - mean_absolute_error: 0.1816 - mean_squared_error: 0.0599
Epoch 00043: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 153us/sample - loss: 0.1821 - mean_absolute_error: 0.1820 - mean_squared_error: 0.0602 - val_loss: 0.1682 - val_mean_absolute_error: 0.1683 - val_mean_squared_error: 0.0524
Epoch 44/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1707 - mean_absolute_error: 0.1707 - mean_squared_error: 0.0547
Epoch 00044: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 152us/sample - loss: 0.1712 - mean_absolute_error: 0.1716 - mean_squared_error: 0.0552 - val_loss: 0.1642 - val_mean_absolute_error: 0.1643 - val_mean_squared_error: 0.0537
Epoch 45/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1771 - mean_absolute_error: 0.1771 - mean_squared_error: 0.0585
Epoch 00045: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 161us/sample - loss: 0.1771 - mean_absolute_error: 0.1770 - mean_squared_error: 0.0584 - val_loss: 0.2337 - val_mean_absolute_error: 0.2335 - val_mean_squared_error: 0.0898
Epoch 46/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1869 - mean_absolute_error: 0.1869 - mean_squared_error: 0.0638
Epoch 00046: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 157us/sample - loss: 0.1871 - mean_absolute_error:

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olute_error: 0.1871 - mean_squared_error: 0.0639 - val_loss: 0.2166 - val_mean_absolute_
error: 0.2167 - val_mean_squared_error: 0.0730
Epoch 47/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1733 - mean_absolute_er
ror: 0.1733 - mean_squared_error: 0.0562
Epoch 00047: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 158us/sample - loss: 0.1733 - mean_abs
olute_error: 0.1734 - mean_squared_error: 0.0563 - val_loss: 0.2006 - val_mean_absolute_
error: 0.2006 - val_mean_squared_error: 0.0651
Epoch 48/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1740 - mean_absolute_er
ror: 0.1740 - mean_squared_error: 0.0562
Epoch 00048: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 160us/sample - loss: 0.1752 - mean_abs
olute_error: 0.1756 - mean_squared_error: 0.0570 - val_loss: 0.2920 - val_mean_absolute_
error: 0.2919 - val_mean_squared_error: 0.1224
Epoch 49/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1881 - mean_absolute_er
ror: 0.1881 - mean_squared_error: 0.0637
Epoch 00049: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 161us/sample - loss: 0.1881 - mean_abs
olute_error: 0.1882 - mean_squared_error: 0.0637 - val_loss: 0.1538 - val_mean_absolute_
error: 0.1538 - val_mean_squared_error: 0.0496
Epoch 50/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1722 - mean_absolute_er
ror: 0.1722 - mean_squared_error: 0.0556
Epoch 00050: val_loss did not improve from 0.14871
10471/10471 [=====] - 2s 156us/sample - loss: 0.1723 - mean_abs
olute_error: 0.1723 - mean_squared_error: 0.0558 - val_loss: 0.1580 - val_mean_absolute_
error: 0.1580 - val_mean_squared_error: 0.0495
Epoch 51/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1793 - mean_absolute_er
ror: 0.1793 - mean_squared_error: 0.0592
Epoch 00051: val_loss improved from 0.14871 to 0.14713, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 160us/sample - loss: 0.1793 - mean_abs
olute_error: 0.1792 - mean_squared_error: 0.0591 - val_loss: 0.1471 - val_mean_absolute_
error: 0.1471 - val_mean_squared_error: 0.0464
Epoch 52/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1874 - mean_absolute_er
ror: 0.1874 - mean_squared_error: 0.0633
Epoch 00052: val_loss did not improve from 0.14713
10471/10471 [=====] - 2s 148us/sample - loss: 0.1868 - mean_abs
olute_error: 0.1868 - mean_squared_error: 0.0630 - val_loss: 0.1595 - val_mean_absolute_
error: 0.1595 - val_mean_squared_error: 0.0527
Epoch 53/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1825 - mean_absolute_er
ror: 0.1825 - mean_squared_error: 0.0608
Epoch 00053: val_loss improved from 0.14713 to 0.14572, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 160us/sample - loss: 0.1814 - mean_abs
olute_error: 0.1815 - mean_squared_error: 0.0603 - val_loss: 0.1457 - val_mean_absolute_
error: 0.1457 - val_mean_squared_error: 0.0452
Epoch 54/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1707 - mean_absolute_er
ror: 0.1707 - mean_squared_error: 0.0549
Epoch 00054: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 158us/sample - loss: 0.1707 - mean_abs
olute_error: 0.1706 - mean_squared_error: 0.0549 - val_loss: 0.1541 - val_mean_absolute_
error: 0.1541 - val_mean_squared_error: 0.0479
Epoch 55/500
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10368/10471 [=====>.] - ETA: 0s - loss: 0.1799 - mean_absolute_error: 0.1799 - mean_squared_error: 0.0593
Epoch 00055: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 159us/sample - loss: 0.1800 - mean_absolute_error: 0.1799 - mean_squared_error: 0.0593 - val_loss: 0.1764 - val_mean_absolute_error: 0.1765 - val_mean_squared_error: 0.0550
Epoch 56/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1830 - mean_absolute_error: 0.1830 - mean_squared_error: 0.0611
Epoch 00056: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 161us/sample - loss: 0.1838 - mean_absolute_error: 0.1838 - mean_squared_error: 0.0616 - val_loss: 0.1710 - val_mean_absolute_error: 0.1710 - val_mean_squared_error: 0.0551
Epoch 57/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1790 - mean_absolute_error: 0.1790 - mean_squared_error: 0.0593
Epoch 00057: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 157us/sample - loss: 0.1786 - mean_absolute_error: 0.1785 - mean_squared_error: 0.0590 - val_loss: 0.1468 - val_mean_absolute_error: 0.1468 - val_mean_squared_error: 0.0455
Epoch 58/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1744 - mean_absolute_error: 0.1744 - mean_squared_error: 0.0555
Epoch 00058: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 160us/sample - loss: 0.1740 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0553 - val_loss: 0.1540 - val_mean_absolute_error: 0.1540 - val_mean_squared_error: 0.0471
Epoch 59/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1828 - mean_absolute_error: 0.1828 - mean_squared_error: 0.0607
Epoch 00059: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 160us/sample - loss: 0.1822 - mean_absolute_error: 0.1825 - mean_squared_error: 0.0608 - val_loss: 0.1555 - val_mean_absolute_error: 0.1555 - val_mean_squared_error: 0.0482
Epoch 60/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1727 - mean_absolute_error: 0.1727 - mean_squared_error: 0.0553
Epoch 00060: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 158us/sample - loss: 0.1727 - mean_absolute_error: 0.1733 - mean_squared_error: 0.0557 - val_loss: 0.2454 - val_mean_absolute_error: 0.2452 - val_mean_squared_error: 0.0961
Epoch 61/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1704 - mean_absolute_error: 0.1704 - mean_squared_error: 0.0549
Epoch 00061: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 160us/sample - loss: 0.1704 - mean_absolute_error: 0.1709 - mean_squared_error: 0.0556 - val_loss: 0.1569 - val_mean_absolute_error: 0.1569 - val_mean_squared_error: 0.0508
Epoch 62/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1695 - mean_absolute_error: 0.1695 - mean_squared_error: 0.0537
Epoch 00062: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 157us/sample - loss: 0.1694 - mean_absolute_error: 0.1693 - mean_squared_error: 0.0535 - val_loss: 0.1907 - val_mean_absolute_error: 0.1907 - val_mean_squared_error: 0.0666
Epoch 63/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1718 - mean_absolute_error: 0.1718 - mean_squared_error: 0.0554
Epoch 00063: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 146us/sample - loss: 0.1716 - mean_absolute_error: 0.1719 - mean_squared_error: 0.0554 - val_loss: 0.1476 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0554
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error: 0.1476 - val_mean_squared_error: 0.0445
Epoch 64/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1713 - mean_absolute_error: 0.1713 - mean_squared_error: 0.0553
Epoch 00064: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 156us/sample - loss: 0.1716 - mean_absolute_error: 0.1716 - mean_squared_error: 0.0553 - val_loss: 0.1528 - val_mean_absolute_error: 0.1527 - val_mean_squared_error: 0.0491
Epoch 65/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1728 - mean_absolute_error: 0.1728 - mean_squared_error: 0.0560
Epoch 00065: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 157us/sample - loss: 0.1735 - mean_absolute_error: 0.1735 - mean_squared_error: 0.0565 - val_loss: 0.1620 - val_mean_absolute_error: 0.1620 - val_mean_squared_error: 0.0524
Epoch 66/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1711 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0551
Epoch 00066: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 158us/sample - loss: 0.1715 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0554 - val_loss: 0.1696 - val_mean_absolute_error: 0.1696 - val_mean_squared_error: 0.0535
Epoch 67/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1706 - mean_absolute_error: 0.1706 - mean_squared_error: 0.0545
Epoch 00067: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 157us/sample - loss: 0.1705 - mean_absolute_error: 0.1704 - mean_squared_error: 0.0543 - val_loss: 0.1504 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0477
Epoch 68/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1672 - mean_absolute_error: 0.1672 - mean_squared_error: 0.0531
Epoch 00068: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 159us/sample - loss: 0.1669 - mean_absolute_error: 0.1669 - mean_squared_error: 0.0530 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0470
Epoch 69/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1668 - mean_absolute_error: 0.1668 - mean_squared_error: 0.0530
Epoch 00069: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 157us/sample - loss: 0.1670 - mean_absolute_error: 0.1675 - mean_squared_error: 0.0534 - val_loss: 0.1530 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0480
Epoch 70/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1703 - mean_absolute_error: 0.1703 - mean_squared_error: 0.0549
Epoch 00070: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 158us/sample - loss: 0.1703 - mean_absolute_error: 0.1703 - mean_squared_error: 0.0549 - val_loss: 0.2247 - val_mean_absolute_error: 0.2248 - val_mean_squared_error: 0.0874
Epoch 71/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1776 - mean_absolute_error: 0.1776 - mean_squared_error: 0.0583
Epoch 00071: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 160us/sample - loss: 0.1775 - mean_absolute_error: 0.1774 - mean_squared_error: 0.0580 - val_loss: 0.2090 - val_mean_absolute_error: 0.2089 - val_mean_squared_error: 0.0747
Epoch 72/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1706 - mean_absolute_error: 0.1706 - mean_squared_error: 0.0551
Epoch 00072: val_loss did not improve from 0.14572
```

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10471/10471 [=====] - 2s 166us/sample - loss: 0.1707 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0554 - val_loss: 0.1462 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0455
Epoch 73/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1704 - mean_absolute_error: 0.1704 - mean_squared_error: 0.0550
Epoch 00073: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 162us/sample - loss: 0.1703 - mean_absolute_error: 0.1702 - mean_squared_error: 0.0549 - val_loss: 0.1520 - val_mean_absolute_error: 0.1520 - val_mean_squared_error: 0.0450
Epoch 74/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1716 - mean_absolute_error: 0.1716 - mean_squared_error: 0.0547
Epoch 00074: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 161us/sample - loss: 0.1719 - mean_absolute_error: 0.1722 - mean_squared_error: 0.0557 - val_loss: 0.1611 - val_mean_absolute_error: 0.1612 - val_mean_squared_error: 0.0486
Epoch 75/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1690 - mean_absolute_error: 0.1690 - mean_squared_error: 0.0542
Epoch 00075: val_loss did not improve from 0.14572
10471/10471 [=====] - 2s 159us/sample - loss: 0.1693 - mean_absolute_error: 0.1694 - mean_squared_error: 0.0543 - val_loss: 0.1485 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0456
Epoch 76/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1638 - mean_absolute_error: 0.1638 - mean_squared_error: 0.0519
Epoch 00076: val_loss improved from 0.14572 to 0.14542, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 163us/sample - loss: 0.1637 - mean_absolute_error: 0.1637 - mean_squared_error: 0.0518 - val_loss: 0.1454 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0437
Epoch 77/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1698 - mean_absolute_error: 0.1698 - mean_squared_error: 0.0545
Epoch 00077: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 158us/sample - loss: 0.1696 - mean_absolute_error: 0.1699 - mean_squared_error: 0.0547 - val_loss: 0.2147 - val_mean_absolute_error: 0.2146 - val_mean_squared_error: 0.0780
Epoch 78/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1631 - mean_absolute_error: 0.1631 - mean_squared_error: 0.0513
Epoch 00078: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 161us/sample - loss: 0.1634 - mean_absolute_error: 0.1634 - mean_squared_error: 0.0515 - val_loss: 0.1559 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0509
Epoch 79/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1622 - mean_absolute_error: 0.1622 - mean_squared_error: 0.0512
Epoch 00079: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 159us/sample - loss: 0.1625 - mean_absolute_error: 0.1626 - mean_squared_error: 0.0514 - val_loss: 0.1588 - val_mean_absolute_error: 0.1588 - val_mean_squared_error: 0.0488
Epoch 80/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1616 - mean_absolute_error: 0.1616 - mean_squared_error: 0.0499
Epoch 00080: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 159us/sample - loss: 0.1623 - mean_absolute_error: 0.1627 - mean_squared_error: 0.0506 - val_loss: 0.1577 - val_mean_absolute_error: 0.1577 - val_mean_squared_error: 0.0507
Epoch 81/500
```

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10304/10471 [=====>.] - ETA: 0s - loss: 0.1692 - mean_absolute_error: 0.1692 - mean_squared_error: 0.0540
Epoch 00081: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 158us/sample - loss: 0.1694 - mean_absolute_error: 0.1694 - mean_squared_error: 0.0539 - val_loss: 0.1508 - val_mean_absolute_error: 0.1508 - val_mean_squared_error: 0.0449
Epoch 82/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1651 - mean_absolute_error: 0.1651 - mean_squared_error: 0.0519
Epoch 00082: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 150us/sample - loss: 0.1654 - mean_absolute_error: 0.1656 - mean_squared_error: 0.0522 - val_loss: 0.1844 - val_mean_absolute_error: 0.1844 - val_mean_squared_error: 0.0574
Epoch 83/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1686 - mean_absolute_error: 0.1686 - mean_squared_error: 0.0540
Epoch 00083: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 148us/sample - loss: 0.1682 - mean_absolute_error: 0.1681 - mean_squared_error: 0.0536 - val_loss: 0.1774 - val_mean_absolute_error: 0.1773 - val_mean_squared_error: 0.0590
Epoch 84/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1627 - mean_absolute_error: 0.1627 - mean_squared_error: 0.0509
Epoch 00084: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 160us/sample - loss: 0.1635 - mean_absolute_error: 0.1636 - mean_squared_error: 0.0516 - val_loss: 0.1658 - val_mean_absolute_error: 0.1659 - val_mean_squared_error: 0.0510
Epoch 85/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1685 - mean_absolute_error: 0.1685 - mean_squared_error: 0.0543
Epoch 00085: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 158us/sample - loss: 0.1683 - mean_absolute_error: 0.1682 - mean_squared_error: 0.0541 - val_loss: 0.1661 - val_mean_absolute_error: 0.1661 - val_mean_squared_error: 0.0558
Epoch 86/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1613 - mean_absolute_error: 0.1613 - mean_squared_error: 0.0506
Epoch 00086: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 157us/sample - loss: 0.1613 - mean_absolute_error: 0.1613 - mean_squared_error: 0.0505 - val_loss: 0.1495 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0465
Epoch 87/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1641 - mean_absolute_error: 0.1641 - mean_squared_error: 0.0517
Epoch 00087: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 159us/sample - loss: 0.1642 - mean_absolute_error: 0.1641 - mean_squared_error: 0.0515 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0466
Epoch 88/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1661 - mean_absolute_error: 0.1661 - mean_squared_error: 0.0523
Epoch 00088: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 159us/sample - loss: 0.1658 - mean_absolute_error: 0.1657 - mean_squared_error: 0.0522 - val_loss: 0.1507 - val_mean_absolute_error: 0.1507 - val_mean_squared_error: 0.0465
Epoch 89/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1690 - mean_absolute_error: 0.1690 - mean_squared_error: 0.0535
Epoch 00089: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 160us/sample - loss: 0.1703 - mean_absolute_error: 0.1708 - mean_squared_error: 0.0547 - val_loss: 0.1910 - val_mean_absolute_error: 0.1910 - val_mean_squared_error: 0.0574
```

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error: 0.1910 - val_mean_squared_error: 0.0656
Epoch 90/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1567 - mean_absolute_error: 0.1567 - mean_squared_error: 0.0480
Epoch 00090: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 159us/sample - loss: 0.1566 - mean_absolute_error: 0.1565 - mean_squared_error: 0.0479 - val_loss: 0.1626 - val_mean_absolute_error: 0.1626 - val_mean_squared_error: 0.0528
Epoch 91/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1609 - mean_absolute_error: 0.1609 - mean_squared_error: 0.0503
Epoch 00091: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 160us/sample - loss: 0.1614 - mean_absolute_error: 0.1616 - mean_squared_error: 0.0509 - val_loss: 0.2247 - val_mean_absolute_error: 0.2248 - val_mean_squared_error: 0.0738
Epoch 92/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1629 - mean_absolute_error: 0.1629 - mean_squared_error: 0.0512
Epoch 00092: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 160us/sample - loss: 0.1626 - mean_absolute_error: 0.1626 - mean_squared_error: 0.0510 - val_loss: 0.1890 - val_mean_absolute_error: 0.1891 - val_mean_squared_error: 0.0576
Epoch 93/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1669 - mean_absolute_error: 0.1669 - mean_squared_error: 0.0524
Epoch 00093: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 158us/sample - loss: 0.1666 - mean_absolute_error: 0.1666 - mean_squared_error: 0.0522 - val_loss: 0.1542 - val_mean_absolute_error: 0.1542 - val_mean_squared_error: 0.0493
Epoch 94/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1608 - mean_absolute_error: 0.1608 - mean_squared_error: 0.0504
Epoch 00094: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 161us/sample - loss: 0.1604 - mean_absolute_error: 0.1603 - mean_squared_error: 0.0501 - val_loss: 0.1577 - val_mean_absolute_error: 0.1577 - val_mean_squared_error: 0.0476
Epoch 95/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1672 - mean_absolute_error: 0.1672 - mean_squared_error: 0.0527
Epoch 00095: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 160us/sample - loss: 0.1672 - mean_absolute_error: 0.1674 - mean_squared_error: 0.0528 - val_loss: 0.1536 - val_mean_absolute_error: 0.1536 - val_mean_squared_error: 0.0464
Epoch 96/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1622 - mean_absolute_error: 0.1622 - mean_squared_error: 0.0507
Epoch 00096: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 159us/sample - loss: 0.1624 - mean_absolute_error: 0.1630 - mean_squared_error: 0.0514 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0453
Epoch 97/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1646 - mean_absolute_error: 0.1646 - mean_squared_error: 0.0519
Epoch 00097: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 162us/sample - loss: 0.1646 - mean_absolute_error: 0.1646 - mean_squared_error: 0.0519 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0441
Epoch 98/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1669 - mean_absolute_error: 0.1669 - mean_squared_error: 0.0527
Epoch 00098: val_loss did not improve from 0.14542
```

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10471/10471 [=====] - 2s 163us/sample - loss: 0.1670 - mean_absolute_error: 0.1673 - mean_squared_error: 0.0530 - val_loss: 0.1937 - val_mean_absolute_error: 0.1937 - val_mean_squared_error: 0.0606
Epoch 99/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1607 - mean_absolute_error: 0.1607 - mean_squared_error: 0.0500
Epoch 00099: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 163us/sample - loss: 0.1606 - mean_absolute_error: 0.1606 - mean_squared_error: 0.0498 - val_loss: 0.2008 - val_mean_absolute_error: 0.2007 - val_mean_squared_error: 0.0708
Epoch 100/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1630 - mean_absolute_error: 0.1630 - mean_squared_error: 0.0508
Epoch 00100: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 158us/sample - loss: 0.1635 - mean_absolute_error: 0.1636 - mean_squared_error: 0.0512 - val_loss: 0.2029 - val_mean_absolute_error: 0.2030 - val_mean_squared_error: 0.0648
Epoch 101/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1624 - mean_absolute_error: 0.1624 - mean_squared_error: 0.0506Restoring model weights from the end of the best epoch.

Epoch 00101: val_loss did not improve from 0.14542
10471/10471 [=====] - 2s 156us/sample - loss: 0.1626 - mean_absolute_error: 0.1629 - mean_squared_error: 0.0509 - val_loss: 0.1470 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0452
Epoch 00101: early stopping
MAE: 0.14542398
RMSE: 0.20896196
Adding initial Dense layers with 32
Adding Dense layer with 32
Adding last layer with 32
Outputting predictive model - Tabular
Model: "model_84"

```

Layer (type)	Output Shape	Param #
input_85 (InputLayer)	[(None, 61)]	0
batch_normalization_151 (Batch Normalization)	(None, 61)	244
dense_607 (Dense)	(None, 32)	1984
batch_normalization_152 (Batch Normalization)	(None, 32)	128
dense_608 (Dense)	(None, 32)	1056
batch_normalization_153 (Batch Normalization)	(None, 32)	128
dense_609 (Dense)	(None, 32)	1056
batch_normalization_154 (Batch Normalization)	(None, 32)	128

dense_610 (Dense)	(None, 32)	1056
batch_normalization_155 (Batch Normalization)	(None, 32)	128
dense_611 (Dense)	(None, 32)	1056
batch_normalization_156 (Batch Normalization)	(None, 32)	128
dense_612 (Dense)	(None, 32)	1056
batch_normalization_157 (Batch Normalization)	(None, 32)	128
dense_613 (Dense)	(None, 32)	1056
batch_normalization_158 (Batch Normalization)	(None, 32)	128
dense_614 (Dense)	(None, 32)	1056
batch_normalization_159 (Batch Normalization)	(None, 32)	128
dense_615 (Dense)	(None, 32)	1056
batch_normalization_160 (Batch Normalization)	(None, 32)	128
dense_616 (Dense)	(None, 32)	1056
batch_normalization_161 (Batch Normalization)	(None, 32)	128
dense_617 (Dense)	(None, 32)	1056
batch_normalization_162 (Batch Normalization)	(None, 32)	128
dense_618 (Dense)	(None, 32)	1056
dense_619 (Dense)	(None, 1)	33

Total params: 15,285

Trainable params: 14,459

Non-trainable params: 826

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10304/10471 [=====>.] - ETA: 0s - loss: 2.0627 - mean_absolute_error: 2.0627 - mean_squared_error: 16.3162

Epoch 00001: val_loss improved from inf to 0.60752, saving model to best_basic_model.hdf5

10471/10471 [=====] - 5s 449us/sample - loss: 2.0366 - mean_absolute_error: 2.0337 - mean_squared_error: 16.0251 - val_loss: 0.6075 - val_mean_absolute_error: 0.6085 - val_mean_squared_error: 1.9453

Epoch 2/500

10368/10471 [=====>.] - ETA: 0s - loss: 0.4530 - mean_absolute_error: 0.4530 - mean_squared_error: 0.3370

Epoch 00002: val_loss improved from 0.60752 to 0.46602, saving model to best_basic_model.hdf5

10471/10471 [=====] - 2s 229us/sample - loss: 0.4523 - mean_absolute_error: 0.4521 - mean_squared_error: 0.3362 - val_loss: 0.4660 - val_mean_absolute_error: 0.4661 - val_mean_squared_error: 0.4625

Epoch 3/500

10304/10471 [=====>.] - ETA: 0s - loss: 0.3781 - mean_absolute_error: 0.3781 - mean_squared_error: 0.2339
Epoch 00003: val_loss improved from 0.46602 to 0.41296, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 224us/sample - loss: 0.3789 - mean_absolute_error: 0.3791 - mean_squared_error: 0.2350 - val_loss: 0.4130 - val_mean_absolute_error: 0.4131 - val_mean_squared_error: 0.2765
Epoch 4/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.3534 - mean_absolute_error: 0.3534 - mean_squared_error: 0.2025
Epoch 00004: val_loss did not improve from 0.41296
10471/10471 [=====] - 2s 215us/sample - loss: 0.3537 - mean_absolute_error: 0.3544 - mean_squared_error: 0.2037 - val_loss: 0.4215 - val_mean_absolute_error: 0.4214 - val_mean_squared_error: 0.2884
Epoch 5/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.3289 - mean_absolute_error: 0.3289 - mean_squared_error: 0.1748
Epoch 00005: val_loss improved from 0.41296 to 0.31048, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 223us/sample - loss: 0.3284 - mean_absolute_error: 0.3288 - mean_squared_error: 0.1748 - val_loss: 0.3105 - val_mean_absolute_error: 0.3106 - val_mean_squared_error: 0.1509
Epoch 6/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.3257 - mean_absolute_error: 0.3257 - mean_squared_error: 0.1705
Epoch 00006: val_loss improved from 0.31048 to 0.23915, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 225us/sample - loss: 0.3263 - mean_absolute_error: 0.3261 - mean_squared_error: 0.1708 - val_loss: 0.2392 - val_mean_absolute_error: 0.2393 - val_mean_squared_error: 0.1024
Epoch 7/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2864 - mean_absolute_error: 0.2864 - mean_squared_error: 0.1366
Epoch 00007: val_loss did not improve from 0.23915
10471/10471 [=====] - 2s 216us/sample - loss: 0.2869 - mean_absolute_error: 0.2874 - mean_squared_error: 0.1374 - val_loss: 0.4397 - val_mean_absolute_error: 0.4400 - val_mean_squared_error: 0.2611
Epoch 8/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2987 - mean_absolute_error: 0.2987 - mean_squared_error: 0.1443
Epoch 00008: val_loss did not improve from 0.23915
10471/10471 [=====] - 2s 216us/sample - loss: 0.2988 - mean_absolute_error: 0.2991 - mean_squared_error: 0.1446 - val_loss: 0.3048 - val_mean_absolute_error: 0.3047 - val_mean_squared_error: 0.1426
Epoch 9/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.2777 - mean_absolute_error: 0.2777 - mean_squared_error: 0.1268
Epoch 00009: val_loss improved from 0.23915 to 0.22274, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 223us/sample - loss: 0.2768 - mean_absolute_error: 0.2773 - mean_squared_error: 0.1268 - val_loss: 0.2227 - val_mean_absolute_error: 0.2227 - val_mean_squared_error: 0.0870
Epoch 10/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2566 - mean_absolute_error: 0.2566 - mean_squared_error: 0.1104
Epoch 00010: val_loss did not improve from 0.22274
10471/10471 [=====] - 2s 218us/sample - loss: 0.2564 - mean_absolute_error: 0.2562 - mean_squared_error: 0.1100 - val_loss: 0.2742 - val_mean_absolute_error: 0.2741 - val_mean_squared_error: 0.1195
Epoch 11/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2488 - mean_absolute_error:

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    ror: 0.2488 - mean_squared_error: 0.1035
Epoch 00011: val_loss improved from 0.22274 to 0.21937, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 227us/sample - loss: 0.2485 - mean_absolute_error: 0.2491 - mean_squared_error: 0.1040 - val_loss: 0.2194 - val_mean_absolute_error: 0.2193 - val_mean_squared_error: 0.0813
Epoch 12/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.2452 - mean_absolute_error: 0.2452 - mean_squared_error: 0.1015
Epoch 00012: val_loss did not improve from 0.21937
10471/10471 [=====] - 2s 220us/sample - loss: 0.2449 - mean_absolute_error: 0.2450 - mean_squared_error: 0.1012 - val_loss: 0.2880 - val_mean_absolute_error: 0.2880 - val_mean_squared_error: 0.1301
Epoch 13/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2583 - mean_absolute_error: 0.2583 - mean_squared_error: 0.1116
Epoch 00013: val_loss improved from 0.21937 to 0.19255, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 216us/sample - loss: 0.2579 - mean_absolute_error: 0.2580 - mean_squared_error: 0.1113 - val_loss: 0.1926 - val_mean_absolute_error: 0.1926 - val_mean_squared_error: 0.0673
Epoch 14/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.2455 - mean_absolute_error: 0.2455 - mean_squared_error: 0.1016
Epoch 00014: val_loss did not improve from 0.19255
10471/10471 [=====] - 2s 204us/sample - loss: 0.2459 - mean_absolute_error: 0.2458 - mean_squared_error: 0.1018 - val_loss: 0.2083 - val_mean_absolute_error: 0.2083 - val_mean_squared_error: 0.0715
Epoch 15/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.2326 - mean_absolute_error: 0.2326 - mean_squared_error: 0.0912
Epoch 00015: val_loss did not improve from 0.19255
10471/10471 [=====] - 2s 215us/sample - loss: 0.2333 - mean_absolute_error: 0.2336 - mean_squared_error: 0.0919 - val_loss: 0.2117 - val_mean_absolute_error: 0.2117 - val_mean_squared_error: 0.0755
Epoch 16/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2161 - mean_absolute_error: 0.2161 - mean_squared_error: 0.0829
Epoch 00016: val_loss improved from 0.19255 to 0.15764, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 224us/sample - loss: 0.2160 - mean_absolute_error: 0.2160 - mean_squared_error: 0.0827 - val_loss: 0.1576 - val_mean_absolute_error: 0.1576 - val_mean_squared_error: 0.0518
Epoch 17/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.2145 - mean_absolute_error: 0.2145 - mean_squared_error: 0.0801
Epoch 00017: val_loss did not improve from 0.15764
10471/10471 [=====] - 2s 215us/sample - loss: 0.2148 - mean_absolute_error: 0.2149 - mean_squared_error: 0.0802 - val_loss: 0.2532 - val_mean_absolute_error: 0.2533 - val_mean_squared_error: 0.0941
Epoch 18/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.2184 - mean_absolute_error: 0.2184 - mean_squared_error: 0.0815
Epoch 00018: val_loss did not improve from 0.15764
10471/10471 [=====] - 2s 213us/sample - loss: 0.2182 - mean_absolute_error: 0.2184 - mean_squared_error: 0.0816 - val_loss: 0.1849 - val_mean_absolute_error: 0.1849 - val_mean_squared_error: 0.0670
Epoch 19/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.2095 - mean_absolute_error: 0.2095 - mean_squared_error: 0.0768
Epoch 00019: val_loss did not improve from 0.15764
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10471/10471 [=====] - 2s 215us/sample - loss: 0.2094 - mean_absolute_error: 0.2096 - mean_squared_error: 0.0769 - val_loss: 0.1820 - val_mean_absolute_error: 0.1820 - val_mean_squared_error: 0.0599
Epoch 20/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2113 - mean_absolute_error: 0.2113 - mean_squared_error: 0.0782
Epoch 00020: val_loss did not improve from 0.15764
10471/10471 [=====] - 2s 216us/sample - loss: 0.2106 - mean_absolute_error: 0.2104 - mean_squared_error: 0.0776 - val_loss: 0.1706 - val_mean_absolute_error: 0.1705 - val_mean_squared_error: 0.0583
Epoch 21/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2076 - mean_absolute_error: 0.2076 - mean_squared_error: 0.0754
Epoch 00021: val_loss did not improve from 0.15764
10471/10471 [=====] - 2s 215us/sample - loss: 0.2103 - mean_absolute_error: 0.2102 - mean_squared_error: 0.0773 - val_loss: 0.2922 - val_mean_absolute_error: 0.2923 - val_mean_squared_error: 0.1145
Epoch 22/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.2099 - mean_absolute_error: 0.2099 - mean_squared_error: 0.0769
Epoch 00022: val_loss did not improve from 0.15764
10471/10471 [=====] - 2s 215us/sample - loss: 0.2100 - mean_absolute_error: 0.2100 - mean_squared_error: 0.0772 - val_loss: 0.2027 - val_mean_absolute_error: 0.2027 - val_mean_squared_error: 0.0690
Epoch 23/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.2015 - mean_absolute_error: 0.2015 - mean_squared_error: 0.0710
Epoch 00023: val_loss did not improve from 0.15764
10471/10471 [=====] - 2s 215us/sample - loss: 0.2016 - mean_absolute_error: 0.2015 - mean_squared_error: 0.0709 - val_loss: 0.2571 - val_mean_absolute_error: 0.2573 - val_mean_squared_error: 0.0948
Epoch 24/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.2014 - mean_absolute_error: 0.2014 - mean_squared_error: 0.0712
Epoch 00024: val_loss improved from 0.15764 to 0.15232, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 223us/sample - loss: 0.2011 - mean_absolute_error: 0.2009 - mean_squared_error: 0.0714 - val_loss: 0.1523 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0482
Epoch 25/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.2005 - mean_absolute_error: 0.2005 - mean_squared_error: 0.0714
Epoch 00025: val_loss did not improve from 0.15232
10471/10471 [=====] - 2s 216us/sample - loss: 0.2007 - mean_absolute_error: 0.2009 - mean_squared_error: 0.0715 - val_loss: 0.2156 - val_mean_absolute_error: 0.2155 - val_mean_squared_error: 0.0800
Epoch 26/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1958 - mean_absolute_error: 0.1958 - mean_squared_error: 0.0681
Epoch 00026: val_loss did not improve from 0.15232
10471/10471 [=====] - 2s 215us/sample - loss: 0.1958 - mean_absolute_error: 0.1957 - mean_squared_error: 0.0680 - val_loss: 0.2048 - val_mean_absolute_error: 0.2046 - val_mean_squared_error: 0.0753
Epoch 27/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2008 - mean_absolute_error: 0.2008 - mean_squared_error: 0.0714
Epoch 00027: val_loss did not improve from 0.15232
10471/10471 [=====] - 2s 214us/sample - loss: 0.2025 - mean_absolute_error: 0.2028 - mean_squared_error: 0.0724 - val_loss: 0.2445 - val_mean_absolute_error: 0.2444 - val_mean_squared_error: 0.0949
Epoch 28/500
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10304/10471 [=====>.] - ETA: 0s - loss: 0.1982 - mean_absolute_error: 0.1982 - mean_squared_error: 0.0694
Epoch 00028: val_loss did not improve from 0.15232
10471/10471 [=====] - 2s 199us/sample - loss: 0.1982 - mean_absolute_error: 0.1989 - mean_squared_error: 0.0698 - val_loss: 0.1690 - val_mean_absolute_error: 0.1690 - val_mean_squared_error: 0.0569
Epoch 29/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1965 - mean_absolute_error: 0.1965 - mean_squared_error: 0.0683
Epoch 00029: val_loss improved from 0.15232 to 0.15226, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 223us/sample - loss: 0.1965 - mean_absolute_error: 0.1971 - mean_squared_error: 0.0687 - val_loss: 0.1523 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0485
Epoch 30/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1989 - mean_absolute_error: 0.1989 - mean_squared_error: 0.0706
Epoch 00030: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 220us/sample - loss: 0.1990 - mean_absolute_error: 0.1992 - mean_squared_error: 0.0708 - val_loss: 0.1545 - val_mean_absolute_error: 0.1545 - val_mean_squared_error: 0.0501
Epoch 31/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1899 - mean_absolute_error: 0.1899 - mean_squared_error: 0.0651
Epoch 00031: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 215us/sample - loss: 0.1903 - mean_absolute_error: 0.1905 - mean_squared_error: 0.0654 - val_loss: 0.1572 - val_mean_absolute_error: 0.1572 - val_mean_squared_error: 0.0483
Epoch 32/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1829 - mean_absolute_error: 0.1829 - mean_squared_error: 0.0606
Epoch 00032: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 215us/sample - loss: 0.1837 - mean_absolute_error: 0.1838 - mean_squared_error: 0.0610 - val_loss: 0.1746 - val_mean_absolute_error: 0.1745 - val_mean_squared_error: 0.0590
Epoch 33/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1937 - mean_absolute_error: 0.1937 - mean_squared_error: 0.0677
Epoch 00033: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 216us/sample - loss: 0.1943 - mean_absolute_error: 0.1947 - mean_squared_error: 0.0683 - val_loss: 0.1538 - val_mean_absolute_error: 0.1539 - val_mean_squared_error: 0.0477
Epoch 34/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1937 - mean_absolute_error: 0.1937 - mean_squared_error: 0.0668
Epoch 00034: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 213us/sample - loss: 0.1935 - mean_absolute_error: 0.1934 - mean_squared_error: 0.0667 - val_loss: 0.1714 - val_mean_absolute_error: 0.1715 - val_mean_squared_error: 0.0534
Epoch 35/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1878 - mean_absolute_error: 0.1878 - mean_squared_error: 0.0637
Epoch 00035: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 215us/sample - loss: 0.1873 - mean_absolute_error: 0.1871 - mean_squared_error: 0.0633 - val_loss: 0.1965 - val_mean_absolute_error: 0.1966 - val_mean_squared_error: 0.0631
Epoch 36/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1952 - mean_absolute_error: 0.1952 - mean_squared_error: 0.0680
Epoch 00036: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 215us/sample - loss: 0.1954 - mean_absolute_error: 0.1954 - mean_squared_error: 0.0682
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olute_error: 0.1960 - mean_squared_error: 0.0686 - val_loss: 0.1580 - val_mean_absolute_error: 0.1581 - val_mean_squared_error: 0.0482
Epoch 37/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1897 - mean_absolute_error: 0.1897 - mean_squared_error: 0.0648
Epoch 00037: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 216us/sample - loss: 0.1899 - mean_absolute_error: 0.1905 - mean_squared_error: 0.0654 - val_loss: 0.1830 - val_mean_absolute_error: 0.1830 - val_mean_squared_error: 0.0626
Epoch 38/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1983 - mean_absolute_error: 0.1983 - mean_squared_error: 0.0708
Epoch 00038: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 217us/sample - loss: 0.1984 - mean_absolute_error: 0.1985 - mean_squared_error: 0.0708 - val_loss: 0.3335 - val_mean_absolute_error: 0.3336 - val_mean_squared_error: 0.1396
Epoch 39/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1957 - mean_absolute_error: 0.1957 - mean_squared_error: 0.0684
Epoch 00039: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 215us/sample - loss: 0.1955 - mean_absolute_error: 0.1958 - mean_squared_error: 0.0685 - val_loss: 0.2100 - val_mean_absolute_error: 0.2099 - val_mean_squared_error: 0.0760
Epoch 40/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1953 - mean_absolute_error: 0.1953 - mean_squared_error: 0.0670
Epoch 00040: val_loss did not improve from 0.15226
10471/10471 [=====] - 2s 214us/sample - loss: 0.1952 - mean_absolute_error: 0.1951 - mean_squared_error: 0.0670 - val_loss: 0.2397 - val_mean_absolute_error: 0.2396 - val_mean_squared_error: 0.0925
Epoch 41/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1898 - mean_absolute_error: 0.1898 - mean_squared_error: 0.0652
Epoch 00041: val_loss improved from 0.15226 to 0.14897, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 221us/sample - loss: 0.1895 - mean_absolute_error: 0.1896 - mean_squared_error: 0.0650 - val_loss: 0.1490 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0449
Epoch 42/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1910 - mean_absolute_error: 0.1910 - mean_squared_error: 0.0650
Epoch 00042: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 205us/sample - loss: 0.1911 - mean_absolute_error: 0.1915 - mean_squared_error: 0.0653 - val_loss: 0.1556 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0489
Epoch 43/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1875 - mean_absolute_error: 0.1875 - mean_squared_error: 0.0634
Epoch 00043: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 210us/sample - loss: 0.1886 - mean_absolute_error: 0.1893 - mean_squared_error: 0.0644 - val_loss: 0.1592 - val_mean_absolute_error: 0.1591 - val_mean_squared_error: 0.0513
Epoch 44/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1950 - mean_absolute_error: 0.1950 - mean_squared_error: 0.0680
Epoch 00044: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 215us/sample - loss: 0.1950 - mean_absolute_error: 0.1952 - mean_squared_error: 0.0681 - val_loss: 0.1540 - val_mean_absolute_error: 0.1540 - val_mean_squared_error: 0.0489
Epoch 45/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1870 - mean_absolute_error:

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ror: 0.1870 - mean_squared_error: 0.0621
Epoch 00045: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 215us/sample - loss: 0.1886 - mean_absolute_error: 0.1888 - mean_squared_error: 0.0633 - val_loss: 0.1509 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0464
Epoch 46/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1846 - mean_absolute_error: 0.1846 - mean_squared_error: 0.0621
Epoch 00046: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 216us/sample - loss: 0.1843 - mean_absolute_error: 0.1843 - mean_squared_error: 0.0618 - val_loss: 0.1778 - val_mean_absolute_error: 0.1779 - val_mean_squared_error: 0.0549
Epoch 47/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1893 - mean_absolute_error: 0.1893 - mean_squared_error: 0.0639
Epoch 00047: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 216us/sample - loss: 0.1908 - mean_absolute_error: 0.1910 - mean_squared_error: 0.0649 - val_loss: 0.2451 - val_mean_absolute_error: 0.2452 - val_mean_squared_error: 0.0852
Epoch 48/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1920 - mean_absolute_error: 0.1920 - mean_squared_error: 0.0662
Epoch 00048: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 215us/sample - loss: 0.1918 - mean_absolute_error: 0.1920 - mean_squared_error: 0.0660 - val_loss: 0.1608 - val_mean_absolute_error: 0.1608 - val_mean_squared_error: 0.0518
Epoch 49/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1818 - mean_absolute_error: 0.1818 - mean_squared_error: 0.0614
Epoch 00049: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 215us/sample - loss: 0.1819 - mean_absolute_error: 0.1819 - mean_squared_error: 0.0616 - val_loss: 0.1680 - val_mean_absolute_error: 0.1679 - val_mean_squared_error: 0.0555
Epoch 50/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1805 - mean_absolute_error: 0.1805 - mean_squared_error: 0.0596
Epoch 00050: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 212us/sample - loss: 0.1806 - mean_absolute_error: 0.1808 - mean_squared_error: 0.0597 - val_loss: 0.1763 - val_mean_absolute_error: 0.1762 - val_mean_squared_error: 0.0588
Epoch 51/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1735 - mean_absolute_error: 0.1735 - mean_squared_error: 0.0561
Epoch 00051: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 212us/sample - loss: 0.1741 - mean_absolute_error: 0.1741 - mean_squared_error: 0.0564 - val_loss: 0.1583 - val_mean_absolute_error: 0.1583 - val_mean_squared_error: 0.0476
Epoch 52/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1893 - mean_absolute_error: 0.1893 - mean_squared_error: 0.0641
Epoch 00052: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 220us/sample - loss: 0.1897 - mean_absolute_error: 0.1899 - mean_squared_error: 0.0648 - val_loss: 0.2693 - val_mean_absolute_error: 0.2694 - val_mean_squared_error: 0.0978
Epoch 53/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1805 - mean_absolute_error: 0.1805 - mean_squared_error: 0.0599
Epoch 00053: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 217us/sample - loss: 0.1806 - mean_absolute_error: 0.1808 - mean_squared_error: 0.0601 - val_loss: 0.1715 - val_mean_absolute_error: 0.1714 - val_mean_squared_error: 0.0582
```

Epoch 54/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1840 - mean_absolute_error: 0.1840 - mean_squared_error: 0.0617
Epoch 00054: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 216us/sample - loss: 0.1836 - mean_absolute_error: 0.1837 - mean_squared_error: 0.0615 - val_loss: 0.1699 - val_mean_absolute_error: 0.1699 - val_mean_squared_error: 0.0522
Epoch 55/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1855 - mean_absolute_error: 0.1855 - mean_squared_error: 0.0621
Epoch 00055: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 218us/sample - loss: 0.1853 - mean_absolute_error: 0.1851 - mean_squared_error: 0.0619 - val_loss: 0.1758 - val_mean_absolute_error: 0.1757 - val_mean_squared_error: 0.0586
Epoch 56/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1847 - mean_absolute_error: 0.1847 - mean_squared_error: 0.0620
Epoch 00056: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 210us/sample - loss: 0.1850 - mean_absolute_error: 0.1851 - mean_squared_error: 0.0621 - val_loss: 0.1979 - val_mean_absolute_error: 0.1978 - val_mean_squared_error: 0.0701
Epoch 57/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1849 - mean_absolute_error: 0.1849 - mean_squared_error: 0.0621
Epoch 00057: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 206us/sample - loss: 0.1848 - mean_absolute_error: 0.1847 - mean_squared_error: 0.0619 - val_loss: 0.1578 - val_mean_absolute_error: 0.1579 - val_mean_squared_error: 0.0503
Epoch 58/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1821 - mean_absolute_error: 0.1821 - mean_squared_error: 0.0613
Epoch 00058: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 212us/sample - loss: 0.1822 - mean_absolute_error: 0.1826 - mean_squared_error: 0.0616 - val_loss: 0.1627 - val_mean_absolute_error: 0.1627 - val_mean_squared_error: 0.0487
Epoch 59/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1851 - mean_absolute_error: 0.1851 - mean_squared_error: 0.0624
Epoch 00059: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 215us/sample - loss: 0.1848 - mean_absolute_error: 0.1848 - mean_squared_error: 0.0623 - val_loss: 0.1660 - val_mean_absolute_error: 0.1661 - val_mean_squared_error: 0.0527
Epoch 60/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1831 - mean_absolute_error: 0.1831 - mean_squared_error: 0.0614
Epoch 00060: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 213us/sample - loss: 0.1834 - mean_absolute_error: 0.1841 - mean_squared_error: 0.0622 - val_loss: 0.1865 - val_mean_absolute_error: 0.1864 - val_mean_squared_error: 0.0637
Epoch 61/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1769 - mean_absolute_error: 0.1769 - mean_squared_error: 0.0583
Epoch 00061: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 215us/sample - loss: 0.1765 - mean_absolute_error: 0.1765 - mean_squared_error: 0.0580 - val_loss: 0.2240 - val_mean_absolute_error: 0.2239 - val_mean_squared_error: 0.0830
Epoch 62/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1799 - mean_absolute_error: 0.1799 - mean_squared_error: 0.0599
Epoch 00062: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 215us/sample - loss: 0.1798 - mean_absolute_error:

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olute_error: 0.1797 - mean_squared_error: 0.0598 - val_loss: 0.1626 - val_mean_absolute_
error: 0.1627 - val_mean_squared_error: 0.0528
Epoch 63/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1800 - mean_absolute_er
ror: 0.1800 - mean_squared_error: 0.0595
Epoch 00063: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 218us/sample - loss: 0.1797 - mean_abs
olute_error: 0.1796 - mean_squared_error: 0.0592 - val_loss: 0.1627 - val_mean_absolute_
error: 0.1627 - val_mean_squared_error: 0.0501
Epoch 64/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1855 - mean_absolute_er
ror: 0.1855 - mean_squared_error: 0.0638
Epoch 00064: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 213us/sample - loss: 0.1854 - mean_abs
olute_error: 0.1853 - mean_squared_error: 0.0637 - val_loss: 0.1601 - val_mean_absolute_
error: 0.1601 - val_mean_squared_error: 0.0515
Epoch 65/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1805 - mean_absolute_er
ror: 0.1805 - mean_squared_error: 0.0600
Epoch 00065: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 216us/sample - loss: 0.1803 - mean_abs
olute_error: 0.1804 - mean_squared_error: 0.0599 - val_loss: 0.1522 - val_mean_absolute_
error: 0.1521 - val_mean_squared_error: 0.0479
Epoch 66/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1763 - mean_absolute_er
ror: 0.1763 - mean_squared_error: 0.0570Restoring model weights from the end of the best
epoch.
```

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Epoch 00066: val_loss did not improve from 0.14897
10471/10471 [=====] - 2s 215us/sample - loss: 0.1765 - mean_abs
olute_error: 0.1765 - mean_squared_error: 0.0570 - val_loss: 0.1751 - val_mean_absolute_
error: 0.1751 - val_mean_squared_error: 0.0585
Epoch 00066: early stopping
MAE: 0.14903024
RMSE: 0.21187195
Adding initial Dense layers with 64
Adding Dense layer with 64
Adding Dense layer with 64
Adding Dense layer with 64
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_85"
```

Layer (type)	Output Shape	Param #
<hr/>		
input_86 (InputLayer)	[(None, 61)]	0
batch_normalization_163 (Batch Normalization)	(None, 61)	244
dense_620 (Dense)	(None, 64)	3968
batch_normalization_164 (Batch Normalization)	(None, 64)	256
dense_621 (Dense)	(None, 64)	4160
batch_normalization_165 (Batch Normalization)	(None, 64)	256
dense_622 (Dense)	(None, 64)	4160
batch_normalization_166 (Batch Normalization)	(None, 64)	256
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dense_623 (Dense)	(None, 64)	4160
batch_normalization_167 (Batch Normalization)	(None, 64)	256
dense_624 (Dense)	(None, 64)	4160
dense_625 (Dense)	(None, 1)	65
<hr/>		
Total params: 21,941		
Trainable params: 21,307		
Non-trainable params: 634		

None

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[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10016/10471 [=====>..] - ETA: 0s - loss: 1.8126 - mean_absolute_error: 1.8126 - mean_squared_error: 11.4107
Epoch 00001: val_loss improved from inf to 0.65602, saving model to best_basic_model.hdf5
10471/10471 [=====] - 2s 213us/sample - loss: 1.7593 - mean_absolute_error: 1.7575 - mean_squared_error: 10.9171 - val_loss: 0.6560 - val_mean_absolute_error: 0.6567 - val_mean_squared_error: 0.6952
Epoch 2/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.5253 - mean_absolute_error: 0.5253 - mean_squared_error: 0.4464
Epoch 00002: val_loss did not improve from 0.65602
10471/10471 [=====] - 1s 118us/sample - loss: 0.5226 - mean_absolute_error: 0.5225 - mean_squared_error: 0.4423 - val_loss: 0.7351 - val_mean_absolute_error: 0.7349 - val_mean_squared_error: 1.2780
Epoch 3/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.4334 - mean_absolute_error: 0.4334 - mean_squared_error: 0.3049
Epoch 00003: val_loss improved from 0.65602 to 0.65389, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 118us/sample - loss: 0.4343 - mean_absolute_error: 0.4348 - mean_squared_error: 0.3059 - val_loss: 0.6539 - val_mean_absolute_error: 0.6539 - val_mean_squared_error: 0.6860
Epoch 4/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.4096 - mean_absolute_error: 0.4096 - mean_squared_error: 0.2719
Epoch 00004: val_loss improved from 0.65389 to 0.39880, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 120us/sample - loss: 0.4094 - mean_absolute_error: 0.4096 - mean_squared_error: 0.2716 - val_loss: 0.3988 - val_mean_absolute_error: 0.3991 - val_mean_squared_error: 0.3268
Epoch 5/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.3696 - mean_absolute_error: 0.3696 - mean_squared_error: 0.2181
Epoch 00005: val_loss improved from 0.39880 to 0.33451, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 119us/sample - loss: 0.3685 - mean_absolute_error: 0.3685 - mean_squared_error: 0.2169 - val_loss: 0.3345 - val_mean_absolute_error: 0.3345 - val_mean_squared_error: 0.1941
Epoch 6/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.3331 - mean_absolute_error: 0.3331 - mean_squared_error: 0.1809
Epoch 00006: val_loss improved from 0.33451 to 0.30706, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 119us/sample - loss: 0.3329 - mean_absolute_error: 0.3330 - mean_squared_error: 0.1806 - val_loss: 0.3071 - val_mean_absolute_error:
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error: 0.3071 - val_mean_squared_error: 0.1520
Epoch 7/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.3002 - mean_absolute_error: 0.3002 - mean_squared_error: 0.1472
Epoch 00007: val_loss improved from 0.30706 to 0.24753, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 112us/sample - loss: 0.2984 - mean_absolute_error: 0.2988 - mean_squared_error: 0.1458 - val_loss: 0.2475 - val_mean_absolute_error: 0.2477 - val_mean_squared_error: 0.1179
Epoch 8/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2737 - mean_absolute_error: 0.2737 - mean_squared_error: 0.1250
Epoch 00008: val_loss did not improve from 0.24753
10471/10471 [=====] - 1s 106us/sample - loss: 0.2736 - mean_absolute_error: 0.2744 - mean_squared_error: 0.1257 - val_loss: 0.3231 - val_mean_absolute_error: 0.3229 - val_mean_squared_error: 0.1567
Epoch 9/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.2861 - mean_absolute_error: 0.2861 - mean_squared_error: 0.1339
Epoch 00009: val_loss improved from 0.24753 to 0.20939, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 116us/sample - loss: 0.2857 - mean_absolute_error: 0.2858 - mean_squared_error: 0.1335 - val_loss: 0.2094 - val_mean_absolute_error: 0.2094 - val_mean_squared_error: 0.0776
Epoch 10/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2726 - mean_absolute_error: 0.2726 - mean_squared_error: 0.1231
Epoch 00010: val_loss improved from 0.20939 to 0.20173, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 119us/sample - loss: 0.2732 - mean_absolute_error: 0.2739 - mean_squared_error: 0.1245 - val_loss: 0.2017 - val_mean_absolute_error: 0.2017 - val_mean_squared_error: 0.0717
Epoch 11/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2531 - mean_absolute_error: 0.2531 - mean_squared_error: 0.1054
Epoch 00011: val_loss did not improve from 0.20173
10471/10471 [=====] - 1s 115us/sample - loss: 0.2532 - mean_absolute_error: 0.2533 - mean_squared_error: 0.1054 - val_loss: 0.4240 - val_mean_absolute_error: 0.4242 - val_mean_squared_error: 0.2287
Epoch 12/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2400 - mean_absolute_error: 0.2400 - mean_squared_error: 0.0982
Epoch 00012: val_loss did not improve from 0.20173
10471/10471 [=====] - 1s 117us/sample - loss: 0.2407 - mean_absolute_error: 0.2411 - mean_squared_error: 0.0986 - val_loss: 0.3308 - val_mean_absolute_error: 0.3310 - val_mean_squared_error: 0.1459
Epoch 13/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.2272 - mean_absolute_error: 0.2272 - mean_squared_error: 0.0887
Epoch 00013: val_loss did not improve from 0.20173
10471/10471 [=====] - 1s 116us/sample - loss: 0.2275 - mean_absolute_error: 0.2276 - mean_squared_error: 0.0889 - val_loss: 0.2178 - val_mean_absolute_error: 0.2177 - val_mean_squared_error: 0.0811
Epoch 14/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.2267 - mean_absolute_error: 0.2267 - mean_squared_error: 0.0873
Epoch 00014: val_loss improved from 0.20173 to 0.17180, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 118us/sample - loss: 0.2254 - mean_absolute_error: 0.2256 - mean_squared_error: 0.0866 - val_loss: 0.1718 - val_mean_absolute_error: 0.1717 - val_mean_squared_error: 0.0590
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Epoch 15/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.2270 - mean_absolute_error: 0.2270 - mean_squared_error: 0.0867
Epoch 00015: val_loss did not improve from 0.17180
10471/10471 [=====] - 1s 119us/sample - loss: 0.2271 - mean_absolute_error: 0.2273 - mean_squared_error: 0.0870 - val_loss: 0.1867 - val_mean_absolute_error: 0.1866 - val_mean_squared_error: 0.0658
Epoch 16/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2138 - mean_absolute_error: 0.2138 - mean_squared_error: 0.0780
Epoch 00016: val_loss did not improve from 0.17180
10471/10471 [=====] - 1s 117us/sample - loss: 0.2141 - mean_absolute_error: 0.2140 - mean_squared_error: 0.0780 - val_loss: 0.2060 - val_mean_absolute_error: 0.2059 - val_mean_squared_error: 0.0773
Epoch 17/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2006 - mean_absolute_error: 0.2006 - mean_squared_error: 0.0704
Epoch 00017: val_loss did not improve from 0.17180
10471/10471 [=====] - 1s 116us/sample - loss: 0.2000 - mean_absolute_error: 0.2001 - mean_squared_error: 0.0701 - val_loss: 0.1731 - val_mean_absolute_error: 0.1731 - val_mean_squared_error: 0.0519
Epoch 18/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.2071 - mean_absolute_error: 0.2071 - mean_squared_error: 0.0742
Epoch 00018: val_loss did not improve from 0.17180
10471/10471 [=====] - 1s 116us/sample - loss: 0.2069 - mean_absolute_error: 0.2076 - mean_squared_error: 0.0746 - val_loss: 0.2086 - val_mean_absolute_error: 0.2086 - val_mean_squared_error: 0.0749
Epoch 19/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1972 - mean_absolute_error: 0.1972 - mean_squared_error: 0.0688
Epoch 00019: val_loss improved from 0.17180 to 0.16561, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 119us/sample - loss: 0.1974 - mean_absolute_error: 0.1974 - mean_squared_error: 0.0690 - val_loss: 0.1656 - val_mean_absolute_error: 0.1656 - val_mean_squared_error: 0.0526
Epoch 20/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1958 - mean_absolute_error: 0.1958 - mean_squared_error: 0.0670
Epoch 00020: val_loss did not improve from 0.16561
10471/10471 [=====] - 1s 117us/sample - loss: 0.1959 - mean_absolute_error: 0.1966 - mean_squared_error: 0.0679 - val_loss: 0.1806 - val_mean_absolute_error: 0.1805 - val_mean_squared_error: 0.0644
Epoch 21/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1862 - mean_absolute_error: 0.1862 - mean_squared_error: 0.0618
Epoch 00021: val_loss did not improve from 0.16561
10471/10471 [=====] - 1s 118us/sample - loss: 0.1864 - mean_absolute_error: 0.1866 - mean_squared_error: 0.0621 - val_loss: 0.2098 - val_mean_absolute_error: 0.2098 - val_mean_squared_error: 0.0722
Epoch 22/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1951 - mean_absolute_error: 0.1951 - mean_squared_error: 0.0674
Epoch 00022: val_loss improved from 0.16561 to 0.16345, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 119us/sample - loss: 0.1951 - mean_absolute_error: 0.1950 - mean_squared_error: 0.0672 - val_loss: 0.1634 - val_mean_absolute_error: 0.1635 - val_mean_squared_error: 0.0471
Epoch 23/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1893 - mean_absolute_error: 0.1893 - mean_squared_error: 0.0645

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Epoch 00023: val_loss did not improve from 0.16345
10471/10471 [=====] - 1s 119us/sample - loss: 0.1887 - mean_absolute_error: 0.1886 - mean_squared_error: 0.0644 - val_loss: 0.2673 - val_mean_absolute_error: 0.2674 - val_mean_squared_error: 0.0997
Epoch 24/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1852 - mean_absolute_error: 0.1852 - mean_squared_error: 0.0627
Epoch 00024: val_loss did not improve from 0.16345
10471/10471 [=====] - 1s 116us/sample - loss: 0.1850 - mean_absolute_error: 0.1851 - mean_squared_error: 0.0626 - val_loss: 0.2231 - val_mean_absolute_error: 0.2232 - val_mean_squared_error: 0.0733
Epoch 25/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1812 - mean_absolute_error: 0.1812 - mean_squared_error: 0.0600
Epoch 00025: val_loss improved from 0.16345 to 0.15293, saving model to best_basic_mode.1.hdf5
10471/10471 [=====] - 1s 119us/sample - loss: 0.1814 - mean_absolute_error: 0.1815 - mean_squared_error: 0.0601 - val_loss: 0.1529 - val_mean_absolute_error: 0.1529 - val_mean_squared_error: 0.0450
Epoch 26/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1785 - mean_absolute_error: 0.1785 - mean_squared_error: 0.0584
Epoch 00026: val_loss did not improve from 0.15293
10471/10471 [=====] - 1s 117us/sample - loss: 0.1787 - mean_absolute_error: 0.1789 - mean_squared_error: 0.0588 - val_loss: 0.1825 - val_mean_absolute_error: 0.1825 - val_mean_squared_error: 0.0556
Epoch 27/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1843 - mean_absolute_error: 0.1843 - mean_squared_error: 0.0617
Epoch 00027: val_loss did not improve from 0.15293
10471/10471 [=====] - 1s 114us/sample - loss: 0.1846 - mean_absolute_error: 0.1847 - mean_squared_error: 0.0620 - val_loss: 0.1641 - val_mean_absolute_error: 0.1641 - val_mean_squared_error: 0.0544
Epoch 28/500
10080/10471 [=====.>..] - ETA: 0s - loss: 0.1904 - mean_absolute_error: 0.1904 - mean_squared_error: 0.0644
Epoch 00028: val_loss did not improve from 0.15293
10471/10471 [=====] - 1s 117us/sample - loss: 0.1900 - mean_absolute_error: 0.1902 - mean_squared_error: 0.0644 - val_loss: 0.1755 - val_mean_absolute_error: 0.1755 - val_mean_squared_error: 0.0560
Epoch 29/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1822 - mean_absolute_error: 0.1822 - mean_squared_error: 0.0604
Epoch 00029: val_loss did not improve from 0.15293
10471/10471 [=====] - 1s 115us/sample - loss: 0.1828 - mean_absolute_error: 0.1828 - mean_squared_error: 0.0607 - val_loss: 0.1616 - val_mean_absolute_error: 0.1616 - val_mean_squared_error: 0.0490
Epoch 30/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1751 - mean_absolute_error: 0.1751 - mean_squared_error: 0.0569
Epoch 00030: val_loss did not improve from 0.15293
10471/10471 [=====] - 1s 116us/sample - loss: 0.1756 - mean_absolute_error: 0.1759 - mean_squared_error: 0.0574 - val_loss: 0.1742 - val_mean_absolute_error: 0.1742 - val_mean_squared_error: 0.0515
Epoch 31/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1886 - mean_absolute_error: 0.1886 - mean_squared_error: 0.0645
Epoch 00031: val_loss did not improve from 0.15293
10471/10471 [=====] - 1s 118us/sample - loss: 0.1875 - mean_absolute_error: 0.1874 - mean_squared_error: 0.0638 - val_loss: 0.1555 - val_mean_absolute_error: 0.1555 - val_mean_squared_error: 0.0460
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Epoch 32/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1859 - mean_absolute_error: 0.1859 - mean_squared_error: 0.0621
Epoch 00032: val_loss improved from 0.15293 to 0.14970, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 120us/sample - loss: 0.1855 - mean_absolute_error: 0.1855 - mean_squared_error: 0.0618 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0448
Epoch 33/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1700 - mean_absolute_error: 0.1700 - mean_squared_error: 0.0545
Epoch 00033: val_loss improved from 0.14970 to 0.14939, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 117us/sample - loss: 0.1697 - mean_absolute_error: 0.1695 - mean_squared_error: 0.0542 - val_loss: 0.1494 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0435
Epoch 34/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1788 - mean_absolute_error: 0.1788 - mean_squared_error: 0.0588
Epoch 00034: val_loss did not improve from 0.14939
10471/10471 [=====] - 1s 108us/sample - loss: 0.1798 - mean_absolute_error: 0.1800 - mean_squared_error: 0.0594 - val_loss: 0.1629 - val_mean_absolute_error: 0.1629 - val_mean_squared_error: 0.0489
Epoch 35/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1739 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0560
Epoch 00035: val_loss improved from 0.14939 to 0.14686, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 113us/sample - loss: 0.1741 - mean_absolute_error: 0.1741 - mean_squared_error: 0.0562 - val_loss: 0.1469 - val_mean_absolute_error: 0.1468 - val_mean_squared_error: 0.0432
Epoch 36/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1689 - mean_absolute_error: 0.1689 - mean_squared_error: 0.0540
Epoch 00036: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 116us/sample - loss: 0.1690 - mean_absolute_error: 0.1690 - mean_squared_error: 0.0540 - val_loss: 0.1635 - val_mean_absolute_error: 0.1634 - val_mean_squared_error: 0.0528
Epoch 37/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1815 - mean_absolute_error: 0.1815 - mean_squared_error: 0.0598
Epoch 00037: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 117us/sample - loss: 0.1821 - mean_absolute_error: 0.1822 - mean_squared_error: 0.0606 - val_loss: 0.1601 - val_mean_absolute_error: 0.1601 - val_mean_squared_error: 0.0467
Epoch 38/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1743 - mean_absolute_error: 0.1743 - mean_squared_error: 0.0557
Epoch 00038: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 116us/sample - loss: 0.1739 - mean_absolute_error: 0.1737 - mean_squared_error: 0.0554 - val_loss: 0.1844 - val_mean_absolute_error: 0.1844 - val_mean_squared_error: 0.0567
Epoch 39/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1790 - mean_absolute_error: 0.1790 - mean_squared_error: 0.0583
Epoch 00039: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 116us/sample - loss: 0.1789 - mean_absolute_error: 0.1794 - mean_squared_error: 0.0588 - val_loss: 0.1622 - val_mean_absolute_error: 0.1623 - val_mean_squared_error: 0.0478
Epoch 40/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1751 - mean_absolute_error:

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ror: 0.1751 - mean_squared_error: 0.0564
Epoch 00040: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 115us/sample - loss: 0.1751 - mean_absolute_error: 0.1751 - mean_squared_error: 0.0564 - val_loss: 0.2017 - val_mean_absolute_error: 0.2016 - val_mean_squared_error: 0.0691
Epoch 41/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1703 - mean_absolute_error: 0.1703 - mean_squared_error: 0.0548
Epoch 00041: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 110us/sample - loss: 0.1700 - mean_absolute_error: 0.1703 - mean_squared_error: 0.0548 - val_loss: 0.2053 - val_mean_absolute_error: 0.2054 - val_mean_squared_error: 0.0667
Epoch 42/500
10048/10471 [=====.>..] - ETA: 0s - loss: 0.1713 - mean_absolute_error: 0.1713 - mean_squared_error: 0.0543
Epoch 00042: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 107us/sample - loss: 0.1715 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0542 - val_loss: 0.2046 - val_mean_absolute_error: 0.2047 - val_mean_squared_error: 0.0657
Epoch 43/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1642 - mean_absolute_error: 0.1642 - mean_squared_error: 0.0508
Epoch 00043: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 111us/sample - loss: 0.1647 - mean_absolute_error: 0.1647 - mean_squared_error: 0.0509 - val_loss: 0.2368 - val_mean_absolute_error: 0.2368 - val_mean_squared_error: 0.0945
Epoch 44/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1778 - mean_absolute_error: 0.1778 - mean_squared_error: 0.0576
Epoch 00044: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 109us/sample - loss: 0.1775 - mean_absolute_error: 0.1776 - mean_squared_error: 0.0575 - val_loss: 0.1487 - val_mean_absolute_error: 0.1486 - val_mean_squared_error: 0.0455
Epoch 45/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1709 - mean_absolute_error: 0.1709 - mean_squared_error: 0.0545
Epoch 00045: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 111us/sample - loss: 0.1712 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0545 - val_loss: 0.1701 - val_mean_absolute_error: 0.1700 - val_mean_squared_error: 0.0543
Epoch 46/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1698 - mean_absolute_error: 0.1698 - mean_squared_error: 0.0538
Epoch 00046: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 110us/sample - loss: 0.1698 - mean_absolute_error: 0.1699 - mean_squared_error: 0.0538 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0431
Epoch 47/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1760 - mean_absolute_error: 0.1760 - mean_squared_error: 0.0566
Epoch 00047: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 109us/sample - loss: 0.1762 - mean_absolute_error: 0.1762 - mean_squared_error: 0.0568 - val_loss: 0.2069 - val_mean_absolute_error: 0.2067 - val_mean_squared_error: 0.0746
Epoch 48/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1654 - mean_absolute_error: 0.1654 - mean_squared_error: 0.0521
Epoch 00048: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 108us/sample - loss: 0.1654 - mean_absolute_error: 0.1653 - mean_squared_error: 0.0520 - val_loss: 0.1587 - val_mean_absolute_error: 0.1586 - val_mean_squared_error: 0.0507
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Epoch 49/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1640 - mean_absolute_error: 0.1640 - mean_squared_error: 0.0506
Epoch 00049: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 110us/sample - loss: 0.1640 - mean_absolute_error: 0.1642 - mean_squared_error: 0.0507 - val_loss: 0.1585 - val_mean_absolute_error: 0.1583 - val_mean_squared_error: 0.0499
Epoch 50/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1652 - mean_absolute_error: 0.1652 - mean_squared_error: 0.0520
Epoch 00050: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 110us/sample - loss: 0.1651 - mean_absolute_error: 0.1652 - mean_squared_error: 0.0520 - val_loss: 0.1923 - val_mean_absolute_error: 0.1924 - val_mean_squared_error: 0.0600
Epoch 51/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1702 - mean_absolute_error: 0.1702 - mean_squared_error: 0.0532
Epoch 00051: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 110us/sample - loss: 0.1707 - mean_absolute_error: 0.1707 - mean_squared_error: 0.0535 - val_loss: 0.2198 - val_mean_absolute_error: 0.2199 - val_mean_squared_error: 0.0716
Epoch 52/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1632 - mean_absolute_error: 0.1632 - mean_squared_error: 0.0502
Epoch 00052: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 109us/sample - loss: 0.1632 - mean_absolute_error: 0.1631 - mean_squared_error: 0.0500 - val_loss: 0.1635 - val_mean_absolute_error: 0.1635 - val_mean_squared_error: 0.0474
Epoch 53/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1626 - mean_absolute_error: 0.1626 - mean_squared_error: 0.0508
Epoch 00053: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 111us/sample - loss: 0.1627 - mean_absolute_error: 0.1628 - mean_squared_error: 0.0511 - val_loss: 0.1621 - val_mean_absolute_error: 0.1622 - val_mean_squared_error: 0.0467
Epoch 54/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1631 - mean_absolute_error: 0.1631 - mean_squared_error: 0.0502
Epoch 00054: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 107us/sample - loss: 0.1627 - mean_absolute_error: 0.1628 - mean_squared_error: 0.0501 - val_loss: 0.1578 - val_mean_absolute_error: 0.1578 - val_mean_squared_error: 0.0493
Epoch 55/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1624 - mean_absolute_error: 0.1624 - mean_squared_error: 0.0502
Epoch 00055: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 112us/sample - loss: 0.1623 - mean_absolute_error: 0.1625 - mean_squared_error: 0.0503 - val_loss: 0.1519 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0468
Epoch 56/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1582 - mean_absolute_error: 0.1582 - mean_squared_error: 0.0486
Epoch 00056: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 109us/sample - loss: 0.1591 - mean_absolute_error: 0.1591 - mean_squared_error: 0.0490 - val_loss: 0.1574 - val_mean_absolute_error: 0.1574 - val_mean_squared_error: 0.0468
Epoch 57/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1667 - mean_absolute_error: 0.1667 - mean_squared_error: 0.0518
Epoch 00057: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 109us/sample - loss: 0.1667 - mean_absolute_error: 0.1667 - mean_squared_error: 0.0518

```

olute_error: 0.1668 - mean_squared_error: 0.0518 - val_loss: 0.1651 - val_mean_absolute_
error: 0.1651 - val_mean_squared_error: 0.0485
Epoch 58/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1606 - mean_absolute_er
ror: 0.1606 - mean_squared_error: 0.0500
Epoch 00058: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 107us/sample - loss: 0.1600 - mean_abs
olute_error: 0.1599 - mean_squared_error: 0.0496 - val_loss: 0.1480 - val_mean_absolute_
error: 0.1480 - val_mean_squared_error: 0.0445
Epoch 59/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1624 - mean_absolute_er
ror: 0.1624 - mean_squared_error: 0.0505
Epoch 00059: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 111us/sample - loss: 0.1621 - mean_abs
olute_error: 0.1623 - mean_squared_error: 0.0504 - val_loss: 0.1472 - val_mean_absolute_
error: 0.1472 - val_mean_squared_error: 0.0429
Epoch 60/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1624 - mean_absolute_er
ror: 0.1624 - mean_squared_error: 0.0502Restoring model weights from the end of the best
epoch.

Epoch 00060: val_loss did not improve from 0.14686
10471/10471 [=====] - 1s 112us/sample - loss: 0.1622 - mean_abs
olute_error: 0.1622 - mean_squared_error: 0.0501 - val_loss: 0.1656 - val_mean_absolute_
error: 0.1655 - val_mean_squared_error: 0.0522
Epoch 00060: early stopping
MAE: 0.1468179
RMSE: 0.20792882
Adding initial Dense layers with 64
Adding Dense layer with 64
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_86"

```

Layer (type)	Output Shape	Param #
input_87 (InputLayer)	[(None, 61)]	0
batch_normalization_168 (Batch Normalization)	(None, 61)	244
dense_626 (Dense)	(None, 64)	3968
batch_normalization_169 (Batch Normalization)	(None, 64)	256
dense_627 (Dense)	(None, 64)	4160
batch_normalization_170 (Batch Normalization)	(None, 64)	256
dense_628 (Dense)	(None, 64)	4160
batch_normalization_171 (Batch Normalization)	(None, 64)	256
dense_629 (Dense)	(None, 64)	4160
batch_normalization_172 (Batch Normalization)	(None, 64)	256

dense_630 (Dense)	(None, 64)	4160
batch_normalization_173 (Batch Normalization)	(None, 64)	256
dense_631 (Dense)	(None, 64)	4160
batch_normalization_174 (Batch Normalization)	(None, 64)	256
dense_632 (Dense)	(None, 64)	4160
batch_normalization_175 (Batch Normalization)	(None, 64)	256
dense_633 (Dense)	(None, 64)	4160
dense_634 (Dense)	(None, 1)	65
<hr/>		
Total params:	35,189	
Trainable params:	34,171	
Non-trainable params:	1,018	

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10368/10471 [=====>.] - ETA: 0s - loss: 1.7698 - mean_absolute_error: 1.7698 - mean_squared_error: 10.9245

Epoch 00001: val_loss improved from inf to 0.89490, saving model to best_basic_model.hdf5

10471/10471 [=====] - 3s 295us/sample - loss: 1.7579 - mean_absolute_error: 1.7559 - mean_squared_error: 10.7981 - val_loss: 0.8949 - val_mean_absolute_error: 0.8951 - val_mean_squared_error: 1.6274

Epoch 2/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.5064 - mean_absolute_error: 0.5064 - mean_squared_error: 0.4095

Epoch 00002: val_loss improved from 0.89490 to 0.69728, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 2s 155us/sample - loss: 0.5064 - mean_absolute_error: 0.5063 - mean_squared_error: 0.4092 - val_loss: 0.6973 - val_mean_absolute_error: 0.6971 - val_mean_squared_error: 0.9628

Epoch 3/500

10240/10471 [=====>.] - ETA: 0s - loss: 0.4206 - mean_absolute_error: 0.4206 - mean_squared_error: 0.2841

Epoch 00003: val_loss improved from 0.69728 to 0.57782, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 2s 154us/sample - loss: 0.4209 - mean_absolute_error: 0.4212 - mean_squared_error: 0.2843 - val_loss: 0.5778 - val_mean_absolute_error: 0.5780 - val_mean_squared_error: 0.4404

Epoch 4/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.3753 - mean_absolute_error: 0.3753 - mean_squared_error: 0.2284

Epoch 00004: val_loss improved from 0.57782 to 0.47092, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 2s 158us/sample - loss: 0.3768 - mean_absolute_error: 0.3767 - mean_squared_error: 0.2295 - val_loss: 0.4709 - val_mean_absolute_error: 0.4707 - val_mean_squared_error: 0.3311

Epoch 5/500

10432/10471 [=====>.] - ETA: 0s - loss: 0.3620 - mean_absolute_error: 0.3620 - mean_squared_error: 0.2093

Epoch 00005: val_loss improved from 0.47092 to 0.35022, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 2s 157us/sample - loss: 0.3619 - mean_absolute_error: 0.3619 - mean_squared_error: 0.2093

```
olute_error: 0.3622 - mean_squared_error: 0.2096 - val_loss: 0.3502 - val_mean_absolute_
error: 0.3502 - val_mean_squared_error: 0.1974
Epoch 6/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.3283 - mean_absolute_er
ror: 0.3283 - mean_squared_error: 0.1757
Epoch 00006: val_loss improved from 0.35022 to 0.33003, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 158us/sample - loss: 0.3282 - mean_abs
olute_error: 0.3284 - mean_squared_error: 0.1756 - val_loss: 0.3300 - val_mean_absolute_
error: 0.3298 - val_mean_squared_error: 0.1620
Epoch 7/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3246 - mean_absolute_er
ror: 0.3246 - mean_squared_error: 0.1684
Epoch 00007: val_loss did not improve from 0.33003
10471/10471 [=====] - 2s 150us/sample - loss: 0.3245 - mean_abs
olute_error: 0.3243 - mean_squared_error: 0.1681 - val_loss: 0.4245 - val_mean_absolute_
error: 0.4246 - val_mean_squared_error: 0.2474
Epoch 8/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.2999 - mean_absolute_er
ror: 0.2999 - mean_squared_error: 0.1461
Epoch 00008: val_loss did not improve from 0.33003
10471/10471 [=====] - 2s 151us/sample - loss: 0.2996 - mean_abs
olute_error: 0.3001 - mean_squared_error: 0.1461 - val_loss: 0.4201 - val_mean_absolute_
error: 0.4203 - val_mean_squared_error: 0.2253
Epoch 9/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2823 - mean_absolute_er
ror: 0.2823 - mean_squared_error: 0.1310
Epoch 00009: val_loss improved from 0.33003 to 0.22895, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 161us/sample - loss: 0.2824 - mean_abs
olute_error: 0.2830 - mean_squared_error: 0.1318 - val_loss: 0.2289 - val_mean_absolute_
error: 0.2290 - val_mean_squared_error: 0.0936
Epoch 10/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.2793 - mean_absolute_er
ror: 0.2793 - mean_squared_error: 0.1287
Epoch 00010: val_loss did not improve from 0.22895
10471/10471 [=====] - 2s 155us/sample - loss: 0.2795 - mean_abs
olute_error: 0.2795 - mean_squared_error: 0.1286 - val_loss: 0.2892 - val_mean_absolute_
error: 0.2894 - val_mean_squared_error: 0.1274
Epoch 11/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2751 - mean_absolute_er
ror: 0.2751 - mean_squared_error: 0.1232
Epoch 00011: val_loss did not improve from 0.22895
10471/10471 [=====] - 2s 161us/sample - loss: 0.2752 - mean_abs
olute_error: 0.2752 - mean_squared_error: 0.1235 - val_loss: 0.2799 - val_mean_absolute_
error: 0.2799 - val_mean_squared_error: 0.1165
Epoch 12/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2588 - mean_absolute_er
ror: 0.2588 - mean_squared_error: 0.1120
Epoch 00012: val_loss did not improve from 0.22895
10471/10471 [=====] - 2s 164us/sample - loss: 0.2587 - mean_abs
olute_error: 0.2586 - mean_squared_error: 0.1119 - val_loss: 0.3222 - val_mean_absolute_
error: 0.3223 - val_mean_squared_error: 0.1437
Epoch 13/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2537 - mean_absolute_er
ror: 0.2537 - mean_squared_error: 0.1071
Epoch 00013: val_loss did not improve from 0.22895
10471/10471 [=====] - 2s 164us/sample - loss: 0.2531 - mean_abs
olute_error: 0.2534 - mean_squared_error: 0.1069 - val_loss: 0.2727 - val_mean_absolute_
error: 0.2726 - val_mean_squared_error: 0.1143
Epoch 14/500
```

```
10304/10471 [=====>.] - ETA: 0s - loss: 0.2417 - mean_absolute_error: 0.2417 - mean_squared_error: 0.0983
Epoch 00014: val_loss improved from 0.22895 to 0.19782, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 164us/sample - loss: 0.2423 - mean_absolute_error: 0.2430 - mean_squared_error: 0.0993 - val_loss: 0.1978 - val_mean_absolute_error: 0.1978 - val_mean_squared_error: 0.0733
Epoch 15/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2331 - mean_absolute_error: 0.2331 - mean_squared_error: 0.0921
Epoch 00015: val_loss did not improve from 0.19782
10471/10471 [=====] - 2s 154us/sample - loss: 0.2325 - mean_absolute_error: 0.2323 - mean_squared_error: 0.0914 - val_loss: 0.3876 - val_mean_absolute_error: 0.3877 - val_mean_squared_error: 0.1887
Epoch 16/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2402 - mean_absolute_error: 0.2402 - mean_squared_error: 0.0974
Epoch 00016: val_loss improved from 0.19782 to 0.17481, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 164us/sample - loss: 0.2402 - mean_absolute_error: 0.2404 - mean_squared_error: 0.0975 - val_loss: 0.1748 - val_mean_absolute_error: 0.1748 - val_mean_squared_error: 0.0584
Epoch 17/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.2192 - mean_absolute_error: 0.2192 - mean_squared_error: 0.0816
Epoch 00017: val_loss did not improve from 0.17481
10471/10471 [=====] - 2s 164us/sample - loss: 0.2198 - mean_absolute_error: 0.2200 - mean_squared_error: 0.0820 - val_loss: 0.2158 - val_mean_absolute_error: 0.2157 - val_mean_squared_error: 0.0798
Epoch 18/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2152 - mean_absolute_error: 0.2152 - mean_squared_error: 0.0803
Epoch 00018: val_loss did not improve from 0.17481
10471/10471 [=====] - 2s 154us/sample - loss: 0.2149 - mean_absolute_error: 0.2148 - mean_squared_error: 0.0802 - val_loss: 0.1930 - val_mean_absolute_error: 0.1930 - val_mean_squared_error: 0.0658
Epoch 19/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2111 - mean_absolute_error: 0.2111 - mean_squared_error: 0.0775
Epoch 00019: val_loss did not improve from 0.17481
10471/10471 [=====] - 2s 156us/sample - loss: 0.2104 - mean_absolute_error: 0.2103 - mean_squared_error: 0.0767 - val_loss: 0.2102 - val_mean_absolute_error: 0.2102 - val_mean_squared_error: 0.0793
Epoch 20/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.2023 - mean_absolute_error: 0.2023 - mean_squared_error: 0.0716
Epoch 00020: val_loss did not improve from 0.17481
10471/10471 [=====] - 2s 145us/sample - loss: 0.2013 - mean_absolute_error: 0.2014 - mean_squared_error: 0.0711 - val_loss: 0.1803 - val_mean_absolute_error: 0.1803 - val_mean_squared_error: 0.0612
Epoch 21/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.2042 - mean_absolute_error: 0.2042 - mean_squared_error: 0.0739
Epoch 00021: val_loss did not improve from 0.17481
10471/10471 [=====] - 2s 148us/sample - loss: 0.2051 - mean_absolute_error: 0.2049 - mean_squared_error: 0.0742 - val_loss: 0.2114 - val_mean_absolute_error: 0.2114 - val_mean_squared_error: 0.0770
Epoch 22/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1980 - mean_absolute_error: 0.1980 - mean_squared_error: 0.0692
Epoch 00022: val_loss improved from 0.17481 to 0.16235, saving model to best_basic_mode
```

```
1.hdf5
10471/10471 [=====] - 2s 154us/sample - loss: 0.1977 - mean_absolute_error: 0.1977 - mean_squared_error: 0.0691 - val_loss: 0.1623 - val_mean_absolute_error: 0.1623 - val_mean_squared_error: 0.0545
Epoch 23/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.2034 - mean_absolute_error: 0.2034 - mean_squared_error: 0.0719
Epoch 00023: val_loss did not improve from 0.16235
10471/10471 [=====] - 2s 149us/sample - loss: 0.2026 - mean_absolute_error: 0.2027 - mean_squared_error: 0.0717 - val_loss: 0.1640 - val_mean_absolute_error: 0.1640 - val_mean_squared_error: 0.0518
Epoch 24/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1822 - mean_absolute_error: 0.1822 - mean_squared_error: 0.0613
Epoch 00024: val_loss did not improve from 0.16235
10471/10471 [=====] - 2s 149us/sample - loss: 0.1827 - mean_absolute_error: 0.1830 - mean_squared_error: 0.0617 - val_loss: 0.1629 - val_mean_absolute_error: 0.1628 - val_mean_squared_error: 0.0528
Epoch 25/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1928 - mean_absolute_error: 0.1928 - mean_squared_error: 0.0665
Epoch 00025: val_loss improved from 0.16235 to 0.15021, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 152us/sample - loss: 0.1928 - mean_absolute_error: 0.1930 - mean_squared_error: 0.0667 - val_loss: 0.1502 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0463
Epoch 26/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1916 - mean_absolute_error: 0.1916 - mean_squared_error: 0.0661
Epoch 00026: val_loss did not improve from 0.15021
10471/10471 [=====] - 2s 149us/sample - loss: 0.1913 - mean_absolute_error: 0.1912 - mean_squared_error: 0.0659 - val_loss: 0.1559 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0487
Epoch 27/500
10112/10471 [=====.>..] - ETA: 0s - loss: 0.1894 - mean_absolute_error: 0.1894 - mean_squared_error: 0.0641
Epoch 00027: val_loss did not improve from 0.15021
10471/10471 [=====] - 2s 150us/sample - loss: 0.1885 - mean_absolute_error: 0.1885 - mean_squared_error: 0.0634 - val_loss: 0.1578 - val_mean_absolute_error: 0.1578 - val_mean_squared_error: 0.0497
Epoch 28/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1876 - mean_absolute_error: 0.1876 - mean_squared_error: 0.0636
Epoch 00028: val_loss improved from 0.15021 to 0.14917, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 152us/sample - loss: 0.1875 - mean_absolute_error: 0.1872 - mean_squared_error: 0.0636 - val_loss: 0.1492 - val_mean_absolute_error: 0.1492 - val_mean_squared_error: 0.0454
Epoch 29/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1837 - mean_absolute_error: 0.1837 - mean_squared_error: 0.0615
Epoch 00029: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 148us/sample - loss: 0.1841 - mean_absolute_error: 0.1840 - mean_squared_error: 0.0618 - val_loss: 0.1835 - val_mean_absolute_error: 0.1836 - val_mean_squared_error: 0.0587
Epoch 30/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1837 - mean_absolute_error: 0.1837 - mean_squared_error: 0.0615
Epoch 00030: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 147us/sample - loss: 0.1834 - mean_absolute_error: 0.1834 - mean_squared_error: 0.0613 - val_loss: 0.1752 - val_mean_absolute_error: 0.1752 - val_mean_squared_error: 0.0587
```

```
error: 0.1753 - val_mean_squared_error: 0.0577
Epoch 31/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1955 - mean_absolute_error: 0.1955 - mean_squared_error: 0.0681
Epoch 00031: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 145us/sample - loss: 0.1966 - mean_absolute_error: 0.1967 - mean_squared_error: 0.0690 - val_loss: 0.4524 - val_mean_absolute_error: 0.4525 - val_mean_squared_error: 0.2373
Epoch 32/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1916 - mean_absolute_error: 0.1916 - mean_squared_error: 0.0660
Epoch 00032: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 147us/sample - loss: 0.1916 - mean_absolute_error: 0.1917 - mean_squared_error: 0.0659 - val_loss: 0.1593 - val_mean_absolute_error: 0.1593 - val_mean_squared_error: 0.0483
Epoch 33/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1813 - mean_absolute_error: 0.1813 - mean_squared_error: 0.0604
Epoch 00033: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 147us/sample - loss: 0.1811 - mean_absolute_error: 0.1811 - mean_squared_error: 0.0602 - val_loss: 0.2216 - val_mean_absolute_error: 0.2217 - val_mean_squared_error: 0.0729
Epoch 34/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1887 - mean_absolute_error: 0.1887 - mean_squared_error: 0.0631
Epoch 00034: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 152us/sample - loss: 0.1888 - mean_absolute_error: 0.1891 - mean_squared_error: 0.0637 - val_loss: 0.1507 - val_mean_absolute_error: 0.1508 - val_mean_squared_error: 0.0450
Epoch 35/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1829 - mean_absolute_error: 0.1829 - mean_squared_error: 0.0607
Epoch 00035: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 150us/sample - loss: 0.1826 - mean_absolute_error: 0.1827 - mean_squared_error: 0.0605 - val_loss: 0.1521 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0461
Epoch 36/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1889 - mean_absolute_error: 0.1889 - mean_squared_error: 0.0636
Epoch 00036: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 150us/sample - loss: 0.1889 - mean_absolute_error: 0.1894 - mean_squared_error: 0.0649 - val_loss: 0.2023 - val_mean_absolute_error: 0.2022 - val_mean_squared_error: 0.0710
Epoch 37/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1839 - mean_absolute_error: 0.1839 - mean_squared_error: 0.0610
Epoch 00037: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 154us/sample - loss: 0.1842 - mean_absolute_error: 0.1848 - mean_squared_error: 0.0617 - val_loss: 0.1509 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0455
Epoch 38/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1832 - mean_absolute_error: 0.1832 - mean_squared_error: 0.0617
Epoch 00038: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 159us/sample - loss: 0.1837 - mean_absolute_error: 0.1837 - mean_squared_error: 0.0619 - val_loss: 0.1735 - val_mean_absolute_error: 0.1735 - val_mean_squared_error: 0.0571
Epoch 39/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1816 - mean_absolute_error: 0.1816 - mean_squared_error: 0.0601
Epoch 00039: val_loss did not improve from 0.14917
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10471/10471 [=====] - 2s 161us/sample - loss: 0.1815 - mean_absolute_error: 0.1816 - mean_squared_error: 0.0601 - val_loss: 0.2010 - val_mean_absolute_error: 0.2010 - val_mean_squared_error: 0.0701
Epoch 40/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1844 - mean_absolute_error: 0.1844 - mean_squared_error: 0.0607
Epoch 00040: val_loss did not improve from 0.14917
10471/10471 [=====] - 2s 149us/sample - loss: 0.1849 - mean_absolute_error: 0.1852 - mean_squared_error: 0.0615 - val_loss: 0.1982 - val_mean_absolute_error: 0.1983 - val_mean_squared_error: 0.0701
Epoch 41/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1777 - mean_absolute_error: 0.1777 - mean_squared_error: 0.0582
Epoch 00041: val_loss improved from 0.14917 to 0.14631, saving model to best_basic_mode.1.hdf5
10471/10471 [=====] - 2s 153us/sample - loss: 0.1783 - mean_absolute_error: 0.1786 - mean_squared_error: 0.0588 - val_loss: 0.1463 - val_mean_absolute_error: 0.1463 - val_mean_squared_error: 0.0433
Epoch 42/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1826 - mean_absolute_error: 0.1826 - mean_squared_error: 0.0605
Epoch 00042: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 148us/sample - loss: 0.1830 - mean_absolute_error: 0.1835 - mean_squared_error: 0.0612 - val_loss: 0.1496 - val_mean_absolute_error: 0.1496 - val_mean_squared_error: 0.0437
Epoch 43/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1830 - mean_absolute_error: 0.1830 - mean_squared_error: 0.0604
Epoch 00043: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 148us/sample - loss: 0.1827 - mean_absolute_error: 0.1830 - mean_squared_error: 0.0602 - val_loss: 0.1587 - val_mean_absolute_error: 0.1588 - val_mean_squared_error: 0.0521
Epoch 44/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1763 - mean_absolute_error: 0.1763 - mean_squared_error: 0.0578
Epoch 00044: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 148us/sample - loss: 0.1763 - mean_absolute_error: 0.1766 - mean_squared_error: 0.0581 - val_loss: 0.1753 - val_mean_absolute_error: 0.1754 - val_mean_squared_error: 0.0528
Epoch 45/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1791 - mean_absolute_error: 0.1791 - mean_squared_error: 0.0587
Epoch 00045: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 149us/sample - loss: 0.1789 - mean_absolute_error: 0.1791 - mean_squared_error: 0.0586 - val_loss: 0.1572 - val_mean_absolute_error: 0.1573 - val_mean_squared_error: 0.0512
Epoch 46/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1812 - mean_absolute_error: 0.1812 - mean_squared_error: 0.0603
Epoch 00046: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 146us/sample - loss: 0.1825 - mean_absolute_error: 0.1829 - mean_squared_error: 0.0612 - val_loss: 0.2906 - val_mean_absolute_error: 0.2906 - val_mean_squared_error: 0.1098
Epoch 47/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1833 - mean_absolute_error: 0.1833 - mean_squared_error: 0.0608
Epoch 00047: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 146us/sample - loss: 0.1830 - mean_absolute_error: 0.1833 - mean_squared_error: 0.0608 - val_loss: 0.1924 - val_mean_absolute_error: 0.1925 - val_mean_squared_error: 0.0594
Epoch 48/500
```

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10144/10471 [=====>.] - ETA: 0s - loss: 0.1780 - mean_absolute_error: 0.1780 - mean_squared_error: 0.0581
Epoch 00048: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 146us/sample - loss: 0.1786 - mean_absolute_error: 0.1787 - mean_squared_error: 0.0584 - val_loss: 0.1928 - val_mean_absolute_error: 0.1929 - val_mean_squared_error: 0.0633
Epoch 49/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1742 - mean_absolute_error: 0.1742 - mean_squared_error: 0.0556
Epoch 00049: val_loss did not improve from 0.14631
10471/10471 [=====] - 1s 143us/sample - loss: 0.1737 - mean_absolute_error: 0.1737 - mean_squared_error: 0.0552 - val_loss: 0.1677 - val_mean_absolute_error: 0.1678 - val_mean_squared_error: 0.0529
Epoch 50/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1801 - mean_absolute_error: 0.1801 - mean_squared_error: 0.0585
Epoch 00050: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 147us/sample - loss: 0.1800 - mean_absolute_error: 0.1802 - mean_squared_error: 0.0585 - val_loss: 0.2010 - val_mean_absolute_error: 0.2011 - val_mean_squared_error: 0.0627
Epoch 51/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1705 - mean_absolute_error: 0.1705 - mean_squared_error: 0.0550
Epoch 00051: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 147us/sample - loss: 0.1703 - mean_absolute_error: 0.1703 - mean_squared_error: 0.0548 - val_loss: 0.1965 - val_mean_absolute_error: 0.1966 - val_mean_squared_error: 0.0626
Epoch 52/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1854 - mean_absolute_error: 0.1854 - mean_squared_error: 0.0619
Epoch 00052: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 145us/sample - loss: 0.1850 - mean_absolute_error: 0.1853 - mean_squared_error: 0.0621 - val_loss: 0.2455 - val_mean_absolute_error: 0.2454 - val_mean_squared_error: 0.0948
Epoch 53/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1720 - mean_absolute_error: 0.1720 - mean_squared_error: 0.0554
Epoch 00053: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 146us/sample - loss: 0.1720 - mean_absolute_error: 0.1721 - mean_squared_error: 0.0553 - val_loss: 0.1702 - val_mean_absolute_error: 0.1703 - val_mean_squared_error: 0.0520
Epoch 54/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1681 - mean_absolute_error: 0.1681 - mean_squared_error: 0.0532
Epoch 00054: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 147us/sample - loss: 0.1680 - mean_absolute_error: 0.1681 - mean_squared_error: 0.0531 - val_loss: 0.1835 - val_mean_absolute_error: 0.1835 - val_mean_squared_error: 0.0581
Epoch 55/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1683 - mean_absolute_error: 0.1683 - mean_squared_error: 0.0535
Epoch 00055: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 147us/sample - loss: 0.1685 - mean_absolute_error: 0.1687 - mean_squared_error: 0.0540 - val_loss: 0.1466 - val_mean_absolute_error: 0.1466 - val_mean_squared_error: 0.0442
Epoch 56/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1699 - mean_absolute_error: 0.1699 - mean_squared_error: 0.0539
Epoch 00056: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 149us/sample - loss: 0.1701 - mean_absolute_error: 0.1702 - mean_squared_error: 0.0539 - val_loss: 0.2493 - val_mean_absolute_error: 0.2493 - val_mean_squared_error: 0.0529
```

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error: 0.2494 - val_mean_squared_error: 0.0862
Epoch 57/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1796 - mean_absolute_error: 0.1796 - mean_squared_error: 0.0587
Epoch 00057: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 145us/sample - loss: 0.1793 - mean_absolute_error: 0.1798 - mean_squared_error: 0.0590 - val_loss: 0.1499 - val_mean_absolute_error: 0.1499 - val_mean_squared_error: 0.0456
Epoch 58/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1703 - mean_absolute_error: 0.1703 - mean_squared_error: 0.0544
Epoch 00058: val_loss did not improve from 0.14631
10471/10471 [=====] - 2s 147us/sample - loss: 0.1704 - mean_absolute_error: 0.1707 - mean_squared_error: 0.0547 - val_loss: 0.1863 - val_mean_absolute_error: 0.1864 - val_mean_squared_error: 0.0595
Epoch 59/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1632 - mean_absolute_error: 0.1632 - mean_squared_error: 0.0513
Epoch 00059: val_loss improved from 0.14631 to 0.14330, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 153us/sample - loss: 0.1627 - mean_absolute_error: 0.1626 - mean_squared_error: 0.0509 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0432
Epoch 60/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1783 - mean_absolute_error: 0.1783 - mean_squared_error: 0.0586
Epoch 00060: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 147us/sample - loss: 0.1781 - mean_absolute_error: 0.1782 - mean_squared_error: 0.0587 - val_loss: 0.1865 - val_mean_absolute_error: 0.1865 - val_mean_squared_error: 0.0564
Epoch 61/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1708 - mean_absolute_error: 0.1708 - mean_squared_error: 0.0544
Epoch 00061: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 147us/sample - loss: 0.1709 - mean_absolute_error: 0.1710 - mean_squared_error: 0.0545 - val_loss: 0.1699 - val_mean_absolute_error: 0.1699 - val_mean_squared_error: 0.0522
Epoch 62/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1664 - mean_absolute_error: 0.1664 - mean_squared_error: 0.0527
Epoch 00062: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 147us/sample - loss: 0.1670 - mean_absolute_error: 0.1671 - mean_squared_error: 0.0530 - val_loss: 0.1779 - val_mean_absolute_error: 0.1778 - val_mean_squared_error: 0.0594
Epoch 63/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1617 - mean_absolute_error: 0.1617 - mean_squared_error: 0.0506
Epoch 00063: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 147us/sample - loss: 0.1618 - mean_absolute_error: 0.1620 - mean_squared_error: 0.0508 - val_loss: 0.1518 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0471
Epoch 64/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1659 - mean_absolute_error: 0.1659 - mean_squared_error: 0.0527
Epoch 00064: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 147us/sample - loss: 0.1657 - mean_absolute_error: 0.1658 - mean_squared_error: 0.0527 - val_loss: 0.1435 - val_mean_absolute_error: 0.1435 - val_mean_squared_error: 0.0428
Epoch 65/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1698 - mean_absolute_error: 0.1698 - mean_squared_error: 0.0539
```

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Epoch 00065: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 147us/sample - loss: 0.1700 - mean_absolute_error: 0.1702 - mean_squared_error: 0.0540 - val_loss: 0.2136 - val_mean_absolute_error: 0.2135 - val_mean_squared_error: 0.0771
Epoch 66/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1678 - mean_absolute_error: 0.1678 - mean_squared_error: 0.0530
Epoch 00066: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 146us/sample - loss: 0.1678 - mean_absolute_error: 0.1678 - mean_squared_error: 0.0530 - val_loss: 0.1979 - val_mean_absolute_error: 0.1980 - val_mean_squared_error: 0.0626
Epoch 67/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1640 - mean_absolute_error: 0.1640 - mean_squared_error: 0.0516
Epoch 00067: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 145us/sample - loss: 0.1639 - mean_absolute_error: 0.1638 - mean_squared_error: 0.0515 - val_loss: 0.1679 - val_mean_absolute_error: 0.1679 - val_mean_squared_error: 0.0514
Epoch 68/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1596 - mean_absolute_error: 0.1596 - mean_squared_error: 0.0492
Epoch 00068: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 148us/sample - loss: 0.1601 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0493 - val_loss: 0.1596 - val_mean_absolute_error: 0.1596 - val_mean_squared_error: 0.0500
Epoch 69/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1664 - mean_absolute_error: 0.1664 - mean_squared_error: 0.0521
Epoch 00069: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 151us/sample - loss: 0.1664 - mean_absolute_error: 0.1669 - mean_squared_error: 0.0524 - val_loss: 0.1693 - val_mean_absolute_error: 0.1693 - val_mean_squared_error: 0.0497
Epoch 70/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1642 - mean_absolute_error: 0.1642 - mean_squared_error: 0.0511
Epoch 00070: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 148us/sample - loss: 0.1640 - mean_absolute_error: 0.1641 - mean_squared_error: 0.0509 - val_loss: 0.1650 - val_mean_absolute_error: 0.1650 - val_mean_squared_error: 0.0500
Epoch 71/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1597 - mean_absolute_error: 0.1597 - mean_squared_error: 0.0490
Epoch 00071: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 148us/sample - loss: 0.1596 - mean_absolute_error: 0.1598 - mean_squared_error: 0.0491 - val_loss: 0.1741 - val_mean_absolute_error: 0.1741 - val_mean_squared_error: 0.0532
Epoch 72/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1683 - mean_absolute_error: 0.1683 - mean_squared_error: 0.0537
Epoch 00072: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 147us/sample - loss: 0.1682 - mean_absolute_error: 0.1685 - mean_squared_error: 0.0539 - val_loss: 0.1732 - val_mean_absolute_error: 0.1732 - val_mean_squared_error: 0.0592
Epoch 73/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1587 - mean_absolute_error: 0.1587 - mean_squared_error: 0.0485
Epoch 00073: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 146us/sample - loss: 0.1587 - mean_absolute_error: 0.1589 - mean_squared_error: 0.0486 - val_loss: 0.1438 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0425
Epoch 74/500
```

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10400/10471 [=====>.] - ETA: 0s - loss: 0.1576 - mean_absolute_error: 0.1576 - mean_squared_error: 0.0492
Epoch 00074: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 146us/sample - loss: 0.1577 - mean_absolute_error: 0.1576 - mean_squared_error: 0.0492 - val_loss: 0.1712 - val_mean_absolute_error: 0.1713 - val_mean_squared_error: 0.0518
Epoch 75/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1567 - mean_absolute_error: 0.1567 - mean_squared_error: 0.0477
Epoch 00075: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 145us/sample - loss: 0.1566 - mean_absolute_error: 0.1565 - mean_squared_error: 0.0476 - val_loss: 0.1448 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0431
Epoch 76/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1559 - mean_absolute_error: 0.1559 - mean_squared_error: 0.0482
Epoch 00076: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 147us/sample - loss: 0.1559 - mean_absolute_error: 0.1560 - mean_squared_error: 0.0482 - val_loss: 0.1559 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0493
Epoch 77/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1599 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0491
Epoch 00077: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 147us/sample - loss: 0.1599 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0491 - val_loss: 0.1529 - val_mean_absolute_error: 0.1529 - val_mean_squared_error: 0.0457
Epoch 78/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1555 - mean_absolute_error: 0.1555 - mean_squared_error: 0.0478
Epoch 00078: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 150us/sample - loss: 0.1552 - mean_absolute_error: 0.1554 - mean_squared_error: 0.0478 - val_loss: 0.1444 - val_mean_absolute_error: 0.1443 - val_mean_squared_error: 0.0433
Epoch 79/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1558 - mean_absolute_error: 0.1558 - mean_squared_error: 0.0480
Epoch 00079: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 146us/sample - loss: 0.1558 - mean_absolute_error: 0.1559 - mean_squared_error: 0.0480 - val_loss: 0.1533 - val_mean_absolute_error: 0.1533 - val_mean_squared_error: 0.0449
Epoch 80/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1612 - mean_absolute_error: 0.1612 - mean_squared_error: 0.0501
Epoch 00080: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 148us/sample - loss: 0.1615 - mean_absolute_error: 0.1616 - mean_squared_error: 0.0503 - val_loss: 0.1496 - val_mean_absolute_error: 0.1496 - val_mean_squared_error: 0.0460
Epoch 81/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1568 - mean_absolute_error: 0.1568 - mean_squared_error: 0.0477
Epoch 00081: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 146us/sample - loss: 0.1569 - mean_absolute_error: 0.1570 - mean_squared_error: 0.0477 - val_loss: 0.1524 - val_mean_absolute_error: 0.1524 - val_mean_squared_error: 0.0443
Epoch 82/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1582 - mean_absolute_error: 0.1582 - mean_squared_error: 0.0491
Epoch 00082: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 145us/sample - loss: 0.1580 - mean_absolute_error: 0.1580 - mean_squared_error: 0.0488 - val_loss: 0.2032 - val_mean_absolute_error: 0.2032 - val_mean_squared_error: 0.0518
```

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error: 0.2032 - val_mean_squared_error: 0.0631
Epoch 83/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1544 - mean_absolute_error: 0.1544 - mean_squared_error: 0.0472
Epoch 00083: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 148us/sample - loss: 0.1549 - mean_absolute_error: 0.1552 - mean_squared_error: 0.0478 - val_loss: 0.1607 - val_mean_absolute_error: 0.1607 - val_mean_squared_error: 0.0475
Epoch 84/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1566 - mean_absolute_error: 0.1566 - mean_squared_error: 0.0482Restoring model weights from the end of the best epoch.

Epoch 00084: val_loss did not improve from 0.14330
10471/10471 [=====] - 2s 147us/sample - loss: 0.1565 - mean_absolute_error: 0.1567 - mean_squared_error: 0.0484 - val_loss: 0.1687 - val_mean_absolute_error: 0.1687 - val_mean_squared_error: 0.0512
Epoch 00084: early stopping
MAE: 0.14333741
RMSE: 0.20780393
Adding initial Dense layers with 64
Adding Dense layer with 64
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_87"

```

Layer (type)	Output Shape	Param #
input_88 (InputLayer)	[(None, 61)]	0
batch_normalization_176 (Batch Normalization)	(None, 61)	244
dense_635 (Dense)	(None, 64)	3968
batch_normalization_177 (Batch Normalization)	(None, 64)	256
dense_636 (Dense)	(None, 64)	4160
batch_normalization_178 (Batch Normalization)	(None, 64)	256
dense_637 (Dense)	(None, 64)	4160
batch_normalization_179 (Batch Normalization)	(None, 64)	256
dense_638 (Dense)	(None, 64)	4160
batch_normalization_180 (Batch Normalization)	(None, 64)	256
dense_639 (Dense)	(None, 64)	4160
batch_normalization_181 (Batch Normalization)	(None, 64)	256

dense_640 (Dense)	(None, 64)	4160
batch_normalization_182 (Batch Normalization)	(None, 64)	256
dense_641 (Dense)	(None, 64)	4160
batch_normalization_183 (Batch Normalization)	(None, 64)	256
dense_642 (Dense)	(None, 64)	4160
batch_normalization_184 (Batch Normalization)	(None, 64)	256
dense_643 (Dense)	(None, 64)	4160
batch_normalization_185 (Batch Normalization)	(None, 64)	256
dense_644 (Dense)	(None, 64)	4160
batch_normalization_186 (Batch Normalization)	(None, 64)	256
dense_645 (Dense)	(None, 64)	4160
batch_normalization_187 (Batch Normalization)	(None, 64)	256
dense_646 (Dense)	(None, 64)	4160
dense_647 (Dense)	(None, 1)	65
<hr/>		
Total params: 52,853		
Trainable params: 51,323		
Non-trainable params: 1,530		

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10400/10471 [=====>.] - ETA: 0s - loss: 1.8252 - mean_absolute_error: 1.8252 - mean_squared_error: 11.8220
Epoch 00001: val_loss improved from inf to 0.69672, saving model to best_basic_model.hdf5
10471/10471 [=====] - 5s 436us/sample - loss: 1.8171 - mean_absolute_error: 1.8143 - mean_squared_error: 11.7198 - val_loss: 0.6967 - val_mean_absolute_error: 0.6972 - val_mean_squared_error: 0.8979
Epoch 2/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.4997 - mean_absolute_error: 0.4997 - mean_squared_error: 0.3996
Epoch 00002: val_loss improved from 0.69672 to 0.56144, saving model to best_basic_model.hdf5
10471/10471 [=====] - 2s 207us/sample - loss: 0.4987 - mean_absolute_error: 0.4995 - mean_squared_error: 0.3988 - val_loss: 0.5614 - val_mean_absolute_error: 0.5613 - val_mean_squared_error: 0.6304
Epoch 3/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.4683 - mean_absolute_error: 0.4683 - mean_squared_error: 0.3513
Epoch 00003: val_loss improved from 0.56144 to 0.47368, saving model to best_basic_model.hdf5
10471/10471 [=====] - 2s 212us/sample - loss: 0.4677 - mean_absolute_error: 0.4682 - mean_squared_error: 0.3512 - val_loss: 0.4737 - val_mean_absolute_error: 0.4734 - val_mean_squared_error: 0.3313
Epoch 4/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.3911 - mean_absolute_error:

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ror: 0.3911 - mean_squared_error: 0.2444
Epoch 00004: val_loss did not improve from 0.47368
10471/10471 [=====] - 2s 209us/sample - loss: 0.3906 - mean_absolute_error: 0.3905 - mean_squared_error: 0.2436 - val_loss: 0.5973 - val_mean_absolute_error: 0.5973 - val_mean_squared_error: 0.5005
Epoch 5/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.3879 - mean_absolute_error: 0.3879 - mean_squared_error: 0.2403
Epoch 00005: val_loss improved from 0.47368 to 0.40685, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 210us/sample - loss: 0.3865 - mean_absolute_error: 0.3866 - mean_squared_error: 0.2387 - val_loss: 0.4068 - val_mean_absolute_error: 0.4070 - val_mean_squared_error: 0.2554
Epoch 6/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.3334 - mean_absolute_error: 0.3334 - mean_squared_error: 0.1808
Epoch 00006: val_loss improved from 0.40685 to 0.36768, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 214us/sample - loss: 0.3321 - mean_absolute_error: 0.3325 - mean_squared_error: 0.1802 - val_loss: 0.3677 - val_mean_absolute_error: 0.3677 - val_mean_squared_error: 0.2097
Epoch 7/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.3314 - mean_absolute_error: 0.3314 - mean_squared_error: 0.1780
Epoch 00007: val_loss did not improve from 0.36768
10471/10471 [=====] - 2s 212us/sample - loss: 0.3333 - mean_absolute_error: 0.3336 - mean_squared_error: 0.1805 - val_loss: 0.7646 - val_mean_absolute_error: 0.7644 - val_mean_squared_error: 0.6890
Epoch 8/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.3424 - mean_absolute_error: 0.3424 - mean_squared_error: 0.1904
Epoch 00008: val_loss improved from 0.36768 to 0.31436, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 217us/sample - loss: 0.3422 - mean_absolute_error: 0.3425 - mean_squared_error: 0.1904 - val_loss: 0.3144 - val_mean_absolute_error: 0.3145 - val_mean_squared_error: 0.1571
Epoch 9/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.3157 - mean_absolute_error: 0.3157 - mean_squared_error: 0.1609
Epoch 00009: val_loss did not improve from 0.31436
10471/10471 [=====] - 2s 213us/sample - loss: 0.3157 - mean_absolute_error: 0.3160 - mean_squared_error: 0.1616 - val_loss: 0.6301 - val_mean_absolute_error: 0.6301 - val_mean_squared_error: 0.5040
Epoch 10/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.3015 - mean_absolute_error: 0.3015 - mean_squared_error: 0.1495
Epoch 00010: val_loss did not improve from 0.31436
10471/10471 [=====] - 2s 206us/sample - loss: 0.3028 - mean_absolute_error: 0.3036 - mean_squared_error: 0.1523 - val_loss: 0.3614 - val_mean_absolute_error: 0.3614 - val_mean_squared_error: 0.2226
Epoch 11/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.2914 - mean_absolute_error: 0.2914 - mean_squared_error: 0.1392
Epoch 00011: val_loss improved from 0.31436 to 0.26544, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 224us/sample - loss: 0.2918 - mean_absolute_error: 0.2925 - mean_squared_error: 0.1404 - val_loss: 0.2654 - val_mean_absolute_error: 0.2653 - val_mean_squared_error: 0.1189
Epoch 12/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.2629 - mean_absolute_error: 0.2629 - mean_squared_error: 0.1153
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Epoch 00012: val_loss improved from 0.26544 to 0.25179, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 211us/sample - loss: 0.2645 - mean_absolute_error: 0.2647 - mean_squared_error: 0.1165 - val_loss: 0.2518 - val_mean_absolute_error: 0.2518 - val_mean_squared_error: 0.1004
Epoch 13/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2710 - mean_absolute_error: 0.2710 - mean_squared_error: 0.1207
Epoch 00013: val_loss improved from 0.25179 to 0.20340, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 222us/sample - loss: 0.2697 - mean_absolute_error: 0.2703 - mean_squared_error: 0.1201 - val_loss: 0.2034 - val_mean_absolute_error: 0.2034 - val_mean_squared_error: 0.0683
Epoch 14/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2417 - mean_absolute_error: 0.2417 - mean_squared_error: 0.0992
Epoch 00014: val_loss improved from 0.20340 to 0.18930, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 214us/sample - loss: 0.2417 - mean_absolute_error: 0.2414 - mean_squared_error: 0.0988 - val_loss: 0.1893 - val_mean_absolute_error: 0.1893 - val_mean_squared_error: 0.0634
Epoch 15/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.2454 - mean_absolute_error: 0.2454 - mean_squared_error: 0.0996
Epoch 00015: val_loss did not improve from 0.18930
10471/10471 [=====] - 2s 200us/sample - loss: 0.2445 - mean_absolute_error: 0.2445 - mean_squared_error: 0.0990 - val_loss: 0.2050 - val_mean_absolute_error: 0.2049 - val_mean_squared_error: 0.0773
Epoch 16/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2371 - mean_absolute_error: 0.2371 - mean_squared_error: 0.0940
Epoch 00016: val_loss did not improve from 0.18930
10471/10471 [=====] - 2s 203us/sample - loss: 0.2378 - mean_absolute_error: 0.2376 - mean_squared_error: 0.0944 - val_loss: 0.2700 - val_mean_absolute_error: 0.2698 - val_mean_squared_error: 0.1126
Epoch 17/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2285 - mean_absolute_error: 0.2285 - mean_squared_error: 0.0884
Epoch 00017: val_loss did not improve from 0.18930
10471/10471 [=====] - 2s 203us/sample - loss: 0.2282 - mean_absolute_error: 0.2286 - mean_squared_error: 0.0886 - val_loss: 0.2317 - val_mean_absolute_error: 0.2316 - val_mean_squared_error: 0.0924
Epoch 18/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2267 - mean_absolute_error: 0.2267 - mean_squared_error: 0.0891
Epoch 00018: val_loss did not improve from 0.18930
10471/10471 [=====] - 2s 202us/sample - loss: 0.2262 - mean_absolute_error: 0.2263 - mean_squared_error: 0.0888 - val_loss: 0.2155 - val_mean_absolute_error: 0.2154 - val_mean_squared_error: 0.0836
Epoch 19/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.2050 - mean_absolute_error: 0.2050 - mean_squared_error: 0.0737
Epoch 00019: val_loss improved from 0.18930 to 0.17943, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 207us/sample - loss: 0.2047 - mean_absolute_error: 0.2049 - mean_squared_error: 0.0738 - val_loss: 0.1794 - val_mean_absolute_error: 0.1794 - val_mean_squared_error: 0.0592
Epoch 20/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2114 - mean_absolute_error: 0.2114 - mean_squared_error: 0.0775
Epoch 00020: val_loss did not improve from 0.17943

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10471/10471 [=====] - 2s 202us/sample - loss: 0.2114 - mean_absolute_error: 0.2114 - mean_squared_error: 0.0775 - val_loss: 0.1977 - val_mean_absolute_error: 0.1977 - val_mean_squared_error: 0.0733
Epoch 21/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1905 - mean_absolute_error: 0.1905 - mean_squared_error: 0.0648
Epoch 00021: val_loss improved from 0.17943 to 0.16074, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 208us/sample - loss: 0.1904 - mean_absolute_error: 0.1904 - mean_squared_error: 0.0647 - val_loss: 0.1607 - val_mean_absolute_error: 0.1607 - val_mean_squared_error: 0.0514
Epoch 22/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.2015 - mean_absolute_error: 0.2015 - mean_squared_error: 0.0708
Epoch 00022: val_loss did not improve from 0.16074
10471/10471 [=====] - 2s 201us/sample - loss: 0.2014 - mean_absolute_error: 0.2019 - mean_squared_error: 0.0710 - val_loss: 0.1680 - val_mean_absolute_error: 0.1680 - val_mean_squared_error: 0.0525
Epoch 23/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1973 - mean_absolute_error: 0.1973 - mean_squared_error: 0.0697
Epoch 00023: val_loss did not improve from 0.16074
10471/10471 [=====] - 2s 199us/sample - loss: 0.1973 - mean_absolute_error: 0.1975 - mean_squared_error: 0.0699 - val_loss: 0.2230 - val_mean_absolute_error: 0.2229 - val_mean_squared_error: 0.0832
Epoch 24/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.2040 - mean_absolute_error: 0.2040 - mean_squared_error: 0.0729
Epoch 00024: val_loss did not improve from 0.16074
10471/10471 [=====] - 2s 198us/sample - loss: 0.2044 - mean_absolute_error: 0.2044 - mean_squared_error: 0.0732 - val_loss: 0.2840 - val_mean_absolute_error: 0.2838 - val_mean_squared_error: 0.1194
Epoch 25/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1966 - mean_absolute_error: 0.1966 - mean_squared_error: 0.0688
Epoch 00025: val_loss did not improve from 0.16074
10471/10471 [=====] - 2s 205us/sample - loss: 0.1961 - mean_absolute_error: 0.1962 - mean_squared_error: 0.0687 - val_loss: 0.1905 - val_mean_absolute_error: 0.1903 - val_mean_squared_error: 0.0647
Epoch 26/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.2091 - mean_absolute_error: 0.2091 - mean_squared_error: 0.0756
Epoch 00026: val_loss improved from 0.16074 to 0.15786, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 209us/sample - loss: 0.2085 - mean_absolute_error: 0.2085 - mean_squared_error: 0.0752 - val_loss: 0.1579 - val_mean_absolute_error: 0.1579 - val_mean_squared_error: 0.0475
Epoch 27/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1906 - mean_absolute_error: 0.1906 - mean_squared_error: 0.0648
Epoch 00027: val_loss did not improve from 0.15786
10471/10471 [=====] - 2s 201us/sample - loss: 0.1908 - mean_absolute_error: 0.1910 - mean_squared_error: 0.0651 - val_loss: 0.1859 - val_mean_absolute_error: 0.1859 - val_mean_squared_error: 0.0613
Epoch 28/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1917 - mean_absolute_error: 0.1917 - mean_squared_error: 0.0660
Epoch 00028: val_loss did not improve from 0.15786
10471/10471 [=====] - 2s 208us/sample - loss: 0.1912 - mean_absolute_error: 0.1911 - mean_squared_error: 0.0657 - val_loss: 0.1827 - val_mean_absolute_error: 0.1828 - val_mean_squared_error: 0.0568
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Epoch 29/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1978 - mean_absolute_error: 0.1978 - mean_squared_error: 0.0695
Epoch 00029: val_loss did not improve from 0.15786
10471/10471 [=====] - 2s 207us/sample - loss: 0.1980 - mean_absolute_error: 0.1981 - mean_squared_error: 0.0696 - val_loss: 0.1718 - val_mean_absolute_error: 0.1718 - val_mean_squared_error: 0.0576
Epoch 30/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1935 - mean_absolute_error: 0.1935 - mean_squared_error: 0.0674
Epoch 00030: val_loss did not improve from 0.15786
10471/10471 [=====] - 2s 200us/sample - loss: 0.1942 - mean_absolute_error: 0.1944 - mean_squared_error: 0.0681 - val_loss: 0.1589 - val_mean_absolute_error: 0.1588 - val_mean_squared_error: 0.0503
Epoch 31/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1881 - mean_absolute_error: 0.1881 - mean_squared_error: 0.0649
Epoch 00031: val_loss did not improve from 0.15786
10471/10471 [=====] - 2s 196us/sample - loss: 0.1883 - mean_absolute_error: 0.1885 - mean_squared_error: 0.0651 - val_loss: 0.1656 - val_mean_absolute_error: 0.1656 - val_mean_squared_error: 0.0519
Epoch 32/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1887 - mean_absolute_error: 0.1887 - mean_squared_error: 0.0650
Epoch 00032: val_loss did not improve from 0.15786
10471/10471 [=====] - 2s 197us/sample - loss: 0.1887 - mean_absolute_error: 0.1890 - mean_squared_error: 0.0651 - val_loss: 0.3007 - val_mean_absolute_error: 0.3006 - val_mean_squared_error: 0.1284
Epoch 33/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1916 - mean_absolute_error: 0.1916 - mean_squared_error: 0.0659
Epoch 00033: val_loss did not improve from 0.15786
10471/10471 [=====] - 2s 198us/sample - loss: 0.1923 - mean_absolute_error: 0.1928 - mean_squared_error: 0.0665 - val_loss: 0.1589 - val_mean_absolute_error: 0.1589 - val_mean_squared_error: 0.0488
Epoch 34/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1944 - mean_absolute_error: 0.1944 - mean_squared_error: 0.0674
Epoch 00034: val_loss did not improve from 0.15786
10471/10471 [=====] - 2s 201us/sample - loss: 0.1944 - mean_absolute_error: 0.1944 - mean_squared_error: 0.0673 - val_loss: 0.1617 - val_mean_absolute_error: 0.1617 - val_mean_squared_error: 0.0524
Epoch 35/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1788 - mean_absolute_error: 0.1788 - mean_squared_error: 0.0588
Epoch 00035: val_loss did not improve from 0.15786
10471/10471 [=====] - 2s 199us/sample - loss: 0.1785 - mean_absolute_error: 0.1786 - mean_squared_error: 0.0586 - val_loss: 0.1707 - val_mean_absolute_error: 0.1706 - val_mean_squared_error: 0.0564
Epoch 36/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1937 - mean_absolute_error: 0.1937 - mean_squared_error: 0.0673
Epoch 00036: val_loss did not improve from 0.15786
10471/10471 [=====] - 2s 198us/sample - loss: 0.1937 - mean_absolute_error: 0.1939 - mean_squared_error: 0.0675 - val_loss: 0.2883 - val_mean_absolute_error: 0.2884 - val_mean_squared_error: 0.1098
Epoch 37/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1962 - mean_absolute_error: 0.1962 - mean_squared_error: 0.0684
Epoch 00037: val_loss improved from 0.15786 to 0.15758, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 2s 206us/sample - loss: 0.1963 - mean_absolute_error: 0.1963 - mean_squared_error: 0.0684 - val_loss: 0.1576 - val_mean_absolute_error: 0.1576 - val_mean_squared_error: 0.0472
Epoch 38/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1866 - mean_absolute_error: 0.1866 - mean_squared_error: 0.0640
Epoch 00038: val_loss did not improve from 0.15758
10471/10471 [=====] - 2s 198us/sample - loss: 0.1862 - mean_absolute_error: 0.1865 - mean_squared_error: 0.0639 - val_loss: 0.1582 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0470
Epoch 39/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1982 - mean_absolute_error: 0.1982 - mean_squared_error: 0.0692
Epoch 00039: val_loss did not improve from 0.15758
10471/10471 [=====] - 2s 200us/sample - loss: 0.1982 - mean_absolute_error: 0.1983 - mean_squared_error: 0.0692 - val_loss: 0.1776 - val_mean_absolute_error: 0.1777 - val_mean_squared_error: 0.0561
Epoch 40/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1841 - mean_absolute_error: 0.1841 - mean_squared_error: 0.0615
Epoch 00040: val_loss did not improve from 0.15758
10471/10471 [=====] - 2s 198us/sample - loss: 0.1848 - mean_absolute_error: 0.1850 - mean_squared_error: 0.0618 - val_loss: 0.2152 - val_mean_absolute_error: 0.2151 - val_mean_squared_error: 0.0780
Epoch 41/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1980 - mean_absolute_error: 0.1980 - mean_squared_error: 0.0692
Epoch 00041: val_loss improved from 0.15758 to 0.15510, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 203us/sample - loss: 0.1981 - mean_absolute_error: 0.1981 - mean_squared_error: 0.0693 - val_loss: 0.1551 - val_mean_absolute_error: 0.1551 - val_mean_squared_error: 0.0469
Epoch 42/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1800 - mean_absolute_error: 0.1800 - mean_squared_error: 0.0590
Epoch 00042: val_loss improved from 0.15510 to 0.14892, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 206us/sample - loss: 0.1796 - mean_absolute_error: 0.1798 - mean_squared_error: 0.0588 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0448
Epoch 43/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1718 - mean_absolute_error: 0.1718 - mean_squared_error: 0.0554
Epoch 00043: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 198us/sample - loss: 0.1719 - mean_absolute_error: 0.1720 - mean_squared_error: 0.0555 - val_loss: 0.1626 - val_mean_absolute_error: 0.1626 - val_mean_squared_error: 0.0490
Epoch 44/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1845 - mean_absolute_error: 0.1845 - mean_squared_error: 0.0620
Epoch 00044: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 199us/sample - loss: 0.1842 - mean_absolute_error: 0.1841 - mean_squared_error: 0.0617 - val_loss: 0.1716 - val_mean_absolute_error: 0.1715 - val_mean_squared_error: 0.0569
Epoch 45/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1771 - mean_absolute_error: 0.1771 - mean_squared_error: 0.0591
Epoch 00045: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 196us/sample - loss: 0.1768 - mean_absolute_error: 0.1773 - mean_squared_error: 0.0595 - val_loss: 0.1706 - val_mean_absolute_error: 0.1706 - val_mean_squared_error: 0.0546

Epoch 46/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1845 - mean_absolute_error: 0.1845 - mean_squared_error: 0.0618
Epoch 00046: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 197us/sample - loss: 0.1847 - mean_absolute_error: 0.1847 - mean_squared_error: 0.0618 - val_loss: 0.1510 - val_mean_absolute_error: 0.1510 - val_mean_squared_error: 0.0459
Epoch 47/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1783 - mean_absolute_error: 0.1783 - mean_squared_error: 0.0584
Epoch 00047: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 199us/sample - loss: 0.1791 - mean_absolute_error: 0.1791 - mean_squared_error: 0.0589 - val_loss: 0.1494 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0450
Epoch 48/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1822 - mean_absolute_error: 0.1822 - mean_squared_error: 0.0607
Epoch 00048: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 197us/sample - loss: 0.1824 - mean_absolute_error: 0.1823 - mean_squared_error: 0.0608 - val_loss: 0.1878 - val_mean_absolute_error: 0.1878 - val_mean_squared_error: 0.0656
Epoch 49/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1800 - mean_absolute_error: 0.1800 - mean_squared_error: 0.0592
Epoch 00049: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 197us/sample - loss: 0.1806 - mean_absolute_error: 0.1805 - mean_squared_error: 0.0596 - val_loss: 0.2220 - val_mean_absolute_error: 0.2220 - val_mean_squared_error: 0.0723
Epoch 50/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1850 - mean_absolute_error: 0.1850 - mean_squared_error: 0.0621
Epoch 00050: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 196us/sample - loss: 0.1849 - mean_absolute_error: 0.1851 - mean_squared_error: 0.0622 - val_loss: 0.1896 - val_mean_absolute_error: 0.1896 - val_mean_squared_error: 0.0657
Epoch 51/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1804 - mean_absolute_error: 0.1804 - mean_squared_error: 0.0595
Epoch 00051: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 198us/sample - loss: 0.1805 - mean_absolute_error: 0.1806 - mean_squared_error: 0.0596 - val_loss: 0.2124 - val_mean_absolute_error: 0.2125 - val_mean_squared_error: 0.0692
Epoch 52/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1774 - mean_absolute_error: 0.1774 - mean_squared_error: 0.0588
Epoch 00052: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 197us/sample - loss: 0.1774 - mean_absolute_error: 0.1776 - mean_squared_error: 0.0589 - val_loss: 0.2063 - val_mean_absolute_error: 0.2064 - val_mean_squared_error: 0.0664
Epoch 53/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1778 - mean_absolute_error: 0.1778 - mean_squared_error: 0.0575
Epoch 00053: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 197us/sample - loss: 0.1777 - mean_absolute_error: 0.1778 - mean_squared_error: 0.0576 - val_loss: 0.1769 - val_mean_absolute_error: 0.1769 - val_mean_squared_error: 0.0602
Epoch 54/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1712 - mean_absolute_error: 0.1712 - mean_squared_error: 0.0545
Epoch 00054: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 197us/sample - loss: 0.1712 - mean_absolute_error: 0.1712 - mean_squared_error: 0.0545

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olute_error: 0.1711 - mean_squared_error: 0.0544 - val_loss: 0.1796 - val_mean_absolute_error: 0.1795 - val_mean_squared_error: 0.0608
Epoch 55/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1822 - mean_absolute_error: 0.1822 - mean_squared_error: 0.0599
Epoch 00055: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 204us/sample - loss: 0.1822 - mean_absolute_error: 0.1825 - mean_squared_error: 0.0602 - val_loss: 0.2223 - val_mean_absolute_error: 0.2222 - val_mean_squared_error: 0.0833
Epoch 56/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1722 - mean_absolute_error: 0.1722 - mean_squared_error: 0.0554
Epoch 00056: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 195us/sample - loss: 0.1732 - mean_absolute_error: 0.1734 - mean_squared_error: 0.0559 - val_loss: 0.1780 - val_mean_absolute_error: 0.1780 - val_mean_squared_error: 0.0595
Epoch 57/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1741 - mean_absolute_error: 0.1741 - mean_squared_error: 0.0563
Epoch 00057: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 197us/sample - loss: 0.1741 - mean_absolute_error: 0.1741 - mean_squared_error: 0.0562 - val_loss: 0.1582 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0477
Epoch 58/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1848 - mean_absolute_error: 0.1848 - mean_squared_error: 0.0613
Epoch 00058: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 197us/sample - loss: 0.1856 - mean_absolute_error: 0.1854 - mean_squared_error: 0.0618 - val_loss: 0.1715 - val_mean_absolute_error: 0.1715 - val_mean_squared_error: 0.0525
Epoch 59/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1717 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0548
Epoch 00059: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 201us/sample - loss: 0.1717 - mean_absolute_error: 0.1716 - mean_squared_error: 0.0548 - val_loss: 0.2429 - val_mean_absolute_error: 0.2428 - val_mean_squared_error: 0.0961
Epoch 60/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1739 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0567
Epoch 00060: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 201us/sample - loss: 0.1740 - mean_absolute_error: 0.1741 - mean_squared_error: 0.0568 - val_loss: 0.1533 - val_mean_absolute_error: 0.1533 - val_mean_squared_error: 0.0479
Epoch 61/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1705 - mean_absolute_error: 0.1705 - mean_squared_error: 0.0544
Epoch 00061: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 198us/sample - loss: 0.1703 - mean_absolute_error: 0.1704 - mean_squared_error: 0.0544 - val_loss: 0.1566 - val_mean_absolute_error: 0.1565 - val_mean_squared_error: 0.0492
Epoch 62/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1762 - mean_absolute_error: 0.1762 - mean_squared_error: 0.0570
Epoch 00062: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 199us/sample - loss: 0.1759 - mean_absolute_error: 0.1759 - mean_squared_error: 0.0568 - val_loss: 0.1494 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0462
Epoch 63/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1752 - mean_absolute_error: 0.1752 - mean_squared_error: 0.0569
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Epoch 00063: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 198us/sample - loss: 0.1751 - mean_absolute_error: 0.1754 - mean_squared_error: 0.0573 - val_loss: 0.1768 - val_mean_absolute_error: 0.1768 - val_mean_squared_error: 0.0571
Epoch 64/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1695 - mean_absolute_error: 0.1695 - mean_squared_error: 0.0536
Epoch 00064: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 195us/sample - loss: 0.1696 - mean_absolute_error: 0.1698 - mean_squared_error: 0.0536 - val_loss: 0.1951 - val_mean_absolute_error: 0.1951 - val_mean_squared_error: 0.0678
Epoch 65/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1742 - mean_absolute_error: 0.1742 - mean_squared_error: 0.0562
Epoch 00065: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 197us/sample - loss: 0.1742 - mean_absolute_error: 0.1741 - mean_squared_error: 0.0562 - val_loss: 0.1631 - val_mean_absolute_error: 0.1631 - val_mean_squared_error: 0.0527
Epoch 66/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1686 - mean_absolute_error: 0.1686 - mean_squared_error: 0.0541
Epoch 00066: val_loss did not improve from 0.14892
10471/10471 [=====] - 2s 197us/sample - loss: 0.1685 - mean_absolute_error: 0.1685 - mean_squared_error: 0.0539 - val_loss: 0.2074 - val_mean_absolute_error: 0.2073 - val_mean_squared_error: 0.0743
Epoch 67/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1668 - mean_absolute_error: 0.1668 - mean_squared_error: 0.0531
Epoch 00067: val_loss improved from 0.14892 to 0.14887, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 205us/sample - loss: 0.1667 - mean_absolute_error: 0.1667 - mean_squared_error: 0.0531 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0465
Epoch 68/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1682 - mean_absolute_error: 0.1682 - mean_squared_error: 0.0535
Epoch 00068: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 201us/sample - loss: 0.1682 - mean_absolute_error: 0.1684 - mean_squared_error: 0.0536 - val_loss: 0.2368 - val_mean_absolute_error: 0.2367 - val_mean_squared_error: 0.0886
Epoch 69/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1717 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0551
Epoch 00069: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 201us/sample - loss: 0.1717 - mean_absolute_error: 0.1718 - mean_squared_error: 0.0551 - val_loss: 0.1605 - val_mean_absolute_error: 0.1605 - val_mean_squared_error: 0.0519
Epoch 70/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1642 - mean_absolute_error: 0.1642 - mean_squared_error: 0.0514
Epoch 00070: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 200us/sample - loss: 0.1641 - mean_absolute_error: 0.1641 - mean_squared_error: 0.0514 - val_loss: 0.1539 - val_mean_absolute_error: 0.1539 - val_mean_squared_error: 0.0481
Epoch 71/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1649 - mean_absolute_error: 0.1649 - mean_squared_error: 0.0521
Epoch 00071: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 197us/sample - loss: 0.1651 - mean_absolute_error: 0.1651 - mean_squared_error: 0.0523 - val_loss: 0.2012 - val_mean_absolute_error: 0.2013 - val_mean_squared_error: 0.0638
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Epoch 72/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1703 - mean_absolute_error: 0.1703 - mean_squared_error: 0.0543
Epoch 00072: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 199us/sample - loss: 0.1704 - mean_absolute_error: 0.1707 - mean_squared_error: 0.0545 - val_loss: 0.1539 - val_mean_absolute_error: 0.1539 - val_mean_squared_error: 0.0477
Epoch 73/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1664 - mean_absolute_error: 0.1664 - mean_squared_error: 0.0523
Epoch 00073: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 200us/sample - loss: 0.1665 - mean_absolute_error: 0.1674 - mean_squared_error: 0.0532 - val_loss: 0.1521 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0462
Epoch 74/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1643 - mean_absolute_error: 0.1643 - mean_squared_error: 0.0519
Epoch 00074: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 198us/sample - loss: 0.1643 - mean_absolute_error: 0.1642 - mean_squared_error: 0.0519 - val_loss: 0.1676 - val_mean_absolute_error: 0.1676 - val_mean_squared_error: 0.0546
Epoch 75/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1686 - mean_absolute_error: 0.1686 - mean_squared_error: 0.0538
Epoch 00075: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 199us/sample - loss: 0.1685 - mean_absolute_error: 0.1689 - mean_squared_error: 0.0540 - val_loss: 0.1509 - val_mean_absolute_error: 0.1508 - val_mean_squared_error: 0.0455
Epoch 76/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1629 - mean_absolute_error: 0.1629 - mean_squared_error: 0.0514
Epoch 00076: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 198us/sample - loss: 0.1632 - mean_absolute_error: 0.1634 - mean_squared_error: 0.0516 - val_loss: 0.1502 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0450
Epoch 77/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1650 - mean_absolute_error: 0.1650 - mean_squared_error: 0.0524
Epoch 00077: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 197us/sample - loss: 0.1650 - mean_absolute_error: 0.1655 - mean_squared_error: 0.0527 - val_loss: 0.1564 - val_mean_absolute_error: 0.1563 - val_mean_squared_error: 0.0492
Epoch 78/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1679 - mean_absolute_error: 0.1679 - mean_squared_error: 0.0541
Epoch 00078: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 199us/sample - loss: 0.1681 - mean_absolute_error: 0.1681 - mean_squared_error: 0.0541 - val_loss: 0.2211 - val_mean_absolute_error: 0.2211 - val_mean_squared_error: 0.0828
Epoch 79/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1642 - mean_absolute_error: 0.1642 - mean_squared_error: 0.0516
Epoch 00079: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 199us/sample - loss: 0.1642 - mean_absolute_error: 0.1642 - mean_squared_error: 0.0516 - val_loss: 0.1775 - val_mean_absolute_error: 0.1776 - val_mean_squared_error: 0.0546
Epoch 80/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1596 - mean_absolute_error: 0.1596 - mean_squared_error: 0.0494
Epoch 00080: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 198us/sample - loss: 0.1606 - mean_absolute_error:

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olute_error: 0.1610 - mean_squared_error: 0.0501 - val_loss: 0.2509 - val_mean_absolute_
error: 0.2510 - val_mean_squared_error: 0.0877
Epoch 81/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1650 - mean_absolute_er
ror: 0.1650 - mean_squared_error: 0.0518
Epoch 00081: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 197us/sample - loss: 0.1651 - mean_abs
olute_error: 0.1650 - mean_squared_error: 0.0517 - val_loss: 0.1573 - val_mean_absolute_
error: 0.1573 - val_mean_squared_error: 0.0483
Epoch 82/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1639 - mean_absolute_er
ror: 0.1639 - mean_squared_error: 0.0517
Epoch 00082: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 198us/sample - loss: 0.1638 - mean_abs
olute_error: 0.1638 - mean_squared_error: 0.0517 - val_loss: 0.1813 - val_mean_absolute_
error: 0.1813 - val_mean_squared_error: 0.0542
Epoch 83/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1645 - mean_absolute_er
ror: 0.1645 - mean_squared_error: 0.0516
Epoch 00083: val_loss did not improve from 0.14887
10471/10471 [=====] - 2s 197us/sample - loss: 0.1643 - mean_abs
olute_error: 0.1646 - mean_squared_error: 0.0517 - val_loss: 0.1630 - val_mean_absolute_
error: 0.1630 - val_mean_squared_error: 0.0491
Epoch 84/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1590 - mean_absolute_er
ror: 0.1590 - mean_squared_error: 0.0500
Epoch 00084: val_loss improved from 0.14887 to 0.14259, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 203us/sample - loss: 0.1594 - mean_abs
olute_error: 0.1597 - mean_squared_error: 0.0504 - val_loss: 0.1426 - val_mean_absolute_
error: 0.1426 - val_mean_squared_error: 0.0434
Epoch 85/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1628 - mean_absolute_er
ror: 0.1628 - mean_squared_error: 0.0512
Epoch 00085: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 199us/sample - loss: 0.1628 - mean_abs
olute_error: 0.1629 - mean_squared_error: 0.0513 - val_loss: 0.1704 - val_mean_absolute_
error: 0.1704 - val_mean_squared_error: 0.0518
Epoch 86/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1628 - mean_absolute_er
ror: 0.1628 - mean_squared_error: 0.0514
Epoch 00086: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 198us/sample - loss: 0.1627 - mean_abs
olute_error: 0.1627 - mean_squared_error: 0.0513 - val_loss: 0.1788 - val_mean_absolute_
error: 0.1787 - val_mean_squared_error: 0.0594
Epoch 87/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1650 - mean_absolute_er
ror: 0.1650 - mean_squared_error: 0.0519
Epoch 00087: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 196us/sample - loss: 0.1648 - mean_abs
olute_error: 0.1651 - mean_squared_error: 0.0520 - val_loss: 0.1758 - val_mean_absolute_
error: 0.1757 - val_mean_squared_error: 0.0578
Epoch 88/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1588 - mean_absolute_er
ror: 0.1588 - mean_squared_error: 0.0498
Epoch 00088: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 197us/sample - loss: 0.1591 - mean_abs
olute_error: 0.1592 - mean_squared_error: 0.0499 - val_loss: 0.1495 - val_mean_absolute_
error: 0.1495 - val_mean_squared_error: 0.0440
Epoch 89/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1538 - mean_absolute_er
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ror: 0.1538 - mean_squared_error: 0.0471
Epoch 00089: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 204us/sample - loss: 0.1537 - mean_absolute_error: 0.1537 - mean_squared_error: 0.0471 - val_loss: 0.1757 - val_mean_absolute_error: 0.1757 - val_mean_squared_error: 0.0584
Epoch 90/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1547 - mean_absolute_error: 0.1547 - mean_squared_error: 0.0474
Epoch 00090: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 201us/sample - loss: 0.1548 - mean_absolute_error: 0.1552 - mean_squared_error: 0.0477 - val_loss: 0.1573 - val_mean_absolute_error: 0.1572 - val_mean_squared_error: 0.0467
Epoch 91/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1553 - mean_absolute_error: 0.1553 - mean_squared_error: 0.0480
Epoch 00091: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 200us/sample - loss: 0.1551 - mean_absolute_error: 0.1551 - mean_squared_error: 0.0479 - val_loss: 0.1574 - val_mean_absolute_error: 0.1574 - val_mean_squared_error: 0.0504
Epoch 92/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1557 - mean_absolute_error: 0.1557 - mean_squared_error: 0.0486
Epoch 00092: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 199us/sample - loss: 0.1559 - mean_absolute_error: 0.1558 - mean_squared_error: 0.0487 - val_loss: 0.1700 - val_mean_absolute_error: 0.1701 - val_mean_squared_error: 0.0502
Epoch 93/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1557 - mean_absolute_error: 0.1557 - mean_squared_error: 0.0475
Epoch 00093: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 198us/sample - loss: 0.1557 - mean_absolute_error: 0.1559 - mean_squared_error: 0.0475 - val_loss: 0.1542 - val_mean_absolute_error: 0.1541 - val_mean_squared_error: 0.0475
Epoch 94/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1536 - mean_absolute_error: 0.1536 - mean_squared_error: 0.0470
Epoch 00094: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 200us/sample - loss: 0.1537 - mean_absolute_error: 0.1536 - mean_squared_error: 0.0469 - val_loss: 0.1448 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0427
Epoch 95/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1583 - mean_absolute_error: 0.1583 - mean_squared_error: 0.0496
Epoch 00095: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 200us/sample - loss: 0.1583 - mean_absolute_error: 0.1587 - mean_squared_error: 0.0500 - val_loss: 0.1474 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0433
Epoch 96/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1633 - mean_absolute_error: 0.1633 - mean_squared_error: 0.0503
Epoch 00096: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 201us/sample - loss: 0.1632 - mean_absolute_error: 0.1631 - mean_squared_error: 0.0502 - val_loss: 0.1510 - val_mean_absolute_error: 0.1510 - val_mean_squared_error: 0.0457
Epoch 97/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1522 - mean_absolute_error: 0.1522 - mean_squared_error: 0.0462
Epoch 00097: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 203us/sample - loss: 0.1522 - mean_absolute_error: 0.1523 - mean_squared_error: 0.0462 - val_loss: 0.1442 - val_mean_absolute_error: 0.1442 - val_mean_squared_error: 0.0435
```

Epoch 98/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1524 - mean_absolute_error: 0.1524 - mean_squared_error: 0.0469
Epoch 00098: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 199us/sample - loss: 0.1524 - mean_absolute_error: 0.1526 - mean_squared_error: 0.0471 - val_loss: 0.1563 - val_mean_absolute_error: 0.1563 - val_mean_squared_error: 0.0473
Epoch 99/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1521 - mean_absolute_error: 0.1521 - mean_squared_error: 0.0460
Epoch 00099: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 200us/sample - loss: 0.1523 - mean_absolute_error: 0.1525 - mean_squared_error: 0.0462 - val_loss: 0.1500 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0454
Epoch 100/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1518 - mean_absolute_error: 0.1518 - mean_squared_error: 0.0467
Epoch 00100: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 198us/sample - loss: 0.1518 - mean_absolute_error: 0.1519 - mean_squared_error: 0.0468 - val_loss: 0.1537 - val_mean_absolute_error: 0.1538 - val_mean_squared_error: 0.0449
Epoch 101/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1525 - mean_absolute_error: 0.1525 - mean_squared_error: 0.0465
Epoch 00101: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 199us/sample - loss: 0.1527 - mean_absolute_error: 0.1528 - mean_squared_error: 0.0468 - val_loss: 0.1444 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0432
Epoch 102/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1505 - mean_absolute_error: 0.1505 - mean_squared_error: 0.0452
Epoch 00102: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 199us/sample - loss: 0.1508 - mean_absolute_error: 0.1507 - mean_squared_error: 0.0452 - val_loss: 0.1464 - val_mean_absolute_error: 0.1465 - val_mean_squared_error: 0.0440
Epoch 103/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1518 - mean_absolute_error: 0.1518 - mean_squared_error: 0.0458
Epoch 00103: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 197us/sample - loss: 0.1517 - mean_absolute_error: 0.1517 - mean_squared_error: 0.0458 - val_loss: 0.1513 - val_mean_absolute_error: 0.1513 - val_mean_squared_error: 0.0464
Epoch 104/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1499 - mean_absolute_error: 0.1499 - mean_squared_error: 0.0449
Epoch 00104: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 198us/sample - loss: 0.1501 - mean_absolute_error: 0.1505 - mean_squared_error: 0.0456 - val_loss: 0.1558 - val_mean_absolute_error: 0.1558 - val_mean_squared_error: 0.0455
Epoch 105/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1520 - mean_absolute_error: 0.1520 - mean_squared_error: 0.0459
Epoch 00105: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 199us/sample - loss: 0.1529 - mean_absolute_error: 0.1535 - mean_squared_error: 0.0468 - val_loss: 0.2045 - val_mean_absolute_error: 0.2046 - val_mean_squared_error: 0.0647
Epoch 106/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1490 - mean_absolute_error: 0.1490 - mean_squared_error: 0.0449
Epoch 00106: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 201us/sample - loss: 0.1492 - mean_absolute_error:

```

olute_error: 0.1493 - mean_squared_error: 0.0449 - val_loss: 0.1441 - val_mean_absolute_
error: 0.1441 - val_mean_squared_error: 0.0432
Epoch 107/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1492 - mean_absolute_er
ror: 0.1492 - mean_squared_error: 0.0454
Epoch 00107: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 200us/sample - loss: 0.1494 - mean_abs
olute_error: 0.1494 - mean_squared_error: 0.0455 - val_loss: 0.1444 - val_mean_absolute_
error: 0.1444 - val_mean_squared_error: 0.0430
Epoch 108/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1510 - mean_absolute_er
ror: 0.1510 - mean_squared_error: 0.0461
Epoch 00108: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 199us/sample - loss: 0.1510 - mean_abs
olute_error: 0.1509 - mean_squared_error: 0.0459 - val_loss: 0.1812 - val_mean_absolute_
error: 0.1811 - val_mean_squared_error: 0.0622
Epoch 109/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1532 - mean_absolute_er
ror: 0.1532 - mean_squared_error: 0.0470Restoring model weights from the end of the best
epoch.

Epoch 00109: val_loss did not improve from 0.14259
10471/10471 [=====] - 2s 200us/sample - loss: 0.1532 - mean_abs
olute_error: 0.1536 - mean_squared_error: 0.0473 - val_loss: 0.1453 - val_mean_absolute_
error: 0.1453 - val_mean_squared_error: 0.0449
Epoch 00109: early stopping
MAE: 0.1425545
RMSE: 0.20822425
Adding initial Dense layers with 128
Adding Dense layer with 128
Adding last layer with 128
Outputting predictive model - Tabular
Model: "model_88"

```

Layer (type)	Output Shape	Param #
input_89 (InputLayer)	[(None, 61)]	0
batch_normalization_188 (Batch Normalization)	(None, 61)	244
dense_648 (Dense)	(None, 128)	7936
batch_normalization_189 (Batch Normalization)	(None, 128)	512
dense_649 (Dense)	(None, 128)	16512
batch_normalization_190 (Batch Normalization)	(None, 128)	512
dense_650 (Dense)	(None, 128)	16512
batch_normalization_191 (Batch Normalization)	(None, 128)	512
dense_651 (Dense)	(None, 128)	16512
batch_normalization_192 (Batch Normalization)	(None, 128)	512

dense_652 (Dense)	(None, 128)	16512
batch_normalization_193 (Batch Normalization)	(None, 128)	512
dense_653 (Dense)	(None, 128)	16512
batch_normalization_194 (Batch Normalization)	(None, 128)	512
dense_654 (Dense)	(None, 128)	16512
batch_normalization_195 (Batch Normalization)	(None, 128)	512
dense_655 (Dense)	(None, 128)	16512
dense_656 (Dense)	(None, 1)	129
<hr/>		
Total params: 127,477		
Trainable params: 125,563		
Non-trainable params: 1,914		

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10304/10471 [=====>.] - ETA: 0s - loss: 1.5853 - mean_absolute_error: 1.5853 - mean_squared_error: 8.9690

Epoch 00001: val_loss improved from inf to 1.00561, saving model to best_basic_model.hdf5

10471/10471 [=====] - 3s 286us/sample - loss: 1.5709 - mean_absolute_error: 1.5691 - mean_squared_error: 8.8185 - val_loss: 1.0056 - val_mean_absolute_error: 1.0067 - val_mean_squared_error: 2.0572

Epoch 2/500

10144/10471 [=====>.] - ETA: 0s - loss: 0.5986 - mean_absolute_error: 0.5986 - mean_squared_error: 0.5784

Epoch 00002: val_loss did not improve from 1.00561

10471/10471 [=====] - 2s 150us/sample - loss: 0.5951 - mean_absolute_error: 0.5955 - mean_squared_error: 0.5729 - val_loss: 1.1248 - val_mean_absolute_error: 1.1258 - val_mean_squared_error: 2.6441

Epoch 3/500

10304/10471 [=====>.] - ETA: 0s - loss: 0.5035 - mean_absolute_error: 0.5035 - mean_squared_error: 0.4104

Epoch 00003: val_loss improved from 1.00561 to 0.70492, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 2s 153us/sample - loss: 0.5037 - mean_absolute_error: 0.5036 - mean_squared_error: 0.4102 - val_loss: 0.7049 - val_mean_absolute_error: 0.7049 - val_mean_squared_error: 0.8595

Epoch 4/500

10144/10471 [=====>.] - ETA: 0s - loss: 0.4666 - mean_absolute_error: 0.4666 - mean_squared_error: 0.3490

Epoch 00004: val_loss improved from 0.70492 to 0.49157, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 2s 155us/sample - loss: 0.4654 - mean_absolute_error: 0.4664 - mean_squared_error: 0.3485 - val_loss: 0.4916 - val_mean_absolute_error: 0.4917 - val_mean_squared_error: 0.3913

Epoch 5/500

10272/10471 [=====>.] - ETA: 0s - loss: 0.4434 - mean_absolute_error: 0.4434 - mean_squared_error: 0.3104

Epoch 00005: val_loss did not improve from 0.49157

10471/10471 [=====] - 2s 152us/sample - loss: 0.4436 - mean_absolute_error: 0.4441 - mean_squared_error: 0.3109 - val_loss: 0.5599 - val_mean_absolute_error: 0.5600 - val_mean_squared_error: 0.4484

Epoch 6/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.4200 - mean_absolute_error: 0.4200 - mean_squared_error: 0.2822
Epoch 00006: val_loss improved from 0.49157 to 0.41256, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 156us/sample - loss: 0.4196 - mean_absolute_error: 0.4199 - mean_squared_error: 0.2821 - val_loss: 0.4126 - val_mean_absolute_error: 0.4126 - val_mean_squared_error: 0.2850
Epoch 7/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.3631 - mean_absolute_error: 0.3631 - mean_squared_error: 0.2127
Epoch 00007: val_loss did not improve from 0.41256
10471/10471 [=====] - 2s 150us/sample - loss: 0.3632 - mean_absolute_error: 0.3634 - mean_squared_error: 0.2128 - val_loss: 0.4220 - val_mean_absolute_error: 0.4220 - val_mean_squared_error: 0.3231
Epoch 8/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.3556 - mean_absolute_error: 0.3556 - mean_squared_error: 0.2008
Epoch 00008: val_loss improved from 0.41256 to 0.36512, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 153us/sample - loss: 0.3553 - mean_absolute_error: 0.3557 - mean_squared_error: 0.2012 - val_loss: 0.3651 - val_mean_absolute_error: 0.3653 - val_mean_squared_error: 0.1937
Epoch 9/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.3279 - mean_absolute_error: 0.3279 - mean_squared_error: 0.1757
Epoch 00009: val_loss improved from 0.36512 to 0.25586, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 159us/sample - loss: 0.3267 - mean_absolute_error: 0.3271 - mean_squared_error: 0.1746 - val_loss: 0.2559 - val_mean_absolute_error: 0.2557 - val_mean_squared_error: 0.1154
Epoch 10/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.3174 - mean_absolute_error: 0.3174 - mean_squared_error: 0.1625
Epoch 00010: val_loss did not improve from 0.25586
10471/10471 [=====] - 2s 149us/sample - loss: 0.3185 - mean_absolute_error: 0.3183 - mean_squared_error: 0.1634 - val_loss: 0.3052 - val_mean_absolute_error: 0.3051 - val_mean_squared_error: 0.1536
Epoch 11/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.3436 - mean_absolute_error: 0.3436 - mean_squared_error: 0.1884
Epoch 00011: val_loss did not improve from 0.25586
10471/10471 [=====] - 2s 149us/sample - loss: 0.3452 - mean_absolute_error: 0.3459 - mean_squared_error: 0.1910 - val_loss: 0.4811 - val_mean_absolute_error: 0.4809 - val_mean_squared_error: 0.3297
Epoch 12/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.3211 - mean_absolute_error: 0.3211 - mean_squared_error: 0.1637
Epoch 00012: val_loss did not improve from 0.25586
10471/10471 [=====] - 2s 148us/sample - loss: 0.3219 - mean_absolute_error: 0.3220 - mean_squared_error: 0.1646 - val_loss: 0.4813 - val_mean_absolute_error: 0.4812 - val_mean_squared_error: 0.3065
Epoch 13/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2721 - mean_absolute_error: 0.2721 - mean_squared_error: 0.1217
Epoch 00013: val_loss did not improve from 0.25586
10471/10471 [=====] - 2s 148us/sample - loss: 0.2729 - mean_absolute_error: 0.2732 - mean_squared_error: 0.1229 - val_loss: 0.4205 - val_mean_absolute_error: 0.4203 - val_mean_squared_error: 0.2504
Epoch 14/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2805 - mean_absolute_error:

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ror: 0.2805 - mean_squared_error: 0.1284
Epoch 00014: val_loss did not improve from 0.25586
10471/10471 [=====] - 2s 149us/sample - loss: 0.2805 - mean_absolute_error: 0.2807 - mean_squared_error: 0.1291 - val_loss: 0.4680 - val_mean_absolute_error: 0.4680 - val_mean_squared_error: 0.2914
Epoch 15/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.2600 - mean_absolute_error: 0.2600 - mean_squared_error: 0.1121
Epoch 00015: val_loss did not improve from 0.25586
10471/10471 [=====] - 2s 148us/sample - loss: 0.2607 - mean_absolute_error: 0.2612 - mean_squared_error: 0.1134 - val_loss: 0.3584 - val_mean_absolute_error: 0.3584 - val_mean_squared_error: 0.1971
Epoch 16/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.2474 - mean_absolute_error: 0.2474 - mean_squared_error: 0.1023
Epoch 00016: val_loss improved from 0.25586 to 0.22346, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 153us/sample - loss: 0.2471 - mean_absolute_error: 0.2478 - mean_squared_error: 0.1028 - val_loss: 0.2235 - val_mean_absolute_error: 0.2236 - val_mean_squared_error: 0.0857
Epoch 17/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2398 - mean_absolute_error: 0.2398 - mean_squared_error: 0.0962
Epoch 00017: val_loss did not improve from 0.22346
10471/10471 [=====] - 2s 149us/sample - loss: 0.2397 - mean_absolute_error: 0.2398 - mean_squared_error: 0.0963 - val_loss: 0.3026 - val_mean_absolute_error: 0.3024 - val_mean_squared_error: 0.1490
Epoch 18/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.2254 - mean_absolute_error: 0.2254 - mean_squared_error: 0.0867
Epoch 00018: val_loss improved from 0.22346 to 0.19338, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 156us/sample - loss: 0.2254 - mean_absolute_error: 0.2255 - mean_squared_error: 0.0866 - val_loss: 0.1934 - val_mean_absolute_error: 0.1933 - val_mean_squared_error: 0.0714
Epoch 19/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.2441 - mean_absolute_error: 0.2441 - mean_squared_error: 0.0996
Epoch 00019: val_loss did not improve from 0.19338
10471/10471 [=====] - 2s 153us/sample - loss: 0.2429 - mean_absolute_error: 0.2428 - mean_squared_error: 0.0987 - val_loss: 0.2098 - val_mean_absolute_error: 0.2099 - val_mean_squared_error: 0.0800
Epoch 20/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.2131 - mean_absolute_error: 0.2131 - mean_squared_error: 0.0789
Epoch 00020: val_loss did not improve from 0.19338
10471/10471 [=====] - 2s 151us/sample - loss: 0.2134 - mean_absolute_error: 0.2135 - mean_squared_error: 0.0791 - val_loss: 0.2885 - val_mean_absolute_error: 0.2887 - val_mean_squared_error: 0.1238
Epoch 21/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.2176 - mean_absolute_error: 0.2176 - mean_squared_error: 0.0810
Epoch 00021: val_loss did not improve from 0.19338
10471/10471 [=====] - 2s 147us/sample - loss: 0.2174 - mean_absolute_error: 0.2173 - mean_squared_error: 0.0808 - val_loss: 0.2071 - val_mean_absolute_error: 0.2071 - val_mean_squared_error: 0.0730
Epoch 22/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1970 - mean_absolute_error: 0.1970 - mean_squared_error: 0.0690
Epoch 00022: val_loss did not improve from 0.19338
10471/10471 [=====] - 2s 147us/sample - loss: 0.1982 - mean_absolute_error:
```

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olute_error: 0.1989 - mean_squared_error: 0.0705 - val_loss: 0.2502 - val_mean_absolute_
error: 0.2504 - val_mean_squared_error: 0.0974
Epoch 23/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1987 - mean_absolute_er
ror: 0.1987 - mean_squared_error: 0.0696
Epoch 00023: val_loss did not improve from 0.19338
10471/10471 [=====] - 2s 149us/sample - loss: 0.1990 - mean_abs
olute_error: 0.1993 - mean_squared_error: 0.0702 - val_loss: 0.1995 - val_mean_absolute_
error: 0.1996 - val_mean_squared_error: 0.0721
Epoch 24/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2087 - mean_absolute_er
ror: 0.2087 - mean_squared_error: 0.0747
Epoch 00024: val_loss did not improve from 0.19338
10471/10471 [=====] - 2s 149us/sample - loss: 0.2085 - mean_abs
olute_error: 0.2084 - mean_squared_error: 0.0745 - val_loss: 0.2210 - val_mean_absolute_
error: 0.2211 - val_mean_squared_error: 0.0866
Epoch 25/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1974 - mean_absolute_er
ror: 0.1974 - mean_squared_error: 0.0685
Epoch 00025: val_loss did not improve from 0.19338
10471/10471 [=====] - 2s 147us/sample - loss: 0.1975 - mean_abs
olute_error: 0.1980 - mean_squared_error: 0.0688 - val_loss: 0.2218 - val_mean_absolute_
error: 0.2217 - val_mean_squared_error: 0.0836
Epoch 26/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1920 - mean_absolute_er
ror: 0.1920 - mean_squared_error: 0.0655
Epoch 00026: val_loss did not improve from 0.19338
10471/10471 [=====] - 2s 148us/sample - loss: 0.1913 - mean_abs
olute_error: 0.1915 - mean_squared_error: 0.0651 - val_loss: 0.2570 - val_mean_absolute_
error: 0.2571 - val_mean_squared_error: 0.0949
Epoch 27/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1910 - mean_absolute_er
ror: 0.1910 - mean_squared_error: 0.0649
Epoch 00027: val_loss improved from 0.19338 to 0.17746, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 153us/sample - loss: 0.1913 - mean_abs
olute_error: 0.1916 - mean_squared_error: 0.0652 - val_loss: 0.1775 - val_mean_absolute_
error: 0.1775 - val_mean_squared_error: 0.0571
Epoch 28/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1824 - mean_absolute_er
ror: 0.1824 - mean_squared_error: 0.0605
Epoch 00028: val_loss improved from 0.17746 to 0.16845, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 155us/sample - loss: 0.1826 - mean_abs
olute_error: 0.1825 - mean_squared_error: 0.0604 - val_loss: 0.1684 - val_mean_absolute_
error: 0.1686 - val_mean_squared_error: 0.0569
Epoch 29/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1844 - mean_absolute_er
ror: 0.1844 - mean_squared_error: 0.0617
Epoch 00029: val_loss improved from 0.16845 to 0.16570, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 154us/sample - loss: 0.1849 - mean_abs
olute_error: 0.1851 - mean_squared_error: 0.0621 - val_loss: 0.1657 - val_mean_absolute_
error: 0.1658 - val_mean_squared_error: 0.0525
Epoch 30/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1858 - mean_absolute_er
ror: 0.1858 - mean_squared_error: 0.0623
Epoch 00030: val_loss did not improve from 0.16570
10471/10471 [=====] - 2s 148us/sample - loss: 0.1879 - mean_abs
olute_error: 0.1884 - mean_squared_error: 0.0640 - val_loss: 0.4777 - val_mean_absolute_
error: 0.4777 - val_mean_squared_error: 0.2615
```

Epoch 31/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1934 - mean_absolute_error: 0.1934 - mean_squared_error: 0.0674
Epoch 00031: val_loss did not improve from 0.16570
10471/10471 [=====] - 2s 148us/sample - loss: 0.1935 - mean_absolute_error: 0.1935 - mean_squared_error: 0.0675 - val_loss: 0.2077 - val_mean_absolute_error: 0.2079 - val_mean_squared_error: 0.0698
Epoch 32/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1755 - mean_absolute_error: 0.1755 - mean_squared_error: 0.0579
Epoch 00032: val_loss did not improve from 0.16570
10471/10471 [=====] - 2s 147us/sample - loss: 0.1756 - mean_absolute_error: 0.1760 - mean_squared_error: 0.0584 - val_loss: 0.1673 - val_mean_absolute_error: 0.1674 - val_mean_squared_error: 0.0536
Epoch 33/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1741 - mean_absolute_error: 0.1741 - mean_squared_error: 0.0560
Epoch 00033: val_loss improved from 0.16570 to 0.15236, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 152us/sample - loss: 0.1741 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0559 - val_loss: 0.1524 - val_mean_absolute_error: 0.1524 - val_mean_squared_error: 0.0455
Epoch 34/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1713 - mean_absolute_error: 0.1713 - mean_squared_error: 0.0548
Epoch 00034: val_loss did not improve from 0.15236
10471/10471 [=====] - 2s 149us/sample - loss: 0.1715 - mean_absolute_error: 0.1715 - mean_squared_error: 0.0548 - val_loss: 0.1590 - val_mean_absolute_error: 0.1591 - val_mean_squared_error: 0.0479
Epoch 35/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1773 - mean_absolute_error: 0.1773 - mean_squared_error: 0.0569
Epoch 00035: val_loss did not improve from 0.15236
10471/10471 [=====] - 2s 148us/sample - loss: 0.1773 - mean_absolute_error: 0.1775 - mean_squared_error: 0.0575 - val_loss: 0.1545 - val_mean_absolute_error: 0.1545 - val_mean_squared_error: 0.0460
Epoch 36/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1665 - mean_absolute_error: 0.1665 - mean_squared_error: 0.0527
Epoch 00036: val_loss did not improve from 0.15236
10471/10471 [=====] - 2s 149us/sample - loss: 0.1665 - mean_absolute_error: 0.1672 - mean_squared_error: 0.0534 - val_loss: 0.1640 - val_mean_absolute_error: 0.1640 - val_mean_squared_error: 0.0490
Epoch 37/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1725 - mean_absolute_error: 0.1725 - mean_squared_error: 0.0559
Epoch 00037: val_loss improved from 0.15236 to 0.15194, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 154us/sample - loss: 0.1725 - mean_absolute_error: 0.1725 - mean_squared_error: 0.0560 - val_loss: 0.1519 - val_mean_absolute_error: 0.1519 - val_mean_squared_error: 0.0465
Epoch 38/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1711 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0552
Epoch 00038: val_loss did not improve from 0.15194
10471/10471 [=====] - 2s 149us/sample - loss: 0.1710 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0552 - val_loss: 0.1685 - val_mean_absolute_error: 0.1685 - val_mean_squared_error: 0.0550
Epoch 39/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1660 - mean_absolute_error: 0.1660 - mean_squared_error: 0.0528

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Epoch 00039: val_loss did not improve from 0.15194
10471/10471 [=====] - 2s 149us/sample - loss: 0.1662 - mean_absolute_error: 0.1663 - mean_squared_error: 0.0529 - val_loss: 0.1533 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0469
Epoch 40/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1721 - mean_absolute_error: 0.1721 - mean_squared_error: 0.0554
Epoch 00040: val_loss did not improve from 0.15194
10471/10471 [=====] - 2s 148us/sample - loss: 0.1718 - mean_absolute_error: 0.1720 - mean_squared_error: 0.0553 - val_loss: 0.1676 - val_mean_absolute_error: 0.1675 - val_mean_squared_error: 0.0545
Epoch 41/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1655 - mean_absolute_error: 0.1655 - mean_squared_error: 0.0530
Epoch 00041: val_loss did not improve from 0.15194
10471/10471 [=====] - 2s 146us/sample - loss: 0.1656 - mean_absolute_error: 0.1659 - mean_squared_error: 0.0531 - val_loss: 0.1581 - val_mean_absolute_error: 0.1581 - val_mean_squared_error: 0.0503
Epoch 42/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1760 - mean_absolute_error: 0.1760 - mean_squared_error: 0.0567
Epoch 00042: val_loss did not improve from 0.15194
10471/10471 [=====] - 2s 149us/sample - loss: 0.1763 - mean_absolute_error: 0.1765 - mean_squared_error: 0.0572 - val_loss: 0.1766 - val_mean_absolute_error: 0.1765 - val_mean_squared_error: 0.0594
Epoch 43/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1709 - mean_absolute_error: 0.1709 - mean_squared_error: 0.0547
Epoch 00043: val_loss improved from 0.15194 to 0.15130, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 154us/sample - loss: 0.1709 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0549 - val_loss: 0.1513 - val_mean_absolute_error: 0.1513 - val_mean_squared_error: 0.0442
Epoch 44/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1664 - mean_absolute_error: 0.1664 - mean_squared_error: 0.0530
Epoch 00044: val_loss did not improve from 0.15130
10471/10471 [=====] - 2s 147us/sample - loss: 0.1661 - mean_absolute_error: 0.1660 - mean_squared_error: 0.0529 - val_loss: 0.1526 - val_mean_absolute_error: 0.1526 - val_mean_squared_error: 0.0479
Epoch 45/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1712 - mean_absolute_error: 0.1712 - mean_squared_error: 0.0550
Epoch 00045: val_loss did not improve from 0.15130
10471/10471 [=====] - 2s 147us/sample - loss: 0.1709 - mean_absolute_error: 0.1707 - mean_squared_error: 0.0547 - val_loss: 0.1556 - val_mean_absolute_error: 0.1556 - val_mean_squared_error: 0.0497
Epoch 46/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1631 - mean_absolute_error: 0.1631 - mean_squared_error: 0.0505
Epoch 00046: val_loss did not improve from 0.15130
10471/10471 [=====] - 2s 149us/sample - loss: 0.1630 - mean_absolute_error: 0.1632 - mean_squared_error: 0.0505 - val_loss: 0.1525 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0466
Epoch 47/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1591 - mean_absolute_error: 0.1591 - mean_squared_error: 0.0493
Epoch 00047: val_loss improved from 0.15130 to 0.14855, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 152us/sample - loss: 0.1593 - mean_absolute_error: 0.1594 - mean_squared_error: 0.0497 - val_loss: 0.1486 - val_mean_absolute_error:
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error: 0.1486 - val_mean_squared_error: 0.0451
Epoch 48/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1603 - mean_absolute_error: 0.1603 - mean_squared_error: 0.0493
Epoch 00048: val_loss did not improve from 0.14855
10471/10471 [=====] - 2s 148us/sample - loss: 0.1600 - mean_absolute_error: 0.1601 - mean_squared_error: 0.0493 - val_loss: 0.1806 - val_mean_absolute_error: 0.1805 - val_mean_squared_error: 0.0622
Epoch 49/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1647 - mean_absolute_error: 0.1647 - mean_squared_error: 0.0516
Epoch 00049: val_loss did not improve from 0.14855
10471/10471 [=====] - 2s 148us/sample - loss: 0.1648 - mean_absolute_error: 0.1651 - mean_squared_error: 0.0517 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0469
Epoch 50/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1602 - mean_absolute_error: 0.1602 - mean_squared_error: 0.0498
Epoch 00050: val_loss did not improve from 0.14855
10471/10471 [=====] - 2s 148us/sample - loss: 0.1603 - mean_absolute_error: 0.1602 - mean_squared_error: 0.0497 - val_loss: 0.1917 - val_mean_absolute_error: 0.1917 - val_mean_squared_error: 0.0587
Epoch 51/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1520 - mean_absolute_error: 0.1520 - mean_squared_error: 0.0459
Epoch 00051: val_loss did not improve from 0.14855
10471/10471 [=====] - 2s 146us/sample - loss: 0.1520 - mean_absolute_error: 0.1519 - mean_squared_error: 0.0457 - val_loss: 0.1544 - val_mean_absolute_error: 0.1544 - val_mean_squared_error: 0.0452
Epoch 52/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1549 - mean_absolute_error: 0.1549 - mean_squared_error: 0.0472
Epoch 00052: val_loss did not improve from 0.14855
10471/10471 [=====] - 2s 149us/sample - loss: 0.1553 - mean_absolute_error: 0.1554 - mean_squared_error: 0.0473 - val_loss: 0.1768 - val_mean_absolute_error: 0.1768 - val_mean_squared_error: 0.0537
Epoch 53/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1568 - mean_absolute_error: 0.1568 - mean_squared_error: 0.0482
Epoch 00053: val_loss improved from 0.14855 to 0.14719, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 152us/sample - loss: 0.1567 - mean_absolute_error: 0.1566 - mean_squared_error: 0.0482 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0450
Epoch 54/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1587 - mean_absolute_error: 0.1587 - mean_squared_error: 0.0499
Epoch 00054: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 148us/sample - loss: 0.1584 - mean_absolute_error: 0.1586 - mean_squared_error: 0.0497 - val_loss: 0.1533 - val_mean_absolute_error: 0.1532 - val_mean_squared_error: 0.0485
Epoch 55/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1527 - mean_absolute_error: 0.1527 - mean_squared_error: 0.0468
Epoch 00055: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 150us/sample - loss: 0.1529 - mean_absolute_error: 0.1533 - mean_squared_error: 0.0471 - val_loss: 0.1624 - val_mean_absolute_error: 0.1624 - val_mean_squared_error: 0.0476
Epoch 56/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1540 - mean_absolute_error: 0.1540 - mean_squared_error: 0.0468
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Epoch 00056: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 150us/sample - loss: 0.1545 - mean_absolute_error: 0.1547 - mean_squared_error: 0.0474 - val_loss: 0.1816 - val_mean_absolute_error: 0.1816 - val_mean_squared_error: 0.0547
Epoch 57/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1522 - mean_absolute_error: 0.1522 - mean_squared_error: 0.0463
Epoch 00057: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 147us/sample - loss: 0.1525 - mean_absolute_error: 0.1525 - mean_squared_error: 0.0465 - val_loss: 0.1566 - val_mean_absolute_error: 0.1565 - val_mean_squared_error: 0.0494
Epoch 58/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1512 - mean_absolute_error: 0.1512 - mean_squared_error: 0.0460
Epoch 00058: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 148us/sample - loss: 0.1516 - mean_absolute_error: 0.1522 - mean_squared_error: 0.0465 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0457
Epoch 59/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1473 - mean_absolute_error: 0.1473 - mean_squared_error: 0.0446
Epoch 00059: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 148us/sample - loss: 0.1477 - mean_absolute_error: 0.1478 - mean_squared_error: 0.0448 - val_loss: 0.1474 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0454
Epoch 60/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1482 - mean_absolute_error: 0.1482 - mean_squared_error: 0.0446
Epoch 00060: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 147us/sample - loss: 0.1483 - mean_absolute_error: 0.1482 - mean_squared_error: 0.0446 - val_loss: 0.1664 - val_mean_absolute_error: 0.1664 - val_mean_squared_error: 0.0511
Epoch 61/500
10112/10471 [=====.>..] - ETA: 0s - loss: 0.1545 - mean_absolute_error: 0.1545 - mean_squared_error: 0.0469
Epoch 00061: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 146us/sample - loss: 0.1542 - mean_absolute_error: 0.1544 - mean_squared_error: 0.0468 - val_loss: 0.1524 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0468
Epoch 62/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1457 - mean_absolute_error: 0.1457 - mean_squared_error: 0.0434
Epoch 00062: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 148us/sample - loss: 0.1458 - mean_absolute_error: 0.1456 - mean_squared_error: 0.0436 - val_loss: 0.1696 - val_mean_absolute_error: 0.1696 - val_mean_squared_error: 0.0576
Epoch 63/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1515 - mean_absolute_error: 0.1515 - mean_squared_error: 0.0459
Epoch 00063: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 146us/sample - loss: 0.1514 - mean_absolute_error: 0.1515 - mean_squared_error: 0.0458 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0456
Epoch 64/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1456 - mean_absolute_error: 0.1456 - mean_squared_error: 0.0437
Epoch 00064: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 148us/sample - loss: 0.1457 - mean_absolute_error: 0.1457 - mean_squared_error: 0.0438 - val_loss: 0.1534 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0495
Epoch 65/500
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10240/10471 [=====>.] - ETA: 0s - loss: 0.1430 - mean_absolute_error: 0.1430 - mean_squared_error: 0.0431
Epoch 00065: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 144us/sample - loss: 0.1431 - mean_absolute_error: 0.1431 - mean_squared_error: 0.0432 - val_loss: 0.1630 - val_mean_absolute_error: 0.1630 - val_mean_squared_error: 0.0485
Epoch 66/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1464 - mean_absolute_error: 0.1464 - mean_squared_error: 0.0443
Epoch 00066: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 147us/sample - loss: 0.1468 - mean_absolute_error: 0.1473 - mean_squared_error: 0.0448 - val_loss: 0.1575 - val_mean_absolute_error: 0.1575 - val_mean_squared_error: 0.0503
Epoch 67/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1466 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0434
Epoch 00067: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 148us/sample - loss: 0.1467 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0434 - val_loss: 0.1534 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0479
Epoch 68/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1437 - mean_absolute_error: 0.1437 - mean_squared_error: 0.0427
Epoch 00068: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 148us/sample - loss: 0.1437 - mean_absolute_error: 0.1438 - mean_squared_error: 0.0426 - val_loss: 0.1480 - val_mean_absolute_error: 0.1480 - val_mean_squared_error: 0.0439
Epoch 69/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1434 - mean_absolute_error: 0.1434 - mean_squared_error: 0.0431
Epoch 00069: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 147us/sample - loss: 0.1430 - mean_absolute_error: 0.1432 - mean_squared_error: 0.0430 - val_loss: 0.1545 - val_mean_absolute_error: 0.1544 - val_mean_squared_error: 0.0462
Epoch 70/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1452 - mean_absolute_error: 0.1452 - mean_squared_error: 0.0438
Epoch 00070: val_loss did not improve from 0.14719
10471/10471 [=====] - 2s 145us/sample - loss: 0.1448 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0436 - val_loss: 0.1473 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0454
Epoch 71/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1443 - mean_absolute_error: 0.1443 - mean_squared_error: 0.0428
Epoch 00071: val_loss improved from 0.14719 to 0.14592, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 153us/sample - loss: 0.1443 - mean_absolute_error: 0.1443 - mean_squared_error: 0.0429 - val_loss: 0.1459 - val_mean_absolute_error: 0.1459 - val_mean_squared_error: 0.0426
Epoch 72/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1420 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0422
Epoch 00072: val_loss did not improve from 0.14592
10471/10471 [=====] - 2s 147us/sample - loss: 0.1422 - mean_absolute_error: 0.1427 - mean_squared_error: 0.0425 - val_loss: 0.1513 - val_mean_absolute_error: 0.1512 - val_mean_squared_error: 0.0475
Epoch 73/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1430 - mean_absolute_error: 0.1430 - mean_squared_error: 0.0428
Epoch 00073: val_loss did not improve from 0.14592
10471/10471 [=====] - 2s 148us/sample - loss: 0.1429 - mean_absolute_error:
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olute_error: 0.1430 - mean_squared_error: 0.0428 - val_loss: 0.1515 - val_mean_absolute_
error: 0.1514 - val_mean_squared_error: 0.0470
Epoch 74/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1428 - mean_absolute_er
ror: 0.1428 - mean_squared_error: 0.0427
Epoch 00074: val_loss improved from 0.14592 to 0.14351, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 154us/sample - loss: 0.1427 - mean_abs
olute_error: 0.1429 - mean_squared_error: 0.0429 - val_loss: 0.1435 - val_mean_absolute_
error: 0.1435 - val_mean_squared_error: 0.0439
Epoch 75/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1395 - mean_absolute_er
ror: 0.1395 - mean_squared_error: 0.0410
Epoch 00075: val_loss did not improve from 0.14351
10471/10471 [=====] - 2s 148us/sample - loss: 0.1397 - mean_abs
olute_error: 0.1397 - mean_squared_error: 0.0411 - val_loss: 0.1476 - val_mean_absolute_
error: 0.1476 - val_mean_squared_error: 0.0432
Epoch 76/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1391 - mean_absolute_er
ror: 0.1391 - mean_squared_error: 0.0410
Epoch 00076: val_loss did not improve from 0.14351
10471/10471 [=====] - 2s 148us/sample - loss: 0.1393 - mean_abs
olute_error: 0.1393 - mean_squared_error: 0.0413 - val_loss: 0.1451 - val_mean_absolute_
error: 0.1451 - val_mean_squared_error: 0.0436
Epoch 77/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1399 - mean_absolute_er
ror: 0.1399 - mean_squared_error: 0.0412
Epoch 00077: val_loss did not improve from 0.14351
10471/10471 [=====] - 2s 148us/sample - loss: 0.1407 - mean_abs
olute_error: 0.1415 - mean_squared_error: 0.0422 - val_loss: 0.1538 - val_mean_absolute_
error: 0.1538 - val_mean_squared_error: 0.0449
Epoch 78/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1405 - mean_absolute_er
ror: 0.1405 - mean_squared_error: 0.0414
Epoch 00078: val_loss did not improve from 0.14351
10471/10471 [=====] - 2s 149us/sample - loss: 0.1403 - mean_abs
olute_error: 0.1407 - mean_squared_error: 0.0416 - val_loss: 0.1589 - val_mean_absolute_
error: 0.1588 - val_mean_squared_error: 0.0529
Epoch 79/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1409 - mean_absolute_er
ror: 0.1409 - mean_squared_error: 0.0416
Epoch 00079: val_loss did not improve from 0.14351
10471/10471 [=====] - 2s 149us/sample - loss: 0.1403 - mean_abs
olute_error: 0.1405 - mean_squared_error: 0.0414 - val_loss: 0.1460 - val_mean_absolute_
error: 0.1460 - val_mean_squared_error: 0.0432
Epoch 80/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1425 - mean_absolute_er
ror: 0.1425 - mean_squared_error: 0.0425
Epoch 00080: val_loss did not improve from 0.14351
10471/10471 [=====] - 2s 149us/sample - loss: 0.1424 - mean_abs
olute_error: 0.1426 - mean_squared_error: 0.0428 - val_loss: 0.1441 - val_mean_absolute_
error: 0.1440 - val_mean_squared_error: 0.0429
Epoch 81/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1384 - mean_absolute_er
ror: 0.1384 - mean_squared_error: 0.0412
Epoch 00081: val_loss improved from 0.14351 to 0.14090, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 156us/sample - loss: 0.1384 - mean_abs
olute_error: 0.1385 - mean_squared_error: 0.0412 - val_loss: 0.1409 - val_mean_absolute_
error: 0.1409 - val_mean_squared_error: 0.0413
Epoch 82/500
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10336/10471 [=====>.] - ETA: 0s - loss: 0.1365 - mean_absolute_error: 0.1365 - mean_squared_error: 0.0400
Epoch 00082: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 147us/sample - loss: 0.1364 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0400 - val_loss: 0.1488 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0462
Epoch 83/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1381 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0405
Epoch 00083: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 149us/sample - loss: 0.1388 - mean_absolute_error: 0.1393 - mean_squared_error: 0.0409 - val_loss: 0.1720 - val_mean_absolute_error: 0.1720 - val_mean_squared_error: 0.0581
Epoch 84/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0412
Epoch 00084: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 149us/sample - loss: 0.1400 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0410 - val_loss: 0.1496 - val_mean_absolute_error: 0.1495 - val_mean_squared_error: 0.0444
Epoch 85/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1357 - mean_absolute_error: 0.1357 - mean_squared_error: 0.0399
Epoch 00085: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 148us/sample - loss: 0.1362 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0401 - val_loss: 0.1465 - val_mean_absolute_error: 0.1465 - val_mean_squared_error: 0.0426
Epoch 86/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1383 - mean_absolute_error: 0.1383 - mean_squared_error: 0.0407
Epoch 00086: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 152us/sample - loss: 0.1384 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0409 - val_loss: 0.1438 - val_mean_absolute_error: 0.1437 - val_mean_squared_error: 0.0428
Epoch 87/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1392 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0406
Epoch 00087: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 150us/sample - loss: 0.1395 - mean_absolute_error: 0.1396 - mean_squared_error: 0.0407 - val_loss: 0.1448 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0441
Epoch 88/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1361 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0396
Epoch 00088: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 148us/sample - loss: 0.1363 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0396 - val_loss: 0.1440 - val_mean_absolute_error: 0.1439 - val_mean_squared_error: 0.0441
Epoch 89/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1356 - mean_absolute_error: 0.1356 - mean_squared_error: 0.0394
Epoch 00089: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 146us/sample - loss: 0.1357 - mean_absolute_error: 0.1359 - mean_squared_error: 0.0395 - val_loss: 0.1756 - val_mean_absolute_error: 0.1755 - val_mean_squared_error: 0.0609
Epoch 90/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1366 - mean_absolute_error: 0.1366 - mean_squared_error: 0.0401
Epoch 00090: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 148us/sample - loss: 0.1366 - mean_absolute_error: 0.1368 - mean_squared_error: 0.0402 - val_loss: 0.1434 - val_mean_absolute_error: 0.1434 - val_mean_squared_error: 0.0581
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error: 0.1433 - val_mean_squared_error: 0.0435
Epoch 91/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1356 - mean_absolute_error: 0.1356 - mean_squared_error: 0.0394
Epoch 00091: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 148us/sample - loss: 0.1355 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0393 - val_loss: 0.1456 - val_mean_absolute_error: 0.1455 - val_mean_squared_error: 0.0436
Epoch 92/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1352 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0392
Epoch 00092: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 149us/sample - loss: 0.1353 - mean_absolute_error: 0.1356 - mean_squared_error: 0.0393 - val_loss: 0.1518 - val_mean_absolute_error: 0.1517 - val_mean_squared_error: 0.0455
Epoch 93/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1350 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0388
Epoch 00093: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 147us/sample - loss: 0.1356 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0392 - val_loss: 0.1605 - val_mean_absolute_error: 0.1604 - val_mean_squared_error: 0.0524
Epoch 94/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1345 - mean_absolute_error: 0.1345 - mean_squared_error: 0.0389
Epoch 00094: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 150us/sample - loss: 0.1345 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0392 - val_loss: 0.1428 - val_mean_absolute_error: 0.1428 - val_mean_squared_error: 0.0426
Epoch 95/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1352 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0393
Epoch 00095: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 148us/sample - loss: 0.1351 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0393 - val_loss: 0.1471 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0454
Epoch 96/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1319 - mean_absolute_error: 0.1319 - mean_squared_error: 0.0382
Epoch 00096: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 150us/sample - loss: 0.1319 - mean_absolute_error: 0.1325 - mean_squared_error: 0.0386 - val_loss: 0.1444 - val_mean_absolute_error: 0.1443 - val_mean_squared_error: 0.0446
Epoch 97/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1328 - mean_absolute_error: 0.1328 - mean_squared_error: 0.0383
Epoch 00097: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 148us/sample - loss: 0.1326 - mean_absolute_error: 0.1327 - mean_squared_error: 0.0381 - val_loss: 0.1469 - val_mean_absolute_error: 0.1469 - val_mean_squared_error: 0.0463
Epoch 98/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1326 - mean_absolute_error: 0.1326 - mean_squared_error: 0.0383
Epoch 00098: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 147us/sample - loss: 0.1326 - mean_absolute_error: 0.1331 - mean_squared_error: 0.0387 - val_loss: 0.1451 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0437
Epoch 99/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1317 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0380
Epoch 00099: val_loss did not improve from 0.14090
```

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10471/10471 [=====] - 2s 145us/sample - loss: 0.1317 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0378 - val_loss: 0.1459 - val_mean_absolute_error: 0.1459 - val_mean_squared_error: 0.0447
Epoch 100/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1316 - mean_absolute_error: 0.1316 - mean_squared_error: 0.0376
Epoch 00100: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 147us/sample - loss: 0.1317 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0377 - val_loss: 0.1585 - val_mean_absolute_error: 0.1585 - val_mean_squared_error: 0.0478
Epoch 101/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1343 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0385
Epoch 00101: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 146us/sample - loss: 0.1344 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0392 - val_loss: 0.1493 - val_mean_absolute_error: 0.1492 - val_mean_squared_error: 0.0446
Epoch 102/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1348 - mean_absolute_error: 0.1348 - mean_squared_error: 0.0386
Epoch 00102: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 146us/sample - loss: 0.1348 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0386 - val_loss: 0.1499 - val_mean_absolute_error: 0.1498 - val_mean_squared_error: 0.0473
Epoch 103/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1330 - mean_absolute_error: 0.1330 - mean_squared_error: 0.0381
Epoch 00103: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 149us/sample - loss: 0.1334 - mean_absolute_error: 0.1338 - mean_squared_error: 0.0385 - val_loss: 0.1447 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0444
Epoch 104/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1357 - mean_absolute_error: 0.1357 - mean_squared_error: 0.0395
Epoch 00104: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 147us/sample - loss: 0.1354 - mean_absolute_error: 0.1356 - mean_squared_error: 0.0394 - val_loss: 0.1451 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0445
Epoch 105/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1304 - mean_absolute_error: 0.1304 - mean_squared_error: 0.0372
Epoch 00105: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 149us/sample - loss: 0.1303 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0374 - val_loss: 0.1558 - val_mean_absolute_error: 0.1558 - val_mean_squared_error: 0.0464
Epoch 106/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1349 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0387Restoring model weights from the end of the best epoch.

Epoch 00106: val_loss did not improve from 0.14090
10471/10471 [=====] - 2s 148us/sample - loss: 0.1347 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0386 - val_loss: 0.1517 - val_mean_absolute_error: 0.1517 - val_mean_squared_error: 0.0455
Epoch 00106: early stopping
MAE: 0.14085227
RMSE: 0.20320424
Adding initial Dense layers with 128
Adding Dense layer with 128
Adding Dense layer with 128
Adding Dense layer with 128
```

```
Adding last layer with 128
Outputting predictive model - Tabular
Model: "model_89"
```

Layer (type)	Output Shape	Param #
<hr/>		
input_90 (InputLayer)	[(None, 61)]	0
batch_normalization_196 (Batch Normalization)	(None, 61)	244
dense_657 (Dense)	(None, 128)	7936
batch_normalization_197 (Batch Normalization)	(None, 128)	512
dense_658 (Dense)	(None, 128)	16512
batch_normalization_198 (Batch Normalization)	(None, 128)	512
dense_659 (Dense)	(None, 128)	16512
batch_normalization_199 (Batch Normalization)	(None, 128)	512
dense_660 (Dense)	(None, 128)	16512
batch_normalization_200 (Batch Normalization)	(None, 128)	512
dense_661 (Dense)	(None, 128)	16512
dense_662 (Dense)	(None, 1)	129
<hr/>		
Total params: 76,405		
Trainable params: 75,259		
Non-trainable params: 1,146		

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10080/10471 [=====>..] - ETA: 0s - loss: 1.5032 - mean_absolute_error: 1.5032 - mean_squared_error: 7.7539
Epoch 00001: val_loss improved from inf to 0.80744, saving model to best_basic_model.hdf5
10471/10471 [=====] - 3s 242us/sample - loss: 1.4720 - mean_absolute_error: 1.4711 - mean_squared_error: 7.4798 - val_loss: 0.8074 - val_mean_absolute_error: 0.8073 - val_mean_squared_error: 1.1505
Epoch 2/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.6134 - mean_absolute_error: 0.6134 - mean_squared_error: 0.6026
Epoch 00002: val_loss improved from 0.80744 to 0.64827, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.6145 - mean_absolute_error: 0.6153 - mean_squared_error: 0.6062 - val_loss: 0.6483 - val_mean_absolute_error: 0.6486 - val_mean_squared_error: 0.8722
Epoch 3/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.5292 - mean_absolute_error: 0.5292 - mean_squared_error: 0.4457
Epoch 00003: val_loss improved from 0.64827 to 0.59012, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.5255 - mean_absolute_error: 0.5251 - mean_squared_error: 0.4395 - val_loss: 0.5901 - val_mean_absolute_error: 0.5900 - val_mean_squared_error: 0.6236
```

Epoch 4/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.4640 - mean_absolute_error: 0.4640 - mean_squared_error: 0.3449
Epoch 00004: val_loss improved from 0.59012 to 0.49647, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.4629 - mean_absolute_error: 0.4633 - mean_squared_error: 0.3437 - val_loss: 0.4965 - val_mean_absolute_error: 0.4965 - val_mean_squared_error: 0.4738
Epoch 5/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.4327 - mean_absolute_error: 0.4327 - mean_squared_error: 0.3016
Epoch 00005: val_loss improved from 0.49647 to 0.45467, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.4349 - mean_absolute_error: 0.4352 - mean_squared_error: 0.3041 - val_loss: 0.4547 - val_mean_absolute_error: 0.4547 - val_mean_squared_error: 0.3484
Epoch 6/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.4134 - mean_absolute_error: 0.4134 - mean_squared_error: 0.2780
Epoch 00006: val_loss improved from 0.45467 to 0.44619, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.4136 - mean_absolute_error: 0.4136 - mean_squared_error: 0.2783 - val_loss: 0.4462 - val_mean_absolute_error: 0.4464 - val_mean_squared_error: 0.3070
Epoch 7/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.3691 - mean_absolute_error: 0.3691 - mean_squared_error: 0.2206
Epoch 00007: val_loss improved from 0.44619 to 0.43323, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.3687 - mean_absolute_error: 0.3687 - mean_squared_error: 0.2201 - val_loss: 0.4332 - val_mean_absolute_error: 0.4334 - val_mean_squared_error: 0.2821
Epoch 8/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.3673 - mean_absolute_error: 0.3673 - mean_squared_error: 0.2193
Epoch 00008: val_loss improved from 0.43323 to 0.36426, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.3660 - mean_absolute_error: 0.3667 - mean_squared_error: 0.2188 - val_loss: 0.3643 - val_mean_absolute_error: 0.3641 - val_mean_squared_error: 0.2077
Epoch 9/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.3349 - mean_absolute_error: 0.3349 - mean_squared_error: 0.1827
Epoch 00009: val_loss improved from 0.36426 to 0.27111, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.3332 - mean_absolute_error: 0.3333 - mean_squared_error: 0.1808 - val_loss: 0.2711 - val_mean_absolute_error: 0.2713 - val_mean_squared_error: 0.1205
Epoch 10/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.3153 - mean_absolute_error: 0.3153 - mean_squared_error: 0.1618
Epoch 00010: val_loss did not improve from 0.27111
10471/10471 [=====] - 1s 107us/sample - loss: 0.3164 - mean_absolute_error: 0.3169 - mean_squared_error: 0.1632 - val_loss: 0.4759 - val_mean_absolute_error: 0.4759 - val_mean_squared_error: 0.3521
Epoch 11/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.3039 - mean_absolute_error: 0.3039 - mean_squared_error: 0.1500
Epoch 00011: val_loss did not improve from 0.27111
10471/10471 [=====] - 1s 107us/sample - loss: 0.3016 - mean_absolute_error: 0.3019 - mean_squared_error: 0.1486 - val_loss: 0.3917 - val_mean_absolute_error: 0.3917 - val_mean_squared_error: 0.3521

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error: 0.3918 - val_mean_squared_error: 0.2134
Epoch 12/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2959 - mean_absolute_error: 0.2959 - mean_squared_error: 0.1419
Epoch 00012: val_loss did not improve from 0.27111
10471/10471 [=====] - 1s 108us/sample - loss: 0.2957 - mean_absolute_error: 0.2958 - mean_squared_error: 0.1422 - val_loss: 0.3625 - val_mean_absolute_error: 0.3626 - val_mean_squared_error: 0.1905
Epoch 13/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2820 - mean_absolute_error: 0.2820 - mean_squared_error: 0.1307
Epoch 00013: val_loss did not improve from 0.27111
10471/10471 [=====] - 1s 107us/sample - loss: 0.2807 - mean_absolute_error: 0.2808 - mean_squared_error: 0.1296 - val_loss: 0.2872 - val_mean_absolute_error: 0.2872 - val_mean_squared_error: 0.1328
Epoch 14/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.2655 - mean_absolute_error: 0.2655 - mean_squared_error: 0.1162
Epoch 00014: val_loss improved from 0.27111 to 0.21155, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.2668 - mean_absolute_error: 0.2669 - mean_squared_error: 0.1173 - val_loss: 0.2115 - val_mean_absolute_error: 0.2115 - val_mean_squared_error: 0.0777
Epoch 15/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.2348 - mean_absolute_error: 0.2348 - mean_squared_error: 0.0940
Epoch 00015: val_loss did not improve from 0.21155
10471/10471 [=====] - 1s 109us/sample - loss: 0.2346 - mean_absolute_error: 0.2349 - mean_squared_error: 0.0939 - val_loss: 0.3012 - val_mean_absolute_error: 0.3010 - val_mean_squared_error: 0.1378
Epoch 16/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.2419 - mean_absolute_error: 0.2419 - mean_squared_error: 0.0976
Epoch 00016: val_loss did not improve from 0.21155
10471/10471 [=====] - 1s 106us/sample - loss: 0.2432 - mean_absolute_error: 0.2440 - mean_squared_error: 0.0993 - val_loss: 0.4347 - val_mean_absolute_error: 0.4348 - val_mean_squared_error: 0.2482
Epoch 17/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2410 - mean_absolute_error: 0.2410 - mean_squared_error: 0.0983
Epoch 00017: val_loss improved from 0.21155 to 0.19660, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.2404 - mean_absolute_error: 0.2403 - mean_squared_error: 0.0976 - val_loss: 0.1966 - val_mean_absolute_error: 0.1966 - val_mean_squared_error: 0.0755
Epoch 18/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2222 - mean_absolute_error: 0.2222 - mean_squared_error: 0.0838
Epoch 00018: val_loss improved from 0.19660 to 0.18631, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 116us/sample - loss: 0.2223 - mean_absolute_error: 0.2224 - mean_squared_error: 0.0836 - val_loss: 0.1863 - val_mean_absolute_error: 0.1863 - val_mean_squared_error: 0.0678
Epoch 19/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.2133 - mean_absolute_error: 0.2133 - mean_squared_error: 0.0783
Epoch 00019: val_loss did not improve from 0.18631
10471/10471 [=====] - 1s 107us/sample - loss: 0.2123 - mean_absolute_error: 0.2127 - mean_squared_error: 0.0781 - val_loss: 0.2043 - val_mean_absolute_error: 0.2044 - val_mean_squared_error: 0.0715
Epoch 20/500
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10016/10471 [=====>..] - ETA: 0s - loss: 0.2051 - mean_absolute_error: 0.2051 - mean_squared_error: 0.0725
Epoch 00020: val_loss did not improve from 0.18631
10471/10471 [=====] - 1s 108us/sample - loss: 0.2051 - mean_absolute_error: 0.2049 - mean_squared_error: 0.0723 - val_loss: 0.1947 - val_mean_absolute_error: 0.1947 - val_mean_squared_error: 0.0654
Epoch 21/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.2152 - mean_absolute_error: 0.2152 - mean_squared_error: 0.0798
Epoch 00021: val_loss did not improve from 0.18631
10471/10471 [=====] - 1s 106us/sample - loss: 0.2182 - mean_absolute_error: 0.2190 - mean_squared_error: 0.0826 - val_loss: 0.3273 - val_mean_absolute_error: 0.3275 - val_mean_squared_error: 0.1457
Epoch 22/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1974 - mean_absolute_error: 0.1974 - mean_squared_error: 0.0691
Epoch 00022: val_loss did not improve from 0.18631
10471/10471 [=====] - 1s 108us/sample - loss: 0.1968 - mean_absolute_error: 0.1970 - mean_squared_error: 0.0687 - val_loss: 0.1870 - val_mean_absolute_error: 0.1871 - val_mean_squared_error: 0.0608
Epoch 23/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1913 - mean_absolute_error: 0.1913 - mean_squared_error: 0.0658
Epoch 00023: val_loss did not improve from 0.18631
10471/10471 [=====] - 1s 108us/sample - loss: 0.1907 - mean_absolute_error: 0.1908 - mean_squared_error: 0.0655 - val_loss: 0.2045 - val_mean_absolute_error: 0.2046 - val_mean_squared_error: 0.0751
Epoch 24/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1845 - mean_absolute_error: 0.1845 - mean_squared_error: 0.0611
Epoch 00024: val_loss improved from 0.18631 to 0.16219, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.1842 - mean_absolute_error: 0.1845 - mean_squared_error: 0.0612 - val_loss: 0.1622 - val_mean_absolute_error: 0.1623 - val_mean_squared_error: 0.0525
Epoch 25/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1822 - mean_absolute_error: 0.1822 - mean_squared_error: 0.0602
Epoch 00025: val_loss did not improve from 0.16219
10471/10471 [=====] - 1s 108us/sample - loss: 0.1815 - mean_absolute_error: 0.1815 - mean_squared_error: 0.0597 - val_loss: 0.1832 - val_mean_absolute_error: 0.1833 - val_mean_squared_error: 0.0581
Epoch 26/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1801 - mean_absolute_error: 0.1801 - mean_squared_error: 0.0575
Epoch 00026: val_loss did not improve from 0.16219
10471/10471 [=====] - 1s 109us/sample - loss: 0.1794 - mean_absolute_error: 0.1795 - mean_squared_error: 0.0576 - val_loss: 0.1735 - val_mean_absolute_error: 0.1735 - val_mean_squared_error: 0.0574
Epoch 27/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1764 - mean_absolute_error: 0.1764 - mean_squared_error: 0.0572
Epoch 00027: val_loss did not improve from 0.16219
10471/10471 [=====] - 1s 111us/sample - loss: 0.1770 - mean_absolute_error: 0.1772 - mean_squared_error: 0.0575 - val_loss: 0.3081 - val_mean_absolute_error: 0.3082 - val_mean_squared_error: 0.1233
Epoch 28/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1773 - mean_absolute_error: 0.1773 - mean_squared_error: 0.0569
Epoch 00028: val_loss did not improve from 0.16219
10471/10471 [=====] - 1s 112us/sample - loss: 0.1775 - mean_absolute_error: 0.1775 - mean_squared_error: 0.0568
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olute_error: 0.1780 - mean_squared_error: 0.0575 - val_loss: 0.2059 - val_mean_absolute_
error: 0.2059 - val_mean_squared_error: 0.0665
Epoch 29/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1814 - mean_absolute_er
ror: 0.1814 - mean_squared_error: 0.0600
Epoch 00029: val_loss did not improve from 0.16219
10471/10471 [=====] - 1s 107us/sample - loss: 0.1802 - mean_abs
olute_error: 0.1801 - mean_squared_error: 0.0592 - val_loss: 0.2175 - val_mean_absolute_
error: 0.2176 - val_mean_squared_error: 0.0710
Epoch 30/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1757 - mean_absolute_er
ror: 0.1757 - mean_squared_error: 0.0567
Epoch 00030: val_loss did not improve from 0.16219
10471/10471 [=====] - 1s 105us/sample - loss: 0.1754 - mean_abs
olute_error: 0.1756 - mean_squared_error: 0.0567 - val_loss: 0.1721 - val_mean_absolute_
error: 0.1722 - val_mean_squared_error: 0.0535
Epoch 31/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1734 - mean_absolute_er
ror: 0.1734 - mean_squared_error: 0.0552
Epoch 00031: val_loss did not improve from 0.16219
10471/10471 [=====] - 1s 108us/sample - loss: 0.1734 - mean_abs
olute_error: 0.1735 - mean_squared_error: 0.0553 - val_loss: 0.1857 - val_mean_absolute_
error: 0.1857 - val_mean_squared_error: 0.0637
Epoch 32/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1688 - mean_absolute_er
ror: 0.1688 - mean_squared_error: 0.0538
Epoch 00032: val_loss improved from 0.16219 to 0.15131, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 116us/sample - loss: 0.1688 - mean_abs
olute_error: 0.1692 - mean_squared_error: 0.0539 - val_loss: 0.1513 - val_mean_absolute_
error: 0.1513 - val_mean_squared_error: 0.0458
Epoch 33/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1717 - mean_absolute_er
ror: 0.1717 - mean_squared_error: 0.0553
Epoch 00033: val_loss did not improve from 0.15131
10471/10471 [=====] - 1s 118us/sample - loss: 0.1710 - mean_abs
olute_error: 0.1708 - mean_squared_error: 0.0547 - val_loss: 0.1524 - val_mean_absolute_
error: 0.1525 - val_mean_squared_error: 0.0473
Epoch 34/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1679 - mean_absolute_er
ror: 0.1679 - mean_squared_error: 0.0525
Epoch 00034: val_loss did not improve from 0.15131
10471/10471 [=====] - 1s 116us/sample - loss: 0.1693 - mean_abs
olute_error: 0.1695 - mean_squared_error: 0.0534 - val_loss: 0.2123 - val_mean_absolute_
error: 0.2123 - val_mean_squared_error: 0.0702
Epoch 35/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1723 - mean_absolute_er
ror: 0.1723 - mean_squared_error: 0.0553
Epoch 00035: val_loss did not improve from 0.15131
10471/10471 [=====] - 1s 116us/sample - loss: 0.1736 - mean_abs
olute_error: 0.1740 - mean_squared_error: 0.0563 - val_loss: 0.1720 - val_mean_absolute_
error: 0.1721 - val_mean_squared_error: 0.0540
Epoch 36/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1666 - mean_absolute_er
ror: 0.1666 - mean_squared_error: 0.0526
Epoch 00036: val_loss did not improve from 0.15131
10471/10471 [=====] - 1s 116us/sample - loss: 0.1670 - mean_abs
olute_error: 0.1672 - mean_squared_error: 0.0531 - val_loss: 0.1676 - val_mean_absolute_
error: 0.1676 - val_mean_squared_error: 0.0503
Epoch 37/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1635 - mean_absolute_er
```

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ror: 0.1635 - mean_squared_error: 0.0505
Epoch 00037: val_loss did not improve from 0.15131
10471/10471 [=====] - 1s 119us/sample - loss: 0.1636 - mean_absolute_error: 0.1637 - mean_squared_error: 0.0505 - val_loss: 0.1582 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0467
Epoch 38/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1688 - mean_absolute_error: 0.1688 - mean_squared_error: 0.0530
Epoch 00038: val_loss did not improve from 0.15131
10471/10471 [=====] - 1s 118us/sample - loss: 0.1688 - mean_absolute_error: 0.1688 - mean_squared_error: 0.0527 - val_loss: 0.1551 - val_mean_absolute_error: 0.1551 - val_mean_squared_error: 0.0479
Epoch 39/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1618 - mean_absolute_error: 0.1618 - mean_squared_error: 0.0500
Epoch 00039: val_loss did not improve from 0.15131
10471/10471 [=====] - 1s 116us/sample - loss: 0.1623 - mean_absolute_error: 0.1627 - mean_squared_error: 0.0505 - val_loss: 0.1700 - val_mean_absolute_error: 0.1701 - val_mean_squared_error: 0.0510
Epoch 40/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1623 - mean_absolute_error: 0.1623 - mean_squared_error: 0.0504
Epoch 00040: val_loss improved from 0.15131 to 0.14942, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 121us/sample - loss: 0.1628 - mean_absolute_error: 0.1630 - mean_squared_error: 0.0507 - val_loss: 0.1494 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0459
Epoch 41/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1708 - mean_absolute_error: 0.1708 - mean_squared_error: 0.0540
Epoch 00041: val_loss did not improve from 0.14942
10471/10471 [=====] - 1s 118us/sample - loss: 0.1711 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0541 - val_loss: 0.1551 - val_mean_absolute_error: 0.1551 - val_mean_squared_error: 0.0469
Epoch 42/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1651 - mean_absolute_error: 0.1651 - mean_squared_error: 0.0516
Epoch 00042: val_loss did not improve from 0.14942
10471/10471 [=====] - 1s 116us/sample - loss: 0.1651 - mean_absolute_error: 0.1654 - mean_squared_error: 0.0518 - val_loss: 0.1877 - val_mean_absolute_error: 0.1877 - val_mean_squared_error: 0.0618
Epoch 43/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1571 - mean_absolute_error: 0.1571 - mean_squared_error: 0.0481
Epoch 00043: val_loss did not improve from 0.14942
10471/10471 [=====] - 1s 117us/sample - loss: 0.1572 - mean_absolute_error: 0.1576 - mean_squared_error: 0.0482 - val_loss: 0.1747 - val_mean_absolute_error: 0.1747 - val_mean_squared_error: 0.0526
Epoch 44/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1614 - mean_absolute_error: 0.1614 - mean_squared_error: 0.0499
Epoch 00044: val_loss did not improve from 0.14942
10471/10471 [=====] - 1s 116us/sample - loss: 0.1613 - mean_absolute_error: 0.1615 - mean_squared_error: 0.0500 - val_loss: 0.1552 - val_mean_absolute_error: 0.1552 - val_mean_squared_error: 0.0473
Epoch 45/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1592 - mean_absolute_error: 0.1592 - mean_squared_error: 0.0483
Epoch 00045: val_loss improved from 0.14942 to 0.14686, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 122us/sample - loss: 0.1595 - mean_absolute_error:
```

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olute_error: 0.1595 - mean_squared_error: 0.0483 - val_loss: 0.1469 - val_mean_absolute_
error: 0.1469 - val_mean_squared_error: 0.0421
Epoch 46/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1508 - mean_absolute_er
ror: 0.1508 - mean_squared_error: 0.0452
Epoch 00046: val_loss improved from 0.14686 to 0.14445, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 121us/sample - loss: 0.1504 - mean_abs
olute_error: 0.1503 - mean_squared_error: 0.0448 - val_loss: 0.1445 - val_mean_absolute_
error: 0.1444 - val_mean_squared_error: 0.0427
Epoch 47/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1576 - mean_absolute_er
ror: 0.1576 - mean_squared_error: 0.0475
Epoch 00047: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 116us/sample - loss: 0.1580 - mean_abs
olute_error: 0.1582 - mean_squared_error: 0.0480 - val_loss: 0.1725 - val_mean_absolute_
error: 0.1725 - val_mean_squared_error: 0.0514
Epoch 48/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1535 - mean_absolute_er
ror: 0.1535 - mean_squared_error: 0.0461
Epoch 00048: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 118us/sample - loss: 0.1535 - mean_abs
olute_error: 0.1537 - mean_squared_error: 0.0463 - val_loss: 0.1617 - val_mean_absolute_
error: 0.1617 - val_mean_squared_error: 0.0477
Epoch 49/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1520 - mean_absolute_er
ror: 0.1520 - mean_squared_error: 0.0450
Epoch 00049: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 117us/sample - loss: 0.1521 - mean_abs
olute_error: 0.1522 - mean_squared_error: 0.0451 - val_loss: 0.1559 - val_mean_absolute_
error: 0.1558 - val_mean_squared_error: 0.0467
Epoch 50/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1516 - mean_absolute_er
ror: 0.1516 - mean_squared_error: 0.0452
Epoch 00050: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 116us/sample - loss: 0.1517 - mean_abs
olute_error: 0.1517 - mean_squared_error: 0.0453 - val_loss: 0.1661 - val_mean_absolute_
error: 0.1660 - val_mean_squared_error: 0.0549
Epoch 51/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1507 - mean_absolute_er
ror: 0.1507 - mean_squared_error: 0.0453
Epoch 00051: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 118us/sample - loss: 0.1503 - mean_abs
olute_error: 0.1506 - mean_squared_error: 0.0453 - val_loss: 0.1555 - val_mean_absolute_
error: 0.1555 - val_mean_squared_error: 0.0453
Epoch 52/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1519 - mean_absolute_er
ror: 0.1519 - mean_squared_error: 0.0456
Epoch 00052: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 116us/sample - loss: 0.1517 - mean_abs
olute_error: 0.1518 - mean_squared_error: 0.0455 - val_loss: 0.1724 - val_mean_absolute_
error: 0.1723 - val_mean_squared_error: 0.0559
Epoch 53/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1485 - mean_absolute_er
ror: 0.1485 - mean_squared_error: 0.0440
Epoch 00053: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 115us/sample - loss: 0.1487 - mean_abs
olute_error: 0.1492 - mean_squared_error: 0.0445 - val_loss: 0.1491 - val_mean_absolute_
error: 0.1491 - val_mean_squared_error: 0.0459
Epoch 54/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1482 - mean_absolute_er
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ror: 0.1482 - mean_squared_error: 0.0437
Epoch 00054: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 118us/sample - loss: 0.1485 - mean_absolute_error: 0.1487 - mean_squared_error: 0.0439 - val_loss: 0.1568 - val_mean_absolute_error: 0.1568 - val_mean_squared_error: 0.0457
Epoch 55/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1548 - mean_absolute_error: 0.1548 - mean_squared_error: 0.0461
Epoch 00055: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 107us/sample - loss: 0.1556 - mean_absolute_error: 0.1556 - mean_squared_error: 0.0465 - val_loss: 0.2431 - val_mean_absolute_error: 0.2432 - val_mean_squared_error: 0.0866
Epoch 56/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1498 - mean_absolute_error: 0.1498 - mean_squared_error: 0.0443
Epoch 00056: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 108us/sample - loss: 0.1497 - mean_absolute_error: 0.1497 - mean_squared_error: 0.0440 - val_loss: 0.1615 - val_mean_absolute_error: 0.1615 - val_mean_squared_error: 0.0504
Epoch 57/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1454 - mean_absolute_error: 0.1454 - mean_squared_error: 0.0423
Epoch 00057: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 119us/sample - loss: 0.1454 - mean_absolute_error: 0.1456 - mean_squared_error: 0.0424 - val_loss: 0.1480 - val_mean_absolute_error: 0.1480 - val_mean_squared_error: 0.0434
Epoch 58/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1495 - mean_absolute_error: 0.1495 - mean_squared_error: 0.0441
Epoch 00058: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 118us/sample - loss: 0.1494 - mean_absolute_error: 0.1494 - mean_squared_error: 0.0442 - val_loss: 0.1484 - val_mean_absolute_error: 0.1483 - val_mean_squared_error: 0.0431
Epoch 59/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1506 - mean_absolute_error: 0.1506 - mean_squared_error: 0.0441
Epoch 00059: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 119us/sample - loss: 0.1520 - mean_absolute_error: 0.1522 - mean_squared_error: 0.0451 - val_loss: 0.1713 - val_mean_absolute_error: 0.1712 - val_mean_squared_error: 0.0568
Epoch 60/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1459 - mean_absolute_error: 0.1459 - mean_squared_error: 0.0427
Epoch 00060: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 119us/sample - loss: 0.1463 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0432 - val_loss: 0.1501 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0430
Epoch 61/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1441 - mean_absolute_error: 0.1441 - mean_squared_error: 0.0421
Epoch 00061: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 122us/sample - loss: 0.1448 - mean_absolute_error: 0.1457 - mean_squared_error: 0.0436 - val_loss: 0.1503 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0474
Epoch 62/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1443 - mean_absolute_error: 0.1443 - mean_squared_error: 0.0423
Epoch 00062: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 121us/sample - loss: 0.1441 - mean_absolute_error: 0.1441 - mean_squared_error: 0.0422 - val_loss: 0.1499 - val_mean_absolute_error: 0.1499 - val_mean_squared_error: 0.0458
```

Epoch 63/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1427 - mean_absolute_error: 0.1427 - mean_squared_error: 0.0414
Epoch 00063: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 120us/sample - loss: 0.1425 - mean_absolute_error: 0.1425 - mean_squared_error: 0.0413 - val_loss: 0.1741 - val_mean_absolute_error: 0.1741 - val_mean_squared_error: 0.0530
Epoch 64/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1437 - mean_absolute_error: 0.1437 - mean_squared_error: 0.0416
Epoch 00064: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 121us/sample - loss: 0.1441 - mean_absolute_error: 0.1443 - mean_squared_error: 0.0421 - val_loss: 0.1772 - val_mean_absolute_error: 0.1772 - val_mean_squared_error: 0.0553
Epoch 65/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1457 - mean_absolute_error: 0.1457 - mean_squared_error: 0.0422
Epoch 00065: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 120us/sample - loss: 0.1458 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0425 - val_loss: 0.1467 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0419
Epoch 66/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1409 - mean_absolute_error: 0.1409 - mean_squared_error: 0.0408
Epoch 00066: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 119us/sample - loss: 0.1404 - mean_absolute_error: 0.1407 - mean_squared_error: 0.0408 - val_loss: 0.1480 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0434
Epoch 67/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1426 - mean_absolute_error: 0.1426 - mean_squared_error: 0.0413
Epoch 00067: val_loss did not improve from 0.14445
10471/10471 [=====] - 1s 121us/sample - loss: 0.1427 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0413 - val_loss: 0.1502 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0453
Epoch 68/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1389 - mean_absolute_error: 0.1389 - mean_squared_error: 0.0397
Epoch 00068: val_loss improved from 0.14445 to 0.14220, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 125us/sample - loss: 0.1389 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0398 - val_loss: 0.1422 - val_mean_absolute_error: 0.1422 - val_mean_squared_error: 0.0426
Epoch 69/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1405 - mean_absolute_error: 0.1405 - mean_squared_error: 0.0411
Epoch 00069: val_loss did not improve from 0.14220
10471/10471 [=====] - 1s 120us/sample - loss: 0.1405 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0410 - val_loss: 0.1516 - val_mean_absolute_error: 0.1516 - val_mean_squared_error: 0.0443
Epoch 70/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1381 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0394
Epoch 00070: val_loss did not improve from 0.14220
10471/10471 [=====] - 1s 119us/sample - loss: 0.1386 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0401 - val_loss: 0.1584 - val_mean_absolute_error: 0.1584 - val_mean_squared_error: 0.0471
Epoch 71/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1409 - mean_absolute_error: 0.1409 - mean_squared_error: 0.0400
Epoch 00071: val_loss did not improve from 0.14220

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10471/10471 [=====] - 1s 120us/sample - loss: 0.1409 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0399 - val_loss: 0.1496 - val_mean_absolute_error: 0.1495 - val_mean_squared_error: 0.0442
Epoch 72/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1392 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0399
Epoch 00072: val_loss did not improve from 0.14220
10471/10471 [=====] - 1s 117us/sample - loss: 0.1397 - mean_absolute_error: 0.1398 - mean_squared_error: 0.0404 - val_loss: 0.1510 - val_mean_absolute_error: 0.1510 - val_mean_squared_error: 0.0446
Epoch 73/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1408 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0409
Epoch 00073: val_loss did not improve from 0.14220
10471/10471 [=====] - 1s 121us/sample - loss: 0.1406 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0408 - val_loss: 0.1475 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0462
Epoch 74/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1375 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0392
Epoch 00074: val_loss improved from 0.14220 to 0.14212, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 124us/sample - loss: 0.1375 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0392 - val_loss: 0.1421 - val_mean_absolute_error: 0.1421 - val_mean_squared_error: 0.0420
Epoch 75/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0394
Epoch 00075: val_loss did not improve from 0.14212
10471/10471 [=====] - 1s 119us/sample - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0395 - val_loss: 0.1618 - val_mean_absolute_error: 0.1618 - val_mean_squared_error: 0.0479
Epoch 76/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1413 - mean_absolute_error: 0.1413 - mean_squared_error: 0.0406
Epoch 00076: val_loss improved from 0.14212 to 0.14009, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 121us/sample - loss: 0.1414 - mean_absolute_error: 0.1415 - mean_squared_error: 0.0410 - val_loss: 0.1401 - val_mean_absolute_error: 0.1401 - val_mean_squared_error: 0.0411
Epoch 77/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1372 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0394
Epoch 00077: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 117us/sample - loss: 0.1372 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0395 - val_loss: 0.1429 - val_mean_absolute_error: 0.1429 - val_mean_squared_error: 0.0425
Epoch 78/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1354 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0384
Epoch 00078: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 117us/sample - loss: 0.1353 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0383 - val_loss: 0.1441 - val_mean_absolute_error: 0.1441 - val_mean_squared_error: 0.0422
Epoch 79/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1351 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0386
Epoch 00079: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 117us/sample - loss: 0.1352 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0387 - val_loss: 0.1564 - val_mean_absolute_error: 0.1564 - val_mean_squared_error: 0.0459
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Epoch 80/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1376 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0393
Epoch 00080: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 119us/sample - loss: 0.1377 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0395 - val_loss: 0.1410 - val_mean_absolute_error: 0.1409 - val_mean_squared_error: 0.0418
Epoch 81/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0396
Epoch 00081: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 106us/sample - loss: 0.1372 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0396 - val_loss: 0.1419 - val_mean_absolute_error: 0.1418 - val_mean_squared_error: 0.0414
Epoch 82/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1329 - mean_absolute_error: 0.1329 - mean_squared_error: 0.0373
Epoch 00082: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 108us/sample - loss: 0.1333 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0375 - val_loss: 0.1449 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0419
Epoch 83/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1356 - mean_absolute_error: 0.1356 - mean_squared_error: 0.0382
Epoch 00083: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 117us/sample - loss: 0.1355 - mean_absolute_error: 0.1359 - mean_squared_error: 0.0384 - val_loss: 0.1711 - val_mean_absolute_error: 0.1711 - val_mean_squared_error: 0.0517
Epoch 84/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0383
Epoch 00084: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 117us/sample - loss: 0.1354 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0383 - val_loss: 0.1461 - val_mean_absolute_error: 0.1461 - val_mean_squared_error: 0.0432
Epoch 85/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1327 - mean_absolute_error: 0.1327 - mean_squared_error: 0.0375
Epoch 00085: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 116us/sample - loss: 0.1329 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0379 - val_loss: 0.1736 - val_mean_absolute_error: 0.1737 - val_mean_squared_error: 0.0533
Epoch 86/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1343 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0381
Epoch 00086: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 118us/sample - loss: 0.1342 - mean_absolute_error: 0.1344 - mean_squared_error: 0.0380 - val_loss: 0.1451 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0426
Epoch 87/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1339 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0380
Epoch 00087: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 117us/sample - loss: 0.1338 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0379 - val_loss: 0.1442 - val_mean_absolute_error: 0.1441 - val_mean_squared_error: 0.0433
Epoch 88/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1333 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0380
Epoch 00088: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 116us/sample - loss: 0.1331 - mean_absolute_error:

olute_error: 0.1332 - mean_squared_error: 0.0379 - val_loss: 0.1466 - val_mean_absolute_error: 0.1466 - val_mean_squared_error: 0.0427
Epoch 89/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1312 - mean_absolute_error: 0.1312 - mean_squared_error: 0.0367
Epoch 00089: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 118us/sample - loss: 0.1315 - mean_absolute_error: 0.1319 - mean_squared_error: 0.0374 - val_loss: 0.1416 - val_mean_absolute_error: 0.1416 - val_mean_squared_error: 0.0409
Epoch 90/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.1316 - mean_absolute_error: 0.1316 - mean_squared_error: 0.0373
Epoch 00090: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 115us/sample - loss: 0.1316 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0373 - val_loss: 0.1476 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0430
Epoch 91/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1334 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0372
Epoch 00091: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 116us/sample - loss: 0.1333 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0373 - val_loss: 0.1470 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0430
Epoch 92/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1311 - mean_absolute_error: 0.1311 - mean_squared_error: 0.0367
Epoch 00092: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 116us/sample - loss: 0.1310 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0365 - val_loss: 0.1522 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0450
Epoch 93/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1328 - mean_absolute_error: 0.1328 - mean_squared_error: 0.0372
Epoch 00093: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 115us/sample - loss: 0.1330 - mean_absolute_error: 0.1332 - mean_squared_error: 0.0374 - val_loss: 0.1462 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0427
Epoch 94/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.1310 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0363
Epoch 00094: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 116us/sample - loss: 0.1309 - mean_absolute_error: 0.1312 - mean_squared_error: 0.0364 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0429
Epoch 95/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1310 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0368
Epoch 00095: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 118us/sample - loss: 0.1312 - mean_absolute_error: 0.1314 - mean_squared_error: 0.0368 - val_loss: 0.1429 - val_mean_absolute_error: 0.1429 - val_mean_squared_error: 0.0425
Epoch 96/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1326 - mean_absolute_error: 0.1326 - mean_squared_error: 0.0373
Epoch 00096: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 116us/sample - loss: 0.1325 - mean_absolute_error: 0.1326 - mean_squared_error: 0.0373 - val_loss: 0.1547 - val_mean_absolute_error: 0.1547 - val_mean_squared_error: 0.0481
Epoch 97/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1316 - mean_absolute_error: 0.1316 - mean_squared_error: 0.0367

```

Epoch 00097: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 118us/sample - loss: 0.1316 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0367 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0433
Epoch 98/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1295 - mean_absolute_error: 0.1295 - mean_squared_error: 0.0357
Epoch 00098: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 117us/sample - loss: 0.1300 - mean_absolute_error: 0.1301 - mean_squared_error: 0.0359 - val_loss: 0.1705 - val_mean_absolute_error: 0.1705 - val_mean_squared_error: 0.0524
Epoch 99/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1291 - mean_absolute_error: 0.1291 - mean_squared_error: 0.0359
Epoch 00099: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 119us/sample - loss: 0.1292 - mean_absolute_error: 0.1293 - mean_squared_error: 0.0360 - val_loss: 0.1440 - val_mean_absolute_error: 0.1440 - val_mean_squared_error: 0.0432
Epoch 100/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1286 - mean_absolute_error: 0.1286 - mean_squared_error: 0.0353
Epoch 00100: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 116us/sample - loss: 0.1287 - mean_absolute_error: 0.1289 - mean_squared_error: 0.0355 - val_loss: 0.1526 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0458
Epoch 101/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1283 - mean_absolute_error: 0.1283 - mean_squared_error: 0.0355Restoring model weights from the end of the best epoch.

Epoch 00101: val_loss did not improve from 0.14009
10471/10471 [=====] - 1s 116us/sample - loss: 0.1279 - mean_absolute_error: 0.1278 - mean_squared_error: 0.0353 - val_loss: 0.1471 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0437
Epoch 00101: early stopping
MAE: 0.14005658
RMSE: 0.20284745
Adding initial Dense layers with 128
Adding Dense layer with 128
Adding last layer with 128
Outputting predictive model - Tabular
Model: "model_90"

```

Layer (type)	Output Shape	Param #
input_91 (InputLayer)	[(None, 61)]	0
batch_normalization_201 (BatchNormalization)	(None, 61)	244
dense_663 (Dense)	(None, 128)	7936
batch_normalization_202 (BatchNormalization)	(None, 128)	512

dense_664 (Dense)	(None, 128)	16512
batch_normalization_203 (Batch Normalization)	(None, 128)	512
dense_665 (Dense)	(None, 128)	16512
batch_normalization_204 (Batch Normalization)	(None, 128)	512
dense_666 (Dense)	(None, 128)	16512
batch_normalization_205 (Batch Normalization)	(None, 128)	512
dense_667 (Dense)	(None, 128)	16512
batch_normalization_206 (Batch Normalization)	(None, 128)	512
dense_668 (Dense)	(None, 128)	16512
batch_normalization_207 (Batch Normalization)	(None, 128)	512
dense_669 (Dense)	(None, 128)	16512
batch_normalization_208 (Batch Normalization)	(None, 128)	512
dense_670 (Dense)	(None, 128)	16512
batch_normalization_209 (Batch Normalization)	(None, 128)	512
dense_671 (Dense)	(None, 128)	16512
batch_normalization_210 (Batch Normalization)	(None, 128)	512
dense_672 (Dense)	(None, 128)	16512
batch_normalization_211 (Batch Normalization)	(None, 128)	512
dense_673 (Dense)	(None, 128)	16512
batch_normalization_212 (Batch Normalization)	(None, 128)	512
dense_674 (Dense)	(None, 128)	16512
dense_675 (Dense)	(None, 1)	129

Total params: 195,573

Trainable params: 192,635

Non-trainable params: 2,938

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10240/10471 [=====>.] - ETA: 0s - loss: 1.5152 - mean_absolute_error: 1.5152 - mean_squared_error: 7.3545

Epoch 00001: val_loss improved from inf to 1.74299, saving model to best_basic_model.hdf5

10471/10471 [=====] - 4s 427us/sample - loss: 1.4980 - mean_absolute_error: 1.4969 - mean_squared_error: 7.1965 - val_loss: 1.7430 - val_mean_absolute_error: 1.7443 - val_mean_squared_error: 12.3815

Epoch 2/500

10304/10471 [=====>.] - ETA: 0s - loss: 0.5664 - mean_absolute_error: 0.5664 - mean_squared_error: 0.5227
Epoch 00002: val_loss improved from 1.74299 to 0.60409, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 222us/sample - loss: 0.5661 - mean_absolute_error: 0.5669 - mean_squared_error: 0.5229 - val_loss: 0.6041 - val_mean_absolute_error: 0.6044 - val_mean_squared_error: 1.0730
Epoch 3/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.4977 - mean_absolute_error: 0.4977 - mean_squared_error: 0.3941
Epoch 00003: val_loss improved from 0.60409 to 0.59114, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 214us/sample - loss: 0.4986 - mean_absolute_error: 0.4993 - mean_squared_error: 0.3956 - val_loss: 0.5911 - val_mean_absolute_error: 0.5910 - val_mean_squared_error: 0.8631
Epoch 4/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.4463 - mean_absolute_error: 0.4463 - mean_squared_error: 0.3177
Epoch 00004: val_loss improved from 0.59114 to 0.48825, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 227us/sample - loss: 0.4467 - mean_absolute_error: 0.4472 - mean_squared_error: 0.3186 - val_loss: 0.4882 - val_mean_absolute_error: 0.4883 - val_mean_squared_error: 0.4421
Epoch 5/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.4404 - mean_absolute_error: 0.4404 - mean_squared_error: 0.3097
Epoch 00005: val_loss did not improve from 0.48825
10471/10471 [=====] - 2s 217us/sample - loss: 0.4417 - mean_absolute_error: 0.4422 - mean_squared_error: 0.3117 - val_loss: 0.6694 - val_mean_absolute_error: 0.6694 - val_mean_squared_error: 0.6837
Epoch 6/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.4211 - mean_absolute_error: 0.4211 - mean_squared_error: 0.2845
Epoch 00006: val_loss improved from 0.48825 to 0.44824, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 225us/sample - loss: 0.4210 - mean_absolute_error: 0.4205 - mean_squared_error: 0.2839 - val_loss: 0.4482 - val_mean_absolute_error: 0.4484 - val_mean_squared_error: 0.3010
Epoch 7/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.4048 - mean_absolute_error: 0.4048 - mean_squared_error: 0.2612
Epoch 00007: val_loss did not improve from 0.44824
10471/10471 [=====] - 2s 217us/sample - loss: 0.4050 - mean_absolute_error: 0.4053 - mean_squared_error: 0.2616 - val_loss: 0.4974 - val_mean_absolute_error: 0.4975 - val_mean_squared_error: 0.3856
Epoch 8/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3639 - mean_absolute_error: 0.3639 - mean_squared_error: 0.2130
Epoch 00008: val_loss improved from 0.44824 to 0.33877, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 225us/sample - loss: 0.3639 - mean_absolute_error: 0.3639 - mean_squared_error: 0.2129 - val_loss: 0.3388 - val_mean_absolute_error: 0.3387 - val_mean_squared_error: 0.1777
Epoch 9/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.3529 - mean_absolute_error: 0.3529 - mean_squared_error: 0.2002
Epoch 00009: val_loss did not improve from 0.33877
10471/10471 [=====] - 2s 219us/sample - loss: 0.3546 - mean_absolute_error: 0.3551 - mean_squared_error: 0.2028 - val_loss: 0.3567 - val_mean_absolute_error: 0.3565 - val_mean_squared_error: 0.2053
Epoch 10/500

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10432/10471 [=====>.] - ETA: 0s - loss: 0.3363 - mean_absolute_error: 0.3363 - mean_squared_error: 0.1862
Epoch 00010: val_loss did not improve from 0.33877
10471/10471 [=====] - 2s 219us/sample - loss: 0.3360 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1855 - val_loss: 0.3778 - val_mean_absolute_error: 0.3778 - val_mean_squared_error: 0.2068
Epoch 11/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.3351 - mean_absolute_error: 0.3351 - mean_squared_error: 0.1794
Epoch 00011: val_loss improved from 0.33877 to 0.24637, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 227us/sample - loss: 0.3354 - mean_absolute_error: 0.3352 - mean_squared_error: 0.1794 - val_loss: 0.2464 - val_mean_absolute_error: 0.2462 - val_mean_squared_error: 0.1040
Epoch 12/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.3032 - mean_absolute_error: 0.3032 - mean_squared_error: 0.1503
Epoch 00012: val_loss did not improve from 0.24637
10471/10471 [=====] - 2s 219us/sample - loss: 0.3035 - mean_absolute_error: 0.3038 - mean_squared_error: 0.1507 - val_loss: 0.4475 - val_mean_absolute_error: 0.4477 - val_mean_squared_error: 0.2818
Epoch 13/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.3167 - mean_absolute_error: 0.3167 - mean_squared_error: 0.1630
Epoch 00013: val_loss improved from 0.24637 to 0.22866, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 225us/sample - loss: 0.3160 - mean_absolute_error: 0.3164 - mean_squared_error: 0.1629 - val_loss: 0.2287 - val_mean_absolute_error: 0.2286 - val_mean_squared_error: 0.0870
Epoch 14/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.2803 - mean_absolute_error: 0.2803 - mean_squared_error: 0.1322
Epoch 00014: val_loss did not improve from 0.22866
10471/10471 [=====] - 2s 218us/sample - loss: 0.2796 - mean_absolute_error: 0.2796 - mean_squared_error: 0.1313 - val_loss: 0.2631 - val_mean_absolute_error: 0.2630 - val_mean_squared_error: 0.1059
Epoch 15/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2813 - mean_absolute_error: 0.2813 - mean_squared_error: 0.1310
Epoch 00015: val_loss did not improve from 0.22866
10471/10471 [=====] - 2s 220us/sample - loss: 0.2809 - mean_absolute_error: 0.2809 - mean_squared_error: 0.1305 - val_loss: 0.2810 - val_mean_absolute_error: 0.2811 - val_mean_squared_error: 0.1229
Epoch 16/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2891 - mean_absolute_error: 0.2891 - mean_squared_error: 0.1356
Epoch 00016: val_loss did not improve from 0.22866
10471/10471 [=====] - 2s 214us/sample - loss: 0.2883 - mean_absolute_error: 0.2891 - mean_squared_error: 0.1360 - val_loss: 0.3913 - val_mean_absolute_error: 0.3911 - val_mean_squared_error: 0.2153
Epoch 17/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2663 - mean_absolute_error: 0.2663 - mean_squared_error: 0.1164
Epoch 00017: val_loss did not improve from 0.22866
10471/10471 [=====] - 2s 205us/sample - loss: 0.2664 - mean_absolute_error: 0.2665 - mean_squared_error: 0.1166 - val_loss: 0.2589 - val_mean_absolute_error: 0.2589 - val_mean_squared_error: 0.1112
Epoch 18/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.2402 - mean_absolute_error: 0.2402 - mean_squared_error: 0.0978
Epoch 00018: val_loss improved from 0.22866 to 0.19310, saving model to best_basic_mode
```

```
1.hdf5
10471/10471 [=====] - 2s 225us/sample - loss: 0.2403 - mean_absolute_error: 0.2403 - mean_squared_error: 0.0978 - val_loss: 0.1931 - val_mean_absolute_error: 0.1931 - val_mean_squared_error: 0.0733
Epoch 19/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2438 - mean_absolute_error: 0.2438 - mean_squared_error: 0.1010
Epoch 00019: val_loss did not improve from 0.19310
10471/10471 [=====] - 2s 217us/sample - loss: 0.2443 - mean_absolute_error: 0.2445 - mean_squared_error: 0.1016 - val_loss: 0.2538 - val_mean_absolute_error: 0.2539 - val_mean_squared_error: 0.1140
Epoch 20/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.2314 - mean_absolute_error: 0.2314 - mean_squared_error: 0.0923
Epoch 00020: val_loss improved from 0.19310 to 0.19267, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 224us/sample - loss: 0.2311 - mean_absolute_error: 0.2309 - mean_squared_error: 0.0920 - val_loss: 0.1927 - val_mean_absolute_error: 0.1927 - val_mean_squared_error: 0.0797
Epoch 21/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.2360 - mean_absolute_error: 0.2360 - mean_squared_error: 0.0930
Epoch 00021: val_loss improved from 0.19267 to 0.19240, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 225us/sample - loss: 0.2362 - mean_absolute_error: 0.2367 - mean_squared_error: 0.0936 - val_loss: 0.1924 - val_mean_absolute_error: 0.1925 - val_mean_squared_error: 0.0687
Epoch 22/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2126 - mean_absolute_error: 0.2126 - mean_squared_error: 0.0784
Epoch 00022: val_loss did not improve from 0.19240
10471/10471 [=====] - 2s 217us/sample - loss: 0.2129 - mean_absolute_error: 0.2133 - mean_squared_error: 0.0789 - val_loss: 0.2901 - val_mean_absolute_error: 0.2902 - val_mean_squared_error: 0.1221
Epoch 23/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.2187 - mean_absolute_error: 0.2187 - mean_squared_error: 0.0820
Epoch 00023: val_loss improved from 0.19240 to 0.18333, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 225us/sample - loss: 0.2182 - mean_absolute_error: 0.2181 - mean_squared_error: 0.0817 - val_loss: 0.1833 - val_mean_absolute_error: 0.1833 - val_mean_squared_error: 0.0643
Epoch 24/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2076 - mean_absolute_error: 0.2076 - mean_squared_error: 0.0749
Epoch 00024: val_loss did not improve from 0.18333
10471/10471 [=====] - 2s 217us/sample - loss: 0.2070 - mean_absolute_error: 0.2069 - mean_squared_error: 0.0745 - val_loss: 0.2192 - val_mean_absolute_error: 0.2191 - val_mean_squared_error: 0.0861
Epoch 25/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.2163 - mean_absolute_error: 0.2163 - mean_squared_error: 0.0809
Epoch 00025: val_loss improved from 0.18333 to 0.17735, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 2s 226us/sample - loss: 0.2163 - mean_absolute_error: 0.2164 - mean_squared_error: 0.0809 - val_loss: 0.1773 - val_mean_absolute_error: 0.1773 - val_mean_squared_error: 0.0573
Epoch 26/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2147 - mean_absolute_error: 0.2147 - mean_squared_error: 0.0810
Epoch 00026: val_loss did not improve from 0.17735
```

```
10471/10471 [=====] - 2s 216us/sample - loss: 0.2150 - mean_absolute_error: 0.2148 - mean_squared_error: 0.0808 - val_loss: 0.2954 - val_mean_absolute_error: 0.2954 - val_mean_squared_error: 0.1176
Epoch 27/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1965 - mean_absolute_error: 0.1965 - mean_squared_error: 0.0688
Epoch 00027: val_loss did not improve from 0.17735
10471/10471 [=====] - 2s 217us/sample - loss: 0.1966 - mean_absolute_error: 0.1968 - mean_squared_error: 0.0692 - val_loss: 0.1980 - val_mean_absolute_error: 0.1980 - val_mean_squared_error: 0.0614
Epoch 28/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.2126 - mean_absolute_error: 0.2126 - mean_squared_error: 0.0782
Epoch 00028: val_loss did not improve from 0.17735
10471/10471 [=====] - 2s 219us/sample - loss: 0.2132 - mean_absolute_error: 0.2135 - mean_squared_error: 0.0789 - val_loss: 0.2121 - val_mean_absolute_error: 0.2120 - val_mean_squared_error: 0.0771
Epoch 29/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1925 - mean_absolute_error: 0.1925 - mean_squared_error: 0.0663
Epoch 00029: val_loss did not improve from 0.17735
10471/10471 [=====] - 2s 217us/sample - loss: 0.1923 - mean_absolute_error: 0.1926 - mean_squared_error: 0.0664 - val_loss: 0.1908 - val_mean_absolute_error: 0.1908 - val_mean_squared_error: 0.0633
Epoch 30/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1958 - mean_absolute_error: 0.1958 - mean_squared_error: 0.0685
Epoch 00030: val_loss did not improve from 0.17735
10471/10471 [=====] - 2s 214us/sample - loss: 0.1953 - mean_absolute_error: 0.1953 - mean_squared_error: 0.0681 - val_loss: 0.1874 - val_mean_absolute_error: 0.1874 - val_mean_squared_error: 0.0593
Epoch 31/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1863 - mean_absolute_error: 0.1863 - mean_squared_error: 0.0627
Epoch 00031: val_loss did not improve from 0.17735
10471/10471 [=====] - 2s 203us/sample - loss: 0.1864 - mean_absolute_error: 0.1868 - mean_squared_error: 0.0630 - val_loss: 0.2889 - val_mean_absolute_error: 0.2887 - val_mean_squared_error: 0.1293
Epoch 32/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1870 - mean_absolute_error: 0.1870 - mean_squared_error: 0.0641
Epoch 00032: val_loss did not improve from 0.17735
10471/10471 [=====] - 2s 219us/sample - loss: 0.1870 - mean_absolute_error: 0.1870 - mean_squared_error: 0.0640 - val_loss: 0.2277 - val_mean_absolute_error: 0.2277 - val_mean_squared_error: 0.0795
Epoch 33/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1823 - mean_absolute_error: 0.1823 - mean_squared_error: 0.0610
Epoch 00033: val_loss improved from 0.17735 to 0.16166, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 226us/sample - loss: 0.1823 - mean_absolute_error: 0.1822 - mean_squared_error: 0.0614 - val_loss: 0.1617 - val_mean_absolute_error: 0.1616 - val_mean_squared_error: 0.0513
Epoch 34/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1871 - mean_absolute_error: 0.1871 - mean_squared_error: 0.0633
Epoch 00034: val_loss improved from 0.16166 to 0.15338, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 225us/sample - loss: 0.1873 - mean_absolute_error: 0.1873 - mean_squared_error: 0.0633 - val_loss: 0.1534 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0461
```

Epoch 35/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1763 - mean_absolute_error: 0.1763 - mean_squared_error: 0.0568
Epoch 00035: val_loss did not improve from 0.15338
10471/10471 [=====] - 2s 218us/sample - loss: 0.1765 - mean_absolute_error: 0.1767 - mean_squared_error: 0.0574 - val_loss: 0.1566 - val_mean_absolute_error: 0.1567 - val_mean_squared_error: 0.0500
Epoch 36/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1846 - mean_absolute_error: 0.1846 - mean_squared_error: 0.0627
Epoch 00036: val_loss did not improve from 0.15338
10471/10471 [=====] - 2s 221us/sample - loss: 0.1846 - mean_absolute_error: 0.1849 - mean_squared_error: 0.0628 - val_loss: 0.1720 - val_mean_absolute_error: 0.1719 - val_mean_squared_error: 0.0548
Epoch 37/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1801 - mean_absolute_error: 0.1801 - mean_squared_error: 0.0596
Epoch 00037: val_loss did not improve from 0.15338
10471/10471 [=====] - 2s 220us/sample - loss: 0.1802 - mean_absolute_error: 0.1806 - mean_squared_error: 0.0598 - val_loss: 0.1913 - val_mean_absolute_error: 0.1914 - val_mean_squared_error: 0.0621
Epoch 38/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1769 - mean_absolute_error: 0.1769 - mean_squared_error: 0.0584
Epoch 00038: val_loss did not improve from 0.15338
10471/10471 [=====] - 2s 219us/sample - loss: 0.1772 - mean_absolute_error: 0.1774 - mean_squared_error: 0.0585 - val_loss: 0.1933 - val_mean_absolute_error: 0.1933 - val_mean_squared_error: 0.0598
Epoch 39/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1694 - mean_absolute_error: 0.1694 - mean_squared_error: 0.0542
Epoch 00039: val_loss did not improve from 0.15338
10471/10471 [=====] - 2s 216us/sample - loss: 0.1690 - mean_absolute_error: 0.1695 - mean_squared_error: 0.0544 - val_loss: 0.1714 - val_mean_absolute_error: 0.1715 - val_mean_squared_error: 0.0512
Epoch 40/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1737 - mean_absolute_error: 0.1737 - mean_squared_error: 0.0556
Epoch 00040: val_loss did not improve from 0.15338
10471/10471 [=====] - 2s 217us/sample - loss: 0.1740 - mean_absolute_error: 0.1744 - mean_squared_error: 0.0560 - val_loss: 0.2117 - val_mean_absolute_error: 0.2118 - val_mean_squared_error: 0.0693
Epoch 41/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1676 - mean_absolute_error: 0.1676 - mean_squared_error: 0.0531
Epoch 00041: val_loss did not improve from 0.15338
10471/10471 [=====] - 2s 212us/sample - loss: 0.1676 - mean_absolute_error: 0.1678 - mean_squared_error: 0.0533 - val_loss: 0.1597 - val_mean_absolute_error: 0.1597 - val_mean_squared_error: 0.0497
Epoch 42/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1710 - mean_absolute_error: 0.1710 - mean_squared_error: 0.0545
Epoch 00042: val_loss did not improve from 0.15338
10471/10471 [=====] - 2s 216us/sample - loss: 0.1711 - mean_absolute_error: 0.1714 - mean_squared_error: 0.0547 - val_loss: 0.1633 - val_mean_absolute_error: 0.1632 - val_mean_squared_error: 0.0524
Epoch 43/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1711 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0550
Epoch 00043: val_loss improved from 0.15338 to 0.14795, saving model to best_basic_mode1.hdf5

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10471/10471 [=====] - 2s 227us/sample - loss: 0.1715 - mean_absolute_error: 0.1719 - mean_squared_error: 0.0556 - val_loss: 0.1480 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0438
Epoch 44/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1709 - mean_absolute_error: 0.1709 - mean_squared_error: 0.0548
Epoch 00044: val_loss did not improve from 0.14795
10471/10471 [=====] - 2s 217us/sample - loss: 0.1708 - mean_absolute_error: 0.1706 - mean_squared_error: 0.0547 - val_loss: 0.1482 - val_mean_absolute_error: 0.1481 - val_mean_squared_error: 0.0443
Epoch 45/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1682 - mean_absolute_error: 0.1682 - mean_squared_error: 0.0545
Epoch 00045: val_loss did not improve from 0.14795
10471/10471 [=====] - 2s 203us/sample - loss: 0.1682 - mean_absolute_error: 0.1685 - mean_squared_error: 0.0547 - val_loss: 0.1642 - val_mean_absolute_error: 0.1642 - val_mean_squared_error: 0.0486
Epoch 46/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1717 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0546
Epoch 00046: val_loss did not improve from 0.14795
10471/10471 [=====] - 2s 221us/sample - loss: 0.1714 - mean_absolute_error: 0.1715 - mean_squared_error: 0.0545 - val_loss: 0.1697 - val_mean_absolute_error: 0.1696 - val_mean_squared_error: 0.0557
Epoch 47/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1608 - mean_absolute_error: 0.1608 - mean_squared_error: 0.0500
Epoch 00047: val_loss did not improve from 0.14795
10471/10471 [=====] - 2s 215us/sample - loss: 0.1606 - mean_absolute_error: 0.1608 - mean_squared_error: 0.0500 - val_loss: 0.1603 - val_mean_absolute_error: 0.1603 - val_mean_squared_error: 0.0472
Epoch 48/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1664 - mean_absolute_error: 0.1664 - mean_squared_error: 0.0530
Epoch 00048: val_loss did not improve from 0.14795
10471/10471 [=====] - 2s 215us/sample - loss: 0.1661 - mean_absolute_error: 0.1661 - mean_squared_error: 0.0527 - val_loss: 0.1522 - val_mean_absolute_error: 0.1522 - val_mean_squared_error: 0.0442
Epoch 49/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1659 - mean_absolute_error: 0.1659 - mean_squared_error: 0.0526
Epoch 00049: val_loss did not improve from 0.14795
10471/10471 [=====] - 2s 216us/sample - loss: 0.1663 - mean_absolute_error: 0.1665 - mean_squared_error: 0.0530 - val_loss: 0.1648 - val_mean_absolute_error: 0.1648 - val_mean_squared_error: 0.0483
Epoch 50/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1698 - mean_absolute_error: 0.1698 - mean_squared_error: 0.0536
Epoch 00050: val_loss did not improve from 0.14795
10471/10471 [=====] - 2s 217us/sample - loss: 0.1698 - mean_absolute_error: 0.1698 - mean_squared_error: 0.0535 - val_loss: 0.1723 - val_mean_absolute_error: 0.1722 - val_mean_squared_error: 0.0566
Epoch 51/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1631 - mean_absolute_error: 0.1631 - mean_squared_error: 0.0508
Epoch 00051: val_loss improved from 0.14795 to 0.14477, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 224us/sample - loss: 0.1631 - mean_absolute_error: 0.1632 - mean_squared_error: 0.0509 - val_loss: 0.1448 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0441
Epoch 52/500
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10336/10471 [=====>.] - ETA: 0s - loss: 0.1610 - mean_absolute_error: 0.1610 - mean_squared_error: 0.0505
Epoch 00052: val_loss did not improve from 0.14477
10471/10471 [=====] - 2s 220us/sample - loss: 0.1610 - mean_absolute_error: 0.1612 - mean_squared_error: 0.0505 - val_loss: 0.1696 - val_mean_absolute_error: 0.1696 - val_mean_squared_error: 0.0501
Epoch 53/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1608 - mean_absolute_error: 0.1608 - mean_squared_error: 0.0502
Epoch 00053: val_loss did not improve from 0.14477
10471/10471 [=====] - 2s 217us/sample - loss: 0.1608 - mean_absolute_error: 0.1608 - mean_squared_error: 0.0503 - val_loss: 0.1584 - val_mean_absolute_error: 0.1584 - val_mean_squared_error: 0.0466
Epoch 54/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1595 - mean_absolute_error: 0.1595 - mean_squared_error: 0.0496
Epoch 00054: val_loss did not improve from 0.14477
10471/10471 [=====] - 2s 217us/sample - loss: 0.1596 - mean_absolute_error: 0.1600 - mean_squared_error: 0.0498 - val_loss: 0.1677 - val_mean_absolute_error: 0.1677 - val_mean_squared_error: 0.0505
Epoch 55/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1622 - mean_absolute_error: 0.1622 - mean_squared_error: 0.0506
Epoch 00055: val_loss did not improve from 0.14477
10471/10471 [=====] - 2s 215us/sample - loss: 0.1625 - mean_absolute_error: 0.1629 - mean_squared_error: 0.0510 - val_loss: 0.1498 - val_mean_absolute_error: 0.1498 - val_mean_squared_error: 0.0436
Epoch 56/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1551 - mean_absolute_error: 0.1551 - mean_squared_error: 0.0473
Epoch 00056: val_loss did not improve from 0.14477
10471/10471 [=====] - 2s 212us/sample - loss: 0.1552 - mean_absolute_error: 0.1552 - mean_squared_error: 0.0473 - val_loss: 0.1512 - val_mean_absolute_error: 0.1512 - val_mean_squared_error: 0.0458
Epoch 57/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1563 - mean_absolute_error: 0.1563 - mean_squared_error: 0.0479
Epoch 00057: val_loss improved from 0.14477 to 0.14164, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 224us/sample - loss: 0.1563 - mean_absolute_error: 0.1566 - mean_squared_error: 0.0482 - val_loss: 0.1416 - val_mean_absolute_error: 0.1416 - val_mean_squared_error: 0.0416
Epoch 58/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1571 - mean_absolute_error: 0.1571 - mean_squared_error: 0.0483
Epoch 00058: val_loss did not improve from 0.14164
10471/10471 [=====] - 2s 220us/sample - loss: 0.1579 - mean_absolute_error: 0.1583 - mean_squared_error: 0.0493 - val_loss: 0.1487 - val_mean_absolute_error: 0.1486 - val_mean_squared_error: 0.0449
Epoch 59/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1637 - mean_absolute_error: 0.1637 - mean_squared_error: 0.0515
Epoch 00059: val_loss did not improve from 0.14164
10471/10471 [=====] - 2s 203us/sample - loss: 0.1635 - mean_absolute_error: 0.1636 - mean_squared_error: 0.0516 - val_loss: 0.1656 - val_mean_absolute_error: 0.1657 - val_mean_squared_error: 0.0498
Epoch 60/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1547 - mean_absolute_error: 0.1547 - mean_squared_error: 0.0478
Epoch 00060: val_loss did not improve from 0.14164
10471/10471 [=====] - 2s 214us/sample - loss: 0.1547 - mean_absolute_error:

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olute_error: 0.1547 - mean_squared_error: 0.0478 - val_loss: 0.1726 - val_mean_absolute_error: 0.1726 - val_mean_squared_error: 0.0542
Epoch 61/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1537 - mean_absolute_error: 0.1537 - mean_squared_error: 0.0474
Epoch 00061: val_loss did not improve from 0.14164
10471/10471 [=====] - 2s 217us/sample - loss: 0.1537 - mean_absolute_error: 0.1540 - mean_squared_error: 0.0473 - val_loss: 0.1661 - val_mean_absolute_error: 0.1661 - val_mean_squared_error: 0.0536
Epoch 62/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1578 - mean_absolute_error: 0.1578 - mean_squared_error: 0.0488
Epoch 00062: val_loss did not improve from 0.14164
10471/10471 [=====] - 2s 218us/sample - loss: 0.1578 - mean_absolute_error: 0.1579 - mean_squared_error: 0.0487 - val_loss: 0.1689 - val_mean_absolute_error: 0.1688 - val_mean_squared_error: 0.0556
Epoch 63/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1552 - mean_absolute_error: 0.1552 - mean_squared_error: 0.0480
Epoch 00063: val_loss did not improve from 0.14164
10471/10471 [=====] - 2s 217us/sample - loss: 0.1552 - mean_absolute_error: 0.1555 - mean_squared_error: 0.0483 - val_loss: 0.1493 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0438
Epoch 64/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1548 - mean_absolute_error: 0.1548 - mean_squared_error: 0.0480
Epoch 00064: val_loss improved from 0.14164 to 0.14058, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 2s 230us/sample - loss: 0.1548 - mean_absolute_error: 0.1552 - mean_squared_error: 0.0483 - val_loss: 0.1406 - val_mean_absolute_error: 0.1406 - val_mean_squared_error: 0.0409
Epoch 65/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1535 - mean_absolute_error: 0.1535 - mean_squared_error: 0.0473
Epoch 00065: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 223us/sample - loss: 0.1534 - mean_absolute_error: 0.1536 - mean_squared_error: 0.0474 - val_loss: 0.1507 - val_mean_absolute_error: 0.1506 - val_mean_squared_error: 0.0454
Epoch 66/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1509 - mean_absolute_error: 0.1509 - mean_squared_error: 0.0463
Epoch 00066: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 222us/sample - loss: 0.1511 - mean_absolute_error: 0.1515 - mean_squared_error: 0.0468 - val_loss: 0.1444 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0414
Epoch 67/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1567 - mean_absolute_error: 0.1567 - mean_squared_error: 0.0487
Epoch 00067: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 218us/sample - loss: 0.1566 - mean_absolute_error: 0.1565 - mean_squared_error: 0.0486 - val_loss: 0.1435 - val_mean_absolute_error: 0.1435 - val_mean_squared_error: 0.0411
Epoch 68/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1503 - mean_absolute_error: 0.1503 - mean_squared_error: 0.0463
Epoch 00068: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 216us/sample - loss: 0.1501 - mean_absolute_error: 0.1502 - mean_squared_error: 0.0461 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0444
Epoch 69/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1487 - mean_absolute_error:
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ror: 0.1487 - mean_squared_error: 0.0454
Epoch 00069: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 215us/sample - loss: 0.1484 - mean_absolute_error: 0.1486 - mean_squared_error: 0.0453 - val_loss: 0.1625 - val_mean_absolute_error: 0.1626 - val_mean_squared_error: 0.0482
Epoch 70/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1504 - mean_absolute_error: 0.1504 - mean_squared_error: 0.0459
Epoch 00070: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 214us/sample - loss: 0.1508 - mean_absolute_error: 0.1517 - mean_squared_error: 0.0471 - val_loss: 0.1519 - val_mean_absolute_error: 0.1519 - val_mean_squared_error: 0.0444
Epoch 71/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1475 - mean_absolute_error: 0.1475 - mean_squared_error: 0.0443
Epoch 00071: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 219us/sample - loss: 0.1475 - mean_absolute_error: 0.1475 - mean_squared_error: 0.0443 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0428
Epoch 72/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1447 - mean_absolute_error: 0.1447 - mean_squared_error: 0.0433
Epoch 00072: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 219us/sample - loss: 0.1445 - mean_absolute_error: 0.1445 - mean_squared_error: 0.0433 - val_loss: 0.1627 - val_mean_absolute_error: 0.1628 - val_mean_squared_error: 0.0497
Epoch 73/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1437 - mean_absolute_error: 0.1437 - mean_squared_error: 0.0437
Epoch 00073: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 207us/sample - loss: 0.1437 - mean_absolute_error: 0.1439 - mean_squared_error: 0.0437 - val_loss: 0.1468 - val_mean_absolute_error: 0.1468 - val_mean_squared_error: 0.0450
Epoch 74/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1458 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0441
Epoch 00074: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 209us/sample - loss: 0.1458 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0442 - val_loss: 0.1583 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0492
Epoch 75/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1453 - mean_absolute_error: 0.1453 - mean_squared_error: 0.0442
Epoch 00075: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 217us/sample - loss: 0.1453 - mean_absolute_error: 0.1453 - mean_squared_error: 0.0442 - val_loss: 0.1415 - val_mean_absolute_error: 0.1415 - val_mean_squared_error: 0.0421
Epoch 76/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1444 - mean_absolute_error: 0.1444 - mean_squared_error: 0.0432
Epoch 00076: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 214us/sample - loss: 0.1444 - mean_absolute_error: 0.1447 - mean_squared_error: 0.0433 - val_loss: 0.1505 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0459
Epoch 77/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1461 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0440
Epoch 00077: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 215us/sample - loss: 0.1462 - mean_absolute_error: 0.1464 - mean_squared_error: 0.0442 - val_loss: 0.1446 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0426
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Epoch 78/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1442 - mean_absolute_error: 0.1442 - mean_squared_error: 0.0433
Epoch 00078: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 219us/sample - loss: 0.1442 - mean_absolute_error: 0.1444 - mean_squared_error: 0.0434 - val_loss: 0.1558 - val_mean_absolute_error: 0.1558 - val_mean_squared_error: 0.0454
Epoch 79/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1449 - mean_absolute_error: 0.1449 - mean_squared_error: 0.0436
Epoch 00079: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 217us/sample - loss: 0.1449 - mean_absolute_error: 0.1450 - mean_squared_error: 0.0437 - val_loss: 0.1433 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0433
Epoch 80/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1416 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0426
Epoch 00080: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 220us/sample - loss: 0.1416 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0425 - val_loss: 0.1447 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0438
Epoch 81/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1439 - mean_absolute_error: 0.1439 - mean_squared_error: 0.0434
Epoch 00081: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 218us/sample - loss: 0.1437 - mean_absolute_error: 0.1438 - mean_squared_error: 0.0434 - val_loss: 0.1778 - val_mean_absolute_error: 0.1778 - val_mean_squared_error: 0.0549
Epoch 82/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1429 - mean_absolute_error: 0.1429 - mean_squared_error: 0.0422
Epoch 00082: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 216us/sample - loss: 0.1430 - mean_absolute_error: 0.1433 - mean_squared_error: 0.0423 - val_loss: 0.1436 - val_mean_absolute_error: 0.1435 - val_mean_squared_error: 0.0427
Epoch 83/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1443 - mean_absolute_error: 0.1443 - mean_squared_error: 0.0432
Epoch 00083: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 217us/sample - loss: 0.1444 - mean_absolute_error: 0.1445 - mean_squared_error: 0.0434 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0428
Epoch 84/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1423 - mean_absolute_error: 0.1423 - mean_squared_error: 0.0428
Epoch 00084: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 215us/sample - loss: 0.1421 - mean_absolute_error: 0.1423 - mean_squared_error: 0.0428 - val_loss: 0.1446 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0432
Epoch 85/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1404 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0420
Epoch 00085: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 224us/sample - loss: 0.1405 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0421 - val_loss: 0.1595 - val_mean_absolute_error: 0.1595 - val_mean_squared_error: 0.0479
Epoch 86/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1404 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0413
Epoch 00086: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 218us/sample - loss: 0.1402 - mean_absolute_error:

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olute_error: 0.1403 - mean_squared_error: 0.0412 - val_loss: 0.1491 - val_mean_absolute_
error: 0.1491 - val_mean_squared_error: 0.0447
Epoch 87/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1416 - mean_absolute_er
ror: 0.1416 - mean_squared_error: 0.0419
Epoch 00087: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 211us/sample - loss: 0.1417 - mean_abs
olute_error: 0.1416 - mean_squared_error: 0.0419 - val_loss: 0.1678 - val_mean_absolute_
error: 0.1677 - val_mean_squared_error: 0.0545
Epoch 88/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1415 - mean_absolute_er
ror: 0.1415 - mean_squared_error: 0.0421
Epoch 00088: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 208us/sample - loss: 0.1415 - mean_abs
olute_error: 0.1418 - mean_squared_error: 0.0422 - val_loss: 0.1428 - val_mean_absolute_
error: 0.1428 - val_mean_squared_error: 0.0426
Epoch 89/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1407 - mean_absolute_er
ror: 0.1407 - mean_squared_error: 0.0416Restoring model weights from the end of the best
epoch.

Epoch 00089: val_loss did not improve from 0.14058
10471/10471 [=====] - 2s 220us/sample - loss: 0.1405 - mean_abs
olute_error: 0.1405 - mean_squared_error: 0.0415 - val_loss: 0.1443 - val_mean_absolute_
error: 0.1442 - val_mean_squared_error: 0.0428
Epoch 00089: early stopping
MAE: 0.14055708
RMSE: 0.20234856

```

In [171...]

```
# Try the layers list with dropout

model_num = 0

for layer in layers_to_try:
    model_num += 1
    layers_list = layer
    label='Neural Net Baseline '+str(model_num)+ 'Dropout'
    neural_networks = mlp_test(X_train_tabular, y_train, X_val_tabular, y_val, label, n
```

```

Adding initial Dense layers with 64
Adding Dense layer with 32
Adding Dense layer with 16
Adding Dense layer with 8
Adding last layer with 4
Outputting predictive model - Tabular
Model: "model_91"
```

Layer (type)	Output Shape	Param #
input_92 (InputLayer)	[(None, 61)]	0
dense_676 (Dense)	(None, 64)	3968
dense_677 (Dense)	(None, 32)	2080
dense_678 (Dense)	(None, 16)	528
dense_679 (Dense)	(None, 8)	136
dense_680 (Dense)	(None, 4)	36

dropout_15 (Dropout)	(None, 4)	0
dense_681 (Dense)	(None, 1)	5
=====		
Total params: 6,753		
Trainable params: 6,753		
Non-trainable params: 0		

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
9856/10471 [=====>..] - ETA: 0s - loss: 9.5788 - mean_absolute_error: 9.5788 - mean_squared_error: 97.5961
Epoch 00001: val_loss improved from inf to 4.34862, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 114us/sample - loss: 9.2922 - mean_absolute_error: 9.2806 - mean_squared_error: 92.9987 - val_loss: 4.3486 - val_mean_absolute_error: 4.3491 - val_mean_squared_error: 19.1056
Epoch 2/500
9920/10471 [=====>..] - ETA: 0s - loss: 1.0687 - mean_absolute_error: 1.0687 - mean_squared_error: 2.6843
Epoch 00002: val_loss improved from 4.34862 to 0.34037, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 69us/sample - loss: 1.0304 - mean_absolute_error: 1.0284 - mean_squared_error: 2.5475 - val_loss: 0.3404 - val_mean_absolute_error: 0.3405 - val_mean_squared_error: 0.1922
Epoch 3/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1893
Epoch 00003: val_loss did not improve from 0.34037
10471/10471 [=====] - 1s 68us/sample - loss: 0.3354 - mean_absolute_error: 0.3358 - mean_squared_error: 0.1895 - val_loss: 0.3405 - val_mean_absolute_error: 0.3406 - val_mean_squared_error: 0.1927
Epoch 4/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.3348 - mean_absolute_error: 0.3348 - mean_squared_error: 0.1888
Epoch 00004: val_loss improved from 0.34037 to 0.30447, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 69us/sample - loss: 0.3340 - mean_absolute_error: 0.3339 - mean_squared_error: 0.1880 - val_loss: 0.3045 - val_mean_absolute_error: 0.3046 - val_mean_squared_error: 0.1594
Epoch 5/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.2668 - mean_absolute_error: 0.2668 - mean_squared_error: 0.1277
Epoch 00005: val_loss improved from 0.30447 to 0.24032, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 70us/sample - loss: 0.2657 - mean_absolute_error: 0.2657 - mean_squared_error: 0.1271 - val_loss: 0.2403 - val_mean_absolute_error: 0.2404 - val_mean_squared_error: 0.1090
Epoch 6/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.2511 - mean_absolute_error: 0.2511 - mean_squared_error: 0.1161
Epoch 00006: val_loss improved from 0.24032 to 0.21850, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 69us/sample - loss: 0.2516 - mean_absolute_error: 0.2517 - mean_squared_error: 0.1168 - val_loss: 0.2185 - val_mean_absolute_error: 0.2185 - val_mean_squared_error: 0.0938
Epoch 7/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.2471 - mean_absolute_error:

```
ror: 0.2471 - mean_squared_error: 0.1128
Epoch 00007: val_loss did not improve from 0.21850
10471/10471 [=====] - 1s 67us/sample - loss: 0.2467 - mean_absolute_error: 0.2465 - mean_squared_error: 0.1124 - val_loss: 0.2238 - val_mean_absolute_error: 0.2238 - val_mean_squared_error: 0.0942
Epoch 8/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.2457 - mean_absolute_error: 0.2457 - mean_squared_error: 0.1123
Epoch 00008: val_loss did not improve from 0.21850
10471/10471 [=====] - 1s 67us/sample - loss: 0.2453 - mean_absolute_error: 0.2452 - mean_squared_error: 0.1113 - val_loss: 0.2187 - val_mean_absolute_error: 0.2187 - val_mean_squared_error: 0.0936
Epoch 9/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.2447 - mean_absolute_error: 0.2447 - mean_squared_error: 0.1115
Epoch 00009: val_loss improved from 0.21850 to 0.21293, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 68us/sample - loss: 0.2444 - mean_absolute_error: 0.2441 - mean_squared_error: 0.1109 - val_loss: 0.2129 - val_mean_absolute_error: 0.2130 - val_mean_squared_error: 0.0914
Epoch 10/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.2441 - mean_absolute_error: 0.2441 - mean_squared_error: 0.1122
Epoch 00010: val_loss did not improve from 0.21293
10471/10471 [=====] - 1s 66us/sample - loss: 0.2444 - mean_absolute_error: 0.2444 - mean_squared_error: 0.1126 - val_loss: 0.2162 - val_mean_absolute_error: 0.2163 - val_mean_squared_error: 0.0931
Epoch 11/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.2391 - mean_absolute_error: 0.2391 - mean_squared_error: 0.1076
Epoch 00011: val_loss did not improve from 0.21293
10471/10471 [=====] - 1s 67us/sample - loss: 0.2398 - mean_absolute_error: 0.2400 - mean_squared_error: 0.1088 - val_loss: 0.2242 - val_mean_absolute_error: 0.2242 - val_mean_squared_error: 0.0945
Epoch 12/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.2402 - mean_absolute_error: 0.2402 - mean_squared_error: 0.1092
Epoch 00012: val_loss improved from 0.21293 to 0.19978, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 66us/sample - loss: 0.2404 - mean_absolute_error: 0.2405 - mean_squared_error: 0.1095 - val_loss: 0.1998 - val_mean_absolute_error: 0.1998 - val_mean_squared_error: 0.0825
Epoch 13/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.2392 - mean_absolute_error: 0.2392 - mean_squared_error: 0.1086
Epoch 00013: val_loss did not improve from 0.19978
10471/10471 [=====] - 1s 61us/sample - loss: 0.2400 - mean_absolute_error: 0.2398 - mean_squared_error: 0.1088 - val_loss: 0.2133 - val_mean_absolute_error: 0.2134 - val_mean_squared_error: 0.0909
Epoch 14/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.2391 - mean_absolute_error: 0.2391 - mean_squared_error: 0.1086
Epoch 00014: val_loss did not improve from 0.19978
10471/10471 [=====] - 1s 61us/sample - loss: 0.2391 - mean_absolute_error: 0.2391 - mean_squared_error: 0.1084 - val_loss: 0.2244 - val_mean_absolute_error: 0.2244 - val_mean_squared_error: 0.0960
Epoch 15/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.2352 - mean_absolute_error: 0.2352 - mean_squared_error: 0.1064
Epoch 00015: val_loss did not improve from 0.19978
10471/10471 [=====] - 1s 63us/sample - loss: 0.2354 - mean_absolute_error:
```

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lute_error: 0.2356 - mean_squared_error: 0.1065 - val_loss: 0.2071 - val_mean_absolute_e
rror: 0.2071 - val_mean_squared_error: 0.0869
Epoch 16/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.2356 - mean_absolute_er
ror: 0.2356 - mean_squared_error: 0.1066
Epoch 00016: val_loss did not improve from 0.19978
10471/10471 [=====] - 1s 67us/sample - loss: 0.2360 - mean_abso
lute_error: 0.2360 - mean_squared_error: 0.1066 - val_loss: 0.2023 - val_mean_absolute_e
rror: 0.2023 - val_mean_squared_error: 0.0872
Epoch 17/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.2354 - mean_absolute_er
ror: 0.2354 - mean_squared_error: 0.1066
Epoch 00017: val_loss improved from 0.19978 to 0.19575, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 69us/sample - loss: 0.2357 - mean_abso
lute_error: 0.2356 - mean_squared_error: 0.1066 - val_loss: 0.1957 - val_mean_absolute_e
rror: 0.1958 - val_mean_squared_error: 0.0806
Epoch 18/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.2367 - mean_absolute_er
ror: 0.2367 - mean_squared_error: 0.1069
Epoch 00018: val_loss did not improve from 0.19575
10471/10471 [=====] - 1s 67us/sample - loss: 0.2364 - mean_abso
lute_error: 0.2363 - mean_squared_error: 0.1065 - val_loss: 0.2001 - val_mean_absolute_e
rror: 0.2001 - val_mean_squared_error: 0.0834
Epoch 19/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.2345 - mean_absolute_er
ror: 0.2345 - mean_squared_error: 0.1052
Epoch 00019: val_loss improved from 0.19575 to 0.19209, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 68us/sample - loss: 0.2348 - mean_abso
lute_error: 0.2347 - mean_squared_error: 0.1055 - val_loss: 0.1921 - val_mean_absolute_e
rror: 0.1921 - val_mean_squared_error: 0.0789
Epoch 20/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.2354 - mean_absolute_er
ror: 0.2354 - mean_squared_error: 0.1065
Epoch 00020: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 68us/sample - loss: 0.2351 - mean_abso
lute_error: 0.2352 - mean_squared_error: 0.1060 - val_loss: 0.2174 - val_mean_absolute_e
rror: 0.2174 - val_mean_squared_error: 0.0905
Epoch 21/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.2343 - mean_absolute_er
ror: 0.2343 - mean_squared_error: 0.1057
Epoch 00021: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 69us/sample - loss: 0.2343 - mean_abso
lute_error: 0.2343 - mean_squared_error: 0.1056 - val_loss: 0.2246 - val_mean_absolute_e
rror: 0.2246 - val_mean_squared_error: 0.0973
Epoch 22/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.2342 - mean_absolute_er
ror: 0.2342 - mean_squared_error: 0.1053
Epoch 00022: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 68us/sample - loss: 0.2336 - mean_abso
lute_error: 0.2337 - mean_squared_error: 0.1045 - val_loss: 0.2146 - val_mean_absolute_e
rror: 0.2146 - val_mean_squared_error: 0.0895
Epoch 23/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.2343 - mean_absolute_er
ror: 0.2343 - mean_squared_error: 0.1055
Epoch 00023: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 69us/sample - loss: 0.2346 - mean_abso
lute_error: 0.2345 - mean_squared_error: 0.1058 - val_loss: 0.1994 - val_mean_absolute_e
rror: 0.1994 - val_mean_squared_error: 0.0839
Epoch 24/500
```

9888/10471 [=====>..] - ETA: 0s - loss: 0.2324 - mean_absolute_error: 0.2324 - mean_squared_error: 0.1048
Epoch 00024: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 67us/sample - loss: 0.2322 - mean_absolute_error: 0.2319 - mean_squared_error: 0.1043 - val_loss: 0.2081 - val_mean_absolute_error: 0.2081 - val_mean_squared_error: 0.0861
Epoch 25/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.2309 - mean_absolute_error: 0.2309 - mean_squared_error: 0.1032
Epoch 00025: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 67us/sample - loss: 0.2310 - mean_absolute_error: 0.2310 - mean_squared_error: 0.1036 - val_loss: 0.2020 - val_mean_absolute_error: 0.2020 - val_mean_squared_error: 0.0858
Epoch 26/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.2335 - mean_absolute_error: 0.2335 - mean_squared_error: 0.1066
Epoch 00026: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 67us/sample - loss: 0.2337 - mean_absolute_error: 0.2337 - mean_squared_error: 0.1065 - val_loss: 0.2064 - val_mean_absolute_error: 0.2065 - val_mean_squared_error: 0.0875
Epoch 27/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.2322 - mean_absolute_error: 0.2322 - mean_squared_error: 0.1057
Epoch 00027: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 66us/sample - loss: 0.2320 - mean_absolute_error: 0.2323 - mean_squared_error: 0.1054 - val_loss: 0.2116 - val_mean_absolute_error: 0.2116 - val_mean_squared_error: 0.0897
Epoch 28/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.2314 - mean_absolute_error: 0.2314 - mean_squared_error: 0.1030
Epoch 00028: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 66us/sample - loss: 0.2322 - mean_absolute_error: 0.2326 - mean_squared_error: 0.1045 - val_loss: 0.2103 - val_mean_absolute_error: 0.2103 - val_mean_squared_error: 0.0882
Epoch 29/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.2305 - mean_absolute_error: 0.2305 - mean_squared_error: 0.1039
Epoch 00029: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 67us/sample - loss: 0.2305 - mean_absolute_error: 0.2304 - mean_squared_error: 0.1034 - val_loss: 0.2027 - val_mean_absolute_error: 0.2027 - val_mean_squared_error: 0.0836
Epoch 30/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.2321 - mean_absolute_error: 0.2321 - mean_squared_error: 0.1043
Epoch 00030: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 67us/sample - loss: 0.2317 - mean_absolute_error: 0.2315 - mean_squared_error: 0.1041 - val_loss: 0.2096 - val_mean_absolute_error: 0.2096 - val_mean_squared_error: 0.0857
Epoch 31/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.2335 - mean_absolute_error: 0.2335 - mean_squared_error: 0.1048
Epoch 00031: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 66us/sample - loss: 0.2326 - mean_absolute_error: 0.2327 - mean_squared_error: 0.1046 - val_loss: 0.2215 - val_mean_absolute_error: 0.2215 - val_mean_squared_error: 0.0944
Epoch 32/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.2313 - mean_absolute_error: 0.2313 - mean_squared_error: 0.1038
Epoch 00032: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 66us/sample - loss: 0.2317 - mean_absolute_error: 0.2320 - mean_squared_error: 0.1049 - val_loss: 0.2146 - val_mean_absolute_error: 0.2146 - val_mean_squared_error: 0.0944

```
rror: 0.2146 - val_mean_squared_error: 0.0895
Epoch 33/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.2290 - mean_absolute_error: 0.2290 - mean_squared_error: 0.1023
Epoch 00033: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 65us/sample - loss: 0.2291 - mean_absolute_error: 0.2294 - mean_squared_error: 0.1026 - val_loss: 0.2129 - val_mean_absolute_error: 0.2129 - val_mean_squared_error: 0.0905
Epoch 34/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.2320 - mean_absolute_error: 0.2320 - mean_squared_error: 0.1045
Epoch 00034: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 67us/sample - loss: 0.2322 - mean_absolute_error: 0.2325 - mean_squared_error: 0.1052 - val_loss: 0.2032 - val_mean_absolute_error: 0.2032 - val_mean_squared_error: 0.0867
Epoch 35/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.2335 - mean_absolute_error: 0.2335 - mean_squared_error: 0.1061
Epoch 00035: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 66us/sample - loss: 0.2328 - mean_absolute_error: 0.2327 - mean_squared_error: 0.1055 - val_loss: 0.2214 - val_mean_absolute_error: 0.2213 - val_mean_squared_error: 0.0935
Epoch 36/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.2318 - mean_absolute_error: 0.2318 - mean_squared_error: 0.1039
Epoch 00036: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 65us/sample - loss: 0.2323 - mean_absolute_error: 0.2322 - mean_squared_error: 0.1040 - val_loss: 0.2107 - val_mean_absolute_error: 0.2107 - val_mean_squared_error: 0.0854
Epoch 37/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.2309 - mean_absolute_error: 0.2309 - mean_squared_error: 0.1038
Epoch 00037: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 66us/sample - loss: 0.2308 - mean_absolute_error: 0.2308 - mean_squared_error: 0.1038 - val_loss: 0.2093 - val_mean_absolute_error: 0.2093 - val_mean_squared_error: 0.0861
Epoch 38/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.2358 - mean_absolute_error: 0.2358 - mean_squared_error: 0.1080
Epoch 00038: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 64us/sample - loss: 0.2355 - mean_absolute_error: 0.2353 - mean_squared_error: 0.1077 - val_loss: 0.1988 - val_mean_absolute_error: 0.1989 - val_mean_squared_error: 0.0823
Epoch 39/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.2296 - mean_absolute_error: 0.2296 - mean_squared_error: 0.1047
Epoch 00039: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 61us/sample - loss: 0.2289 - mean_absolute_error: 0.2288 - mean_squared_error: 0.1040 - val_loss: 0.1943 - val_mean_absolute_error: 0.1943 - val_mean_squared_error: 0.0783
Epoch 40/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.2302 - mean_absolute_error: 0.2302 - mean_squared_error: 0.1028
Epoch 00040: val_loss did not improve from 0.19209
10471/10471 [=====] - 1s 61us/sample - loss: 0.2298 - mean_absolute_error: 0.2298 - mean_squared_error: 0.1028 - val_loss: 0.2124 - val_mean_absolute_error: 0.2124 - val_mean_squared_error: 0.0897
Epoch 41/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.2290 - mean_absolute_error: 0.2290 - mean_squared_error: 0.1034
Epoch 00041: val_loss did not improve from 0.19209
```

10471/10471 [=====] - 1s 61us/sample - loss: 0.2289 - mean_absolute_error: 0.2287 - mean_squared_error: 0.1030 - val_loss: 0.2106 - val_mean_absolute_error: 0.2106 - val_mean_squared_error: 0.0859
 Epoch 42/500
 10144/10471 [=====>.] - ETA: 0s - loss: 0.2302 - mean_absolute_error: 0.2302 - mean_squared_error: 0.1042
 Epoch 00042: val_loss did not improve from 0.19209
 10471/10471 [=====] - 1s 65us/sample - loss: 0.2302 - mean_absolute_error: 0.2302 - mean_squared_error: 0.1041 - val_loss: 0.2108 - val_mean_absolute_error: 0.2108 - val_mean_squared_error: 0.0853
 Epoch 43/500
 9952/10471 [=====>..] - ETA: 0s - loss: 0.2292 - mean_absolute_error: 0.2292 - mean_squared_error: 0.1032
 Epoch 00043: val_loss did not improve from 0.19209
 10471/10471 [=====] - 1s 66us/sample - loss: 0.2292 - mean_absolute_error: 0.2292 - mean_squared_error: 0.1033 - val_loss: 0.2082 - val_mean_absolute_error: 0.2082 - val_mean_squared_error: 0.0858
 Epoch 44/500
 9824/10471 [=====>..] - ETA: 0s - loss: 0.2254 - mean_absolute_error: 0.2254 - mean_squared_error: 0.1000Restoring model weights from the end of the best epoch.
 Epoch 00044: val_loss did not improve from 0.19209
 10471/10471 [=====] - 1s 66us/sample - loss: 0.2259 - mean_absolute_error: 0.2259 - mean_squared_error: 0.1004 - val_loss: 0.2252 - val_mean_absolute_error: 0.2251 - val_mean_squared_error: 0.0918
 Epoch 00044: early stopping
 MAE: 0.19214886
 RMSE: 0.28092045
 Adding initial Dense layers with 1024
 Adding Dense layer with 512
 Adding Dense layer with 256
 Adding Dense layer with 128
 Adding Dense layer with 64
 Adding Dense layer with 32
 Adding Dense layer with 16
 Adding Dense layer with 8
 Adding last layer with 4
 Outputting predictive model - Tabular
 Model: "model_92"

Layer (type)	Output Shape	Param #
<hr/>		
input_93 (InputLayer)	[None, 61]	0
dense_682 (Dense)	(None, 1024)	63488
dense_683 (Dense)	(None, 512)	524800
dense_684 (Dense)	(None, 256)	131328
dense_685 (Dense)	(None, 128)	32896
dense_686 (Dense)	(None, 64)	8256
dense_687 (Dense)	(None, 32)	2080
dense_688 (Dense)	(None, 16)	528
dense_689 (Dense)	(None, 8)	136

dense_690 (Dense)	(None, 4)	36
dropout_16 (Dropout)	(None, 4)	0
dense_691 (Dense)	(None, 1)	5
=====		
Total params:	763,553	
Trainable params:	763,553	
Non-trainable params:	0	

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10240/10471 [=====>.] - ETA: 0s - loss: 3.7845 - mean_absolute_error: 3.7845 - mean_squared_error: 23.6321

Epoch 00001: val_loss improved from inf to 2.36140, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 141us/sample - loss: 3.7685 - mean_absolute_error: 3.7677 - mean_squared_error: 23.4185 - val_loss: 2.3614 - val_mean_absolute_error: 2.3618 - val_mean_squared_error: 5.7380

Epoch 2/500

10112/10471 [=====>..] - ETA: 0s - loss: 2.2286 - mean_absolute_error: 2.2286 - mean_squared_error: 7.9321

Epoch 00002: val_loss improved from 2.36140 to 0.61351, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 90us/sample - loss: 2.2050 - mean_absolute_error: 2.2019 - mean_squared_error: 7.7653 - val_loss: 0.6135 - val_mean_absolute_error: 0.6139 - val_mean_squared_error: 0.5172

Epoch 3/500

10176/10471 [=====>.] - ETA: 0s - loss: 0.8019 - mean_absolute_error: 0.8019 - mean_squared_error: 1.2103

Epoch 00003: val_loss improved from 0.61351 to 0.24626, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 89us/sample - loss: 0.7871 - mean_absolute_error: 0.7858 - mean_squared_error: 1.1774 - val_loss: 0.2463 - val_mean_absolute_error: 0.2464 - val_mean_squared_error: 0.1021

Epoch 4/500

9920/10471 [=====>..] - ETA: 0s - loss: 0.2286 - mean_absolute_error: 0.2286 - mean_squared_error: 0.0927

Epoch 00004: val_loss improved from 0.24626 to 0.18941, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 92us/sample - loss: 0.2282 - mean_absolute_error: 0.2281 - mean_squared_error: 0.0926 - val_loss: 0.1894 - val_mean_absolute_error: 0.1894 - val_mean_squared_error: 0.0662

Epoch 5/500

10144/10471 [=====>.] - ETA: 0s - loss: 0.2194 - mean_absolute_error: 0.2194 - mean_squared_error: 0.0870

Epoch 00005: val_loss improved from 0.18941 to 0.18095, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 89us/sample - loss: 0.2194 - mean_absolute_error: 0.2195 - mean_squared_error: 0.0867 - val_loss: 0.1810 - val_mean_absolute_error: 0.1809 - val_mean_squared_error: 0.0612

Epoch 6/500

10400/10471 [=====>.] - ETA: 0s - loss: 0.2140 - mean_absolute_error: 0.2140 - mean_squared_error: 0.0843

Epoch 00006: val_loss did not improve from 0.18095

10471/10471 [=====] - 1s 85us/sample - loss: 0.2138 - mean_absolute_error: 0.2138 - mean_squared_error: 0.0841 - val_loss: 0.2177 - val_mean_absolute_error: 0.2177 - val_mean_squared_error: 0.0777

Epoch 7/500

9984/10471 [=====>..] - ETA: 0s - loss: 0.2143 - mean_absolute_error: 0.2143 - mean_squared_error: 0.0852
Epoch 00007: val_loss improved from 0.18095 to 0.17884, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 92us/sample - loss: 0.2143 - mean_absolute_error: 0.2142 - mean_squared_error: 0.0848 - val_loss: 0.1788 - val_mean_absolute_error: 0.1788 - val_mean_squared_error: 0.0616
Epoch 8/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.2129 - mean_absolute_error: 0.2129 - mean_squared_error: 0.0846
Epoch 00008: val_loss did not improve from 0.17884
10471/10471 [=====] - 1s 87us/sample - loss: 0.2128 - mean_absolute_error: 0.2129 - mean_squared_error: 0.0848 - val_loss: 0.1817 - val_mean_absolute_error: 0.1817 - val_mean_squared_error: 0.0614
Epoch 9/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.2095 - mean_absolute_error: 0.2095 - mean_squared_error: 0.0829
Epoch 00009: val_loss did not improve from 0.17884
10471/10471 [=====] - 1s 88us/sample - loss: 0.2092 - mean_absolute_error: 0.2090 - mean_squared_error: 0.0825 - val_loss: 0.1935 - val_mean_absolute_error: 0.1935 - val_mean_squared_error: 0.0699
Epoch 10/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.2083 - mean_absolute_error: 0.2083 - mean_squared_error: 0.0824
Epoch 00010: val_loss improved from 0.17884 to 0.17604, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.2082 - mean_absolute_error: 0.2080 - mean_squared_error: 0.0821 - val_loss: 0.1760 - val_mean_absolute_error: 0.1760 - val_mean_squared_error: 0.0607
Epoch 11/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.2083 - mean_absolute_error: 0.2083 - mean_squared_error: 0.0816
Epoch 00011: val_loss did not improve from 0.17604
10471/10471 [=====] - 1s 85us/sample - loss: 0.2083 - mean_absolute_error: 0.2084 - mean_squared_error: 0.0817 - val_loss: 0.1783 - val_mean_absolute_error: 0.1783 - val_mean_squared_error: 0.0598
Epoch 12/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2046 - mean_absolute_error: 0.2046 - mean_squared_error: 0.0796
Epoch 00012: val_loss improved from 0.17604 to 0.17274, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.2045 - mean_absolute_error: 0.2044 - mean_squared_error: 0.0793 - val_loss: 0.1727 - val_mean_absolute_error: 0.1727 - val_mean_squared_error: 0.0582
Epoch 13/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.2063 - mean_absolute_error: 0.2063 - mean_squared_error: 0.0819
Epoch 00013: val_loss did not improve from 0.17274
10471/10471 [=====] - 1s 86us/sample - loss: 0.2062 - mean_absolute_error: 0.2063 - mean_squared_error: 0.0816 - val_loss: 0.1735 - val_mean_absolute_error: 0.1734 - val_mean_squared_error: 0.0588
Epoch 14/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.2019 - mean_absolute_error: 0.2019 - mean_squared_error: 0.0765
Epoch 00014: val_loss did not improve from 0.17274
10471/10471 [=====] - 1s 86us/sample - loss: 0.2016 - mean_absolute_error: 0.2018 - mean_squared_error: 0.0764 - val_loss: 0.1809 - val_mean_absolute_error: 0.1809 - val_mean_squared_error: 0.0618
Epoch 15/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.2023 - mean_absolute_error: 0.2023 - mean_squared_error: 0.0781

```
Epoch 00015: val_loss did not improve from 0.17274
10471/10471 [=====] - 1s 85us/sample - loss: 0.2022 - mean_absolute_error: 0.2021 - mean_squared_error: 0.0778 - val_loss: 0.2109 - val_mean_absolute_error: 0.2110 - val_mean_squared_error: 0.0768
Epoch 16/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2016 - mean_absolute_error: 0.2016 - mean_squared_error: 0.0781
Epoch 00016: val_loss did not improve from 0.17274
10471/10471 [=====] - 1s 86us/sample - loss: 0.2014 - mean_absolute_error: 0.2017 - mean_squared_error: 0.0784 - val_loss: 0.1745 - val_mean_absolute_error: 0.1744 - val_mean_squared_error: 0.0594
Epoch 17/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.2005 - mean_absolute_error: 0.2005 - mean_squared_error: 0.0773
Epoch 00017: val_loss improved from 0.17274 to 0.16638, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.2008 - mean_absolute_error: 0.2006 - mean_squared_error: 0.0772 - val_loss: 0.1664 - val_mean_absolute_error: 0.1664 - val_mean_squared_error: 0.0539
Epoch 18/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2008 - mean_absolute_error: 0.2008 - mean_squared_error: 0.0768
Epoch 00018: val_loss did not improve from 0.16638
10471/10471 [=====] - 1s 86us/sample - loss: 0.2005 - mean_absolute_error: 0.2006 - mean_squared_error: 0.0764 - val_loss: 0.1822 - val_mean_absolute_error: 0.1822 - val_mean_squared_error: 0.0632
Epoch 19/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2003 - mean_absolute_error: 0.2003 - mean_squared_error: 0.0772
Epoch 00019: val_loss did not improve from 0.16638
10471/10471 [=====] - 1s 85us/sample - loss: 0.1998 - mean_absolute_error: 0.1999 - mean_squared_error: 0.0768 - val_loss: 0.1830 - val_mean_absolute_error: 0.1831 - val_mean_squared_error: 0.0626
Epoch 20/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1994 - mean_absolute_error: 0.1994 - mean_squared_error: 0.0770
Epoch 00020: val_loss did not improve from 0.16638
10471/10471 [=====] - 1s 85us/sample - loss: 0.1987 - mean_absolute_error: 0.1986 - mean_squared_error: 0.0763 - val_loss: 0.1860 - val_mean_absolute_error: 0.1860 - val_mean_squared_error: 0.0633
Epoch 21/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1999 - mean_absolute_error: 0.1999 - mean_squared_error: 0.0758
Epoch 00021: val_loss did not improve from 0.16638
10471/10471 [=====] - 1s 85us/sample - loss: 0.1999 - mean_absolute_error: 0.2002 - mean_squared_error: 0.0761 - val_loss: 0.1843 - val_mean_absolute_error: 0.1843 - val_mean_squared_error: 0.0635
Epoch 22/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1967 - mean_absolute_error: 0.1967 - mean_squared_error: 0.0735
Epoch 00022: val_loss improved from 0.16638 to 0.16499, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 88us/sample - loss: 0.1969 - mean_absolute_error: 0.1967 - mean_squared_error: 0.0736 - val_loss: 0.1650 - val_mean_absolute_error: 0.1649 - val_mean_squared_error: 0.0534
Epoch 23/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1961 - mean_absolute_error: 0.1961 - mean_squared_error: 0.0743
Epoch 00023: val_loss improved from 0.16499 to 0.16307, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 89us/sample - loss: 0.1961 - mean_absolute_error:
```

lute_error: 0.1960 - mean_squared_error: 0.0742 - val_loss: 0.1631 - val_mean_absolute_error: 0.1630 - val_mean_squared_error: 0.0533

Epoch 24/500

10208/10471 [=====>.] - ETA: 0s - loss: 0.1981 - mean_absolute_error: 0.1981 - mean_squared_error: 0.0754

Epoch 00024: val_loss did not improve from 0.16307

10471/10471 [=====] - 1s 86us/sample - loss: 0.1978 - mean_absolute_error: 0.1980 - mean_squared_error: 0.0755 - val_loss: 0.1887 - val_mean_absolute_error: 0.1887 - val_mean_squared_error: 0.0662

Epoch 25/500

9984/10471 [=====>..] - ETA: 0s - loss: 0.1963 - mean_absolute_error: 0.1963 - mean_squared_error: 0.0749

Epoch 00025: val_loss did not improve from 0.16307

10471/10471 [=====] - 1s 88us/sample - loss: 0.1959 - mean_absolute_error: 0.1957 - mean_squared_error: 0.0745 - val_loss: 0.1744 - val_mean_absolute_error: 0.1744 - val_mean_squared_error: 0.0581

Epoch 26/500

10368/10471 [=====>.] - ETA: 0s - loss: 0.1978 - mean_absolute_error: 0.1978 - mean_squared_error: 0.0756

Epoch 00026: val_loss did not improve from 0.16307

10471/10471 [=====] - 1s 84us/sample - loss: 0.1976 - mean_absolute_error: 0.1975 - mean_squared_error: 0.0754 - val_loss: 0.2099 - val_mean_absolute_error: 0.2100 - val_mean_squared_error: 0.0783

Epoch 27/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.1943 - mean_absolute_error: 0.1943 - mean_squared_error: 0.0741

Epoch 00027: val_loss did not improve from 0.16307

10471/10471 [=====] - 1s 84us/sample - loss: 0.1943 - mean_absolute_error: 0.1943 - mean_squared_error: 0.0740 - val_loss: 0.1654 - val_mean_absolute_error: 0.1653 - val_mean_squared_error: 0.0551

Epoch 28/500

9888/10471 [=====>..] - ETA: 0s - loss: 0.1959 - mean_absolute_error: 0.1959 - mean_squared_error: 0.0760

Epoch 00028: val_loss did not improve from 0.16307

10471/10471 [=====] - 1s 83us/sample - loss: 0.1962 - mean_absolute_error: 0.1961 - mean_squared_error: 0.0759 - val_loss: 0.1721 - val_mean_absolute_error: 0.1720 - val_mean_squared_error: 0.0584

Epoch 29/500

9856/10471 [=====>..] - ETA: 0s - loss: 0.1941 - mean_absolute_error: 0.1941 - mean_squared_error: 0.0736

Epoch 00029: val_loss did not improve from 0.16307

10471/10471 [=====] - 1s 84us/sample - loss: 0.1938 - mean_absolute_error: 0.1937 - mean_squared_error: 0.0732 - val_loss: 0.1758 - val_mean_absolute_error: 0.1758 - val_mean_squared_error: 0.0594

Epoch 30/500

10432/10471 [=====>.] - ETA: 0s - loss: 0.1921 - mean_absolute_error: 0.1921 - mean_squared_error: 0.0718

Epoch 00030: val_loss did not improve from 0.16307

10471/10471 [=====] - 1s 84us/sample - loss: 0.1922 - mean_absolute_error: 0.1923 - mean_squared_error: 0.0720 - val_loss: 0.1765 - val_mean_absolute_error: 0.1765 - val_mean_squared_error: 0.0601

Epoch 31/500

10208/10471 [=====>.] - ETA: 0s - loss: 0.1929 - mean_absolute_error: 0.1929 - mean_squared_error: 0.0725

Epoch 00031: val_loss did not improve from 0.16307

10471/10471 [=====] - 1s 79us/sample - loss: 0.1929 - mean_absolute_error: 0.1927 - mean_squared_error: 0.0721 - val_loss: 0.2032 - val_mean_absolute_error: 0.2033 - val_mean_squared_error: 0.0725

Epoch 32/500

10368/10471 [=====>.] - ETA: 0s - loss: 0.1933 - mean_absolute_error: 0.1933 - mean_squared_error: 0.0734

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Epoch 00032: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 78us/sample - loss: 0.1932 - mean_absolute_error: 0.1934 - mean_squared_error: 0.0736 - val_loss: 0.1677 - val_mean_absolute_error: 0.1677 - val_mean_squared_error: 0.0552
Epoch 33/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1909 - mean_absolute_error: 0.1909 - mean_squared_error: 0.0716
Epoch 00033: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 80us/sample - loss: 0.1909 - mean_absolute_error: 0.1911 - mean_squared_error: 0.0721 - val_loss: 0.1860 - val_mean_absolute_error: 0.1860 - val_mean_squared_error: 0.0659
Epoch 34/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1928 - mean_absolute_error: 0.1928 - mean_squared_error: 0.0726
Epoch 00034: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 87us/sample - loss: 0.1925 - mean_absolute_error: 0.1926 - mean_squared_error: 0.0725 - val_loss: 0.1771 - val_mean_absolute_error: 0.1771 - val_mean_squared_error: 0.0607
Epoch 35/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1895 - mean_absolute_error: 0.1895 - mean_squared_error: 0.0702
Epoch 00035: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 83us/sample - loss: 0.1895 - mean_absolute_error: 0.1895 - mean_squared_error: 0.0701 - val_loss: 0.1742 - val_mean_absolute_error: 0.1742 - val_mean_squared_error: 0.0594
Epoch 36/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1908 - mean_absolute_error: 0.1908 - mean_squared_error: 0.0719
Epoch 00036: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 83us/sample - loss: 0.1915 - mean_absolute_error: 0.1916 - mean_squared_error: 0.0724 - val_loss: 0.1838 - val_mean_absolute_error: 0.1838 - val_mean_squared_error: 0.0626
Epoch 37/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1910 - mean_absolute_error: 0.1910 - mean_squared_error: 0.0735
Epoch 00037: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 85us/sample - loss: 0.1910 - mean_absolute_error: 0.1910 - mean_squared_error: 0.0733 - val_loss: 0.1881 - val_mean_absolute_error: 0.1882 - val_mean_squared_error: 0.0641
Epoch 38/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1900 - mean_absolute_error: 0.1900 - mean_squared_error: 0.0715
Epoch 00038: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 85us/sample - loss: 0.1900 - mean_absolute_error: 0.1902 - mean_squared_error: 0.0714 - val_loss: 0.1780 - val_mean_absolute_error: 0.1780 - val_mean_squared_error: 0.0611
Epoch 39/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1883 - mean_absolute_error: 0.1883 - mean_squared_error: 0.0706
Epoch 00039: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 83us/sample - loss: 0.1888 - mean_absolute_error: 0.1889 - mean_squared_error: 0.0709 - val_loss: 0.1910 - val_mean_absolute_error: 0.1910 - val_mean_squared_error: 0.0656
Epoch 40/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1900 - mean_absolute_error: 0.1900 - mean_squared_error: 0.0710
Epoch 00040: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 86us/sample - loss: 0.1901 - mean_absolute_error: 0.1903 - mean_squared_error: 0.0711 - val_loss: 0.1817 - val_mean_absolute_error: 0.1816 - val_mean_squared_error: 0.0636
Epoch 41/500
```

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10400/10471 [=====>.] - ETA: 0s - loss: 0.1884 - mean_absolute_error: 0.1884 - mean_squared_error: 0.0700
Epoch 00041: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 84us/sample - loss: 0.1885 - mean_absolute_error: 0.1884 - mean_squared_error: 0.0699 - val_loss: 0.1859 - val_mean_absolute_error: 0.1860 - val_mean_squared_error: 0.0640
Epoch 42/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1893 - mean_absolute_error: 0.1893 - mean_squared_error: 0.0720
Epoch 00042: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 86us/sample - loss: 0.1887 - mean_absolute_error: 0.1885 - mean_squared_error: 0.0714 - val_loss: 0.1650 - val_mean_absolute_error: 0.1650 - val_mean_squared_error: 0.0562
Epoch 43/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1868 - mean_absolute_error: 0.1868 - mean_squared_error: 0.0695
Epoch 00043: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 84us/sample - loss: 0.1872 - mean_absolute_error: 0.1870 - mean_squared_error: 0.0695 - val_loss: 0.1870 - val_mean_absolute_error: 0.1870 - val_mean_squared_error: 0.0635
Epoch 44/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1859 - mean_absolute_error: 0.1859 - mean_squared_error: 0.0689
Epoch 00044: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 84us/sample - loss: 0.1858 - mean_absolute_error: 0.1856 - mean_squared_error: 0.0687 - val_loss: 0.1931 - val_mean_absolute_error: 0.1931 - val_mean_squared_error: 0.0684
Epoch 45/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1872 - mean_absolute_error: 0.1872 - mean_squared_error: 0.0698
Epoch 00045: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 85us/sample - loss: 0.1868 - mean_absolute_error: 0.1868 - mean_squared_error: 0.0696 - val_loss: 0.1795 - val_mean_absolute_error: 0.1794 - val_mean_squared_error: 0.0633
Epoch 46/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1876 - mean_absolute_error: 0.1876 - mean_squared_error: 0.0703
Epoch 00046: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 83us/sample - loss: 0.1876 - mean_absolute_error: 0.1877 - mean_squared_error: 0.0703 - val_loss: 0.1868 - val_mean_absolute_error: 0.1868 - val_mean_squared_error: 0.0658
Epoch 47/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1891 - mean_absolute_error: 0.1891 - mean_squared_error: 0.0708
Epoch 00047: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 84us/sample - loss: 0.1889 - mean_absolute_error: 0.1887 - mean_squared_error: 0.0705 - val_loss: 0.1847 - val_mean_absolute_error: 0.1847 - val_mean_squared_error: 0.0634
Epoch 48/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1876 - mean_absolute_error: 0.1876 - mean_squared_error: 0.0708Restoring model weights from the end of the best epoch.

Epoch 00048: val_loss did not improve from 0.16307
10471/10471 [=====] - 1s 85us/sample - loss: 0.1874 - mean_absolute_error: 0.1874 - mean_squared_error: 0.0707 - val_loss: 0.1876 - val_mean_absolute_error: 0.1876 - val_mean_squared_error: 0.0663
Epoch 00048: early stopping
MAE: 0.1630254
RMSE: 0.23085381
Adding initial Dense layers with 1024
```

```

Adding Dense layer with 512
Adding Dense layer with 256
Adding Dense layer with 128
Adding Dense layer with 64
Adding Dense layer with 32
Adding last layer with 16
Outputting predictive model - Tabular
Model: "model_93"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_94 (InputLayer)	[(None, 61)]	0
dense_692 (Dense)	(None, 1024)	63488
dense_693 (Dense)	(None, 512)	524800
dense_694 (Dense)	(None, 256)	131328
dense_695 (Dense)	(None, 128)	32896
dense_696 (Dense)	(None, 64)	8256
dense_697 (Dense)	(None, 32)	2080
dense_698 (Dense)	(None, 16)	528
dropout_17 (Dropout)	(None, 16)	0
dense_699 (Dense)	(None, 1)	17
<hr/>		
Total params: 763,393		
Trainable params: 763,393		
Non-trainable params: 0		

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
9984/10471 [=====>..] - ETA: 0s - loss: 2.8910 - mean_absolute_error: 2.8910 - mean_squared_error: 14.1561
Epoch 00001: val_loss improved from inf to 0.93538, saving model to best_basic_model.hdf5
10471/10471 [=====] - 2s 169us/sample - loss: 2.8590 - mean_absolute_error: 2.8585 - mean_squared_error: 13.8461 - val_loss: 0.9354 - val_mean_absolute_error: 0.9356 - val_mean_squared_error: 1.2705
Epoch 2/500
10208/10471 [=====>..] - ETA: 0s - loss: 1.7893 - mean_absolute_error: 1.7893 - mean_squared_error: 5.1172
Epoch 00002: val_loss improved from 0.93538 to 0.38083, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 78us/sample - loss: 1.7786 - mean_absolute_error: 1.7786 - mean_squared_error: 5.0607 - val_loss: 0.3808 - val_mean_absolute_error: 0.3809 - val_mean_squared_error: 0.2407
Epoch 3/500
10112/10471 [=====>..] - ETA: 0s - loss: 1.1225 - mean_absolute_error: 1.1225 - mean_squared_error: 2.0226
Epoch 00003: val_loss improved from 0.38083 to 0.23963, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 1.1114 - mean_absolute_error: 1.1103 - mean_squared_error: 1.9834 - val_loss: 0.2396 - val_mean_absolute_error:

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rror: 0.2398 - val_mean_squared_error: 0.1054
Epoch 4/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.5734 - mean_absolute_error: 0.5734 - mean_squared_error: 0.5502
Epoch 00004: val_loss improved from 0.23963 to 0.19778, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 0.5641 - mean_absolute_error: 0.5635 - mean_squared_error: 0.5352 - val_loss: 0.1978 - val_mean_absolute_error: 0.1978 - val_mean_squared_error: 0.0714
Epoch 5/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.2330 - mean_absolute_error: 0.2330 - mean_squared_error: 0.0955
Epoch 00005: val_loss improved from 0.19778 to 0.18314, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 79us/sample - loss: 0.2304 - mean_absolute_error: 0.2303 - mean_squared_error: 0.0936 - val_loss: 0.1831 - val_mean_absolute_error: 0.1832 - val_mean_squared_error: 0.0623
Epoch 6/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1801 - mean_absolute_error: 0.1801 - mean_squared_error: 0.0616
Epoch 00006: val_loss improved from 0.18314 to 0.16792, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 0.1798 - mean_absolute_error: 0.1796 - mean_squared_error: 0.0613 - val_loss: 0.1679 - val_mean_absolute_error: 0.1679 - val_mean_squared_error: 0.0549
Epoch 7/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1717 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0564
Epoch 00007: val_loss improved from 0.16792 to 0.15392, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 0.1716 - mean_absolute_error: 0.1715 - mean_squared_error: 0.0565 - val_loss: 0.1539 - val_mean_absolute_error: 0.1539 - val_mean_squared_error: 0.0484
Epoch 8/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1671 - mean_absolute_error: 0.1671 - mean_squared_error: 0.0555
Epoch 00008: val_loss did not improve from 0.15392
10471/10471 [=====] - 1s 77us/sample - loss: 0.1677 - mean_absolute_error: 0.1677 - mean_squared_error: 0.0559 - val_loss: 0.1711 - val_mean_absolute_error: 0.1712 - val_mean_squared_error: 0.0571
Epoch 9/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1643 - mean_absolute_error: 0.1643 - mean_squared_error: 0.0539
Epoch 00009: val_loss did not improve from 0.15392
10471/10471 [=====] - 1s 77us/sample - loss: 0.1636 - mean_absolute_error: 0.1635 - mean_squared_error: 0.0532 - val_loss: 0.1597 - val_mean_absolute_error: 0.1597 - val_mean_squared_error: 0.0500
Epoch 10/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1598 - mean_absolute_error: 0.1598 - mean_squared_error: 0.0513
Epoch 00010: val_loss improved from 0.15392 to 0.14748, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 0.1597 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0514 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0444
Epoch 11/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1582 - mean_absolute_error: 0.1582 - mean_squared_error: 0.0507
Epoch 00011: val_loss did not improve from 0.14748
10471/10471 [=====] - 1s 78us/sample - loss: 0.1580 - mean_absolute_error: 0.1580 - mean_squared_error: 0.0505 - val_loss: 0.1566 - val_mean_absolute_error: 0.1566 - val_mean_squared_error: 0.0444
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rror: 0.1567 - val_mean_squared_error: 0.0482
Epoch 12/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1558 - mean_absolute_error: 0.1558 - mean_squared_error: 0.0494
Epoch 00012: val_loss did not improve from 0.14748
10471/10471 [=====] - 1s 78us/sample - loss: 0.1566 - mean_absolute_error: 0.1567 - mean_squared_error: 0.0498 - val_loss: 0.1493 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0463
Epoch 13/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1560 - mean_absolute_error: 0.1560 - mean_squared_error: 0.0486
Epoch 00013: val_loss did not improve from 0.14748
10471/10471 [=====] - 1s 76us/sample - loss: 0.1562 - mean_absolute_error: 0.1561 - mean_squared_error: 0.0489 - val_loss: 0.1556 - val_mean_absolute_error: 0.1556 - val_mean_squared_error: 0.0493
Epoch 14/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1546 - mean_absolute_error: 0.1546 - mean_squared_error: 0.0488
Epoch 00014: val_loss did not improve from 0.14748
10471/10471 [=====] - 1s 76us/sample - loss: 0.1548 - mean_absolute_error: 0.1549 - mean_squared_error: 0.0493 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0457
Epoch 15/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1521 - mean_absolute_error: 0.1521 - mean_squared_error: 0.0477
Epoch 00015: val_loss improved from 0.14748 to 0.14647, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 79us/sample - loss: 0.1523 - mean_absolute_error: 0.1526 - mean_squared_error: 0.0481 - val_loss: 0.1465 - val_mean_absolute_error: 0.1465 - val_mean_squared_error: 0.0441
Epoch 16/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1508 - mean_absolute_error: 0.1508 - mean_squared_error: 0.0474
Epoch 00016: val_loss improved from 0.14647 to 0.14326, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 0.1499 - mean_absolute_error: 0.1500 - mean_squared_error: 0.0468 - val_loss: 0.1433 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0437
Epoch 17/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1466 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0452
Epoch 00017: val_loss improved from 0.14326 to 0.14252, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 81us/sample - loss: 0.1467 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0450 - val_loss: 0.1425 - val_mean_absolute_error: 0.1425 - val_mean_squared_error: 0.0418
Epoch 18/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1480 - mean_absolute_error: 0.1480 - mean_squared_error: 0.0460
Epoch 00018: val_loss did not improve from 0.14252
10471/10471 [=====] - 1s 76us/sample - loss: 0.1483 - mean_absolute_error: 0.1483 - mean_squared_error: 0.0460 - val_loss: 0.1467 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0447
Epoch 19/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1492 - mean_absolute_error: 0.1492 - mean_squared_error: 0.0463
Epoch 00019: val_loss did not improve from 0.14252
10471/10471 [=====] - 1s 79us/sample - loss: 0.1493 - mean_absolute_error: 0.1493 - mean_squared_error: 0.0462 - val_loss: 0.1515 - val_mean_absolute_error: 0.1516 - val_mean_squared_error: 0.0458
Epoch 20/500
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10240/10471 [=====>.] - ETA: 0s - loss: 0.1454 - mean_absolute_error: 0.1454 - mean_squared_error: 0.0437
Epoch 00020: val_loss did not improve from 0.14252
10471/10471 [=====] - 1s 69us/sample - loss: 0.1453 - mean_absolute_error: 0.1453 - mean_squared_error: 0.0436 - val_loss: 0.1470 - val_mean_absolute_error: 0.1471 - val_mean_squared_error: 0.0444
Epoch 21/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1446 - mean_absolute_error: 0.1446 - mean_squared_error: 0.0444
Epoch 00021: val_loss did not improve from 0.14252
10471/10471 [=====] - 1s 71us/sample - loss: 0.1443 - mean_absolute_error: 0.1446 - mean_squared_error: 0.0442 - val_loss: 0.1462 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0430
Epoch 22/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1424 - mean_absolute_error: 0.1424 - mean_squared_error: 0.0433
Epoch 00022: val_loss did not improve from 0.14252
10471/10471 [=====] - 1s 71us/sample - loss: 0.1419 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0429 - val_loss: 0.1438 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0427
Epoch 23/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1429 - mean_absolute_error: 0.1429 - mean_squared_error: 0.0430
Epoch 00023: val_loss improved from 0.14252 to 0.14216, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 0.1424 - mean_absolute_error: 0.1423 - mean_squared_error: 0.0427 - val_loss: 0.1422 - val_mean_absolute_error: 0.1421 - val_mean_squared_error: 0.0424
Epoch 24/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1403 - mean_absolute_error: 0.1403 - mean_squared_error: 0.0419
Epoch 00024: val_loss did not improve from 0.14216
10471/10471 [=====] - 1s 77us/sample - loss: 0.1404 - mean_absolute_error: 0.1402 - mean_squared_error: 0.0420 - val_loss: 0.1507 - val_mean_absolute_error: 0.1506 - val_mean_squared_error: 0.0474
Epoch 25/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1404 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0417
Epoch 00025: val_loss did not improve from 0.14216
10471/10471 [=====] - 1s 78us/sample - loss: 0.1408 - mean_absolute_error: 0.1408 - mean_squared_error: 0.0420 - val_loss: 0.1486 - val_mean_absolute_error: 0.1486 - val_mean_squared_error: 0.0446
Epoch 26/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0419
Epoch 00026: val_loss did not improve from 0.14216
10471/10471 [=====] - 1s 75us/sample - loss: 0.1398 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0419 - val_loss: 0.1682 - val_mean_absolute_error: 0.1682 - val_mean_squared_error: 0.0534
Epoch 27/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1404 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0416
Epoch 00027: val_loss did not improve from 0.14216
10471/10471 [=====] - 1s 75us/sample - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0420 - val_loss: 0.1445 - val_mean_absolute_error: 0.1445 - val_mean_squared_error: 0.0437
Epoch 28/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1372 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0402
Epoch 00028: val_loss did not improve from 0.14216
10471/10471 [=====] - 1s 75us/sample - loss: 0.1375 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0401
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lute_error: 0.1375 - mean_squared_error: 0.0404 - val_loss: 0.1497 - val_mean_absolute_e
rror: 0.1497 - val_mean_squared_error: 0.0450
Epoch 29/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1378 - mean_absolute_error: 0.1378 - mean_squared_error: 0.0397
Epoch 00029: val_loss improved from 0.14216 to 0.14051, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0399 - val_loss: 0.1405 - val_mean_absolute_error: 0.1405 - val_mean_squared_error: 0.0409
Epoch 30/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1355 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0395
Epoch 00030: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 76us/sample - loss: 0.1356 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0397 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0435
Epoch 31/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1352 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0392
Epoch 00031: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 78us/sample - loss: 0.1354 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0394 - val_loss: 0.1582 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0486
Epoch 32/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0394
Epoch 00032: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 76us/sample - loss: 0.1349 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0390 - val_loss: 0.1479 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0449
Epoch 33/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1331 - mean_absolute_error: 0.1331 - mean_squared_error: 0.0376
Epoch 00033: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 75us/sample - loss: 0.1330 - mean_absolute_error: 0.1329 - mean_squared_error: 0.0375 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0444
Epoch 34/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1319 - mean_absolute_error: 0.1319 - mean_squared_error: 0.0376
Epoch 00034: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 75us/sample - loss: 0.1317 - mean_absolute_error: 0.1316 - mean_squared_error: 0.0374 - val_loss: 0.1515 - val_mean_absolute_error: 0.1514 - val_mean_squared_error: 0.0458
Epoch 35/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1320 - mean_absolute_error: 0.1320 - mean_squared_error: 0.0375
Epoch 00035: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 75us/sample - loss: 0.1318 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0372 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0454
Epoch 36/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1306 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0373
Epoch 00036: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 75us/sample - loss: 0.1302 - mean_absolute_error: 0.1302 - mean_squared_error: 0.0370 - val_loss: 0.1542 - val_mean_absolute_error: 0.1542 - val_mean_squared_error: 0.0479
Epoch 37/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1302 - mean_absolute_error:
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ror: 0.1302 - mean_squared_error: 0.0369
Epoch 00037: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 76us/sample - loss: 0.1300 - mean_absolute_error: 0.1302 - mean_squared_error: 0.0369 - val_loss: 0.1444 - val_mean_absolute_error: 0.1443 - val_mean_squared_error: 0.0438
Epoch 38/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1267 - mean_absolute_error: 0.1267 - mean_squared_error: 0.0343
Epoch 00038: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 76us/sample - loss: 0.1271 - mean_absolute_error: 0.1272 - mean_squared_error: 0.0347 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0434
Epoch 39/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1268 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0348
Epoch 00039: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 77us/sample - loss: 0.1266 - mean_absolute_error: 0.1265 - mean_squared_error: 0.0346 - val_loss: 0.1588 - val_mean_absolute_error: 0.1588 - val_mean_squared_error: 0.0499
Epoch 40/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1268 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0345
Epoch 00040: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 75us/sample - loss: 0.1270 - mean_absolute_error: 0.1273 - mean_squared_error: 0.0350 - val_loss: 0.1598 - val_mean_absolute_error: 0.1598 - val_mean_squared_error: 0.0508
Epoch 41/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1266 - mean_absolute_error: 0.1266 - mean_squared_error: 0.0344
Epoch 00041: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 74us/sample - loss: 0.1266 - mean_absolute_error: 0.1266 - mean_squared_error: 0.0344 - val_loss: 0.1530 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0479
Epoch 42/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1239 - mean_absolute_error: 0.1239 - mean_squared_error: 0.0334
Epoch 00042: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 75us/sample - loss: 0.1238 - mean_absolute_error: 0.1238 - mean_squared_error: 0.0332 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0438
Epoch 43/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1250 - mean_absolute_error: 0.1250 - mean_squared_error: 0.0341
Epoch 00043: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 75us/sample - loss: 0.1253 - mean_absolute_error: 0.1254 - mean_squared_error: 0.0345 - val_loss: 0.1465 - val_mean_absolute_error: 0.1465 - val_mean_squared_error: 0.0438
Epoch 44/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1248 - mean_absolute_error: 0.1248 - mean_squared_error: 0.0338
Epoch 00044: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 76us/sample - loss: 0.1251 - mean_absolute_error: 0.1253 - mean_squared_error: 0.0341 - val_loss: 0.1457 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0432
Epoch 45/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1229 - mean_absolute_error: 0.1229 - mean_squared_error: 0.0325
Epoch 00045: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 74us/sample - loss: 0.1230 - mean_absolute_error: 0.1228 - mean_squared_error: 0.0325 - val_loss: 0.1559 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0486
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Epoch 46/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1237 - mean_absolute_error: 0.1237 - mean_squared_error: 0.0335
Epoch 00046: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 87us/sample - loss: 0.1238 - mean_absolute_error: 0.1237 - mean_squared_error: 0.0335 - val_loss: 0.1449 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0436
Epoch 47/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1209 - mean_absolute_error: 0.1209 - mean_squared_error: 0.0321
Epoch 00047: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 81us/sample - loss: 0.1215 - mean_absolute_error: 0.1214 - mean_squared_error: 0.0325 - val_loss: 0.1564 - val_mean_absolute_error: 0.1564 - val_mean_squared_error: 0.0492
Epoch 48/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1209 - mean_absolute_error: 0.1209 - mean_squared_error: 0.0322
Epoch 00048: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 78us/sample - loss: 0.1216 - mean_absolute_error: 0.1217 - mean_squared_error: 0.0322 - val_loss: 0.1609 - val_mean_absolute_error: 0.1608 - val_mean_squared_error: 0.0511
Epoch 49/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1212 - mean_absolute_error: 0.1212 - mean_squared_error: 0.0314
Epoch 00049: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 77us/sample - loss: 0.1210 - mean_absolute_error: 0.1208 - mean_squared_error: 0.0313 - val_loss: 0.1544 - val_mean_absolute_error: 0.1544 - val_mean_squared_error: 0.0476
Epoch 50/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1191 - mean_absolute_error: 0.1191 - mean_squared_error: 0.0316
Epoch 00050: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 76us/sample - loss: 0.1192 - mean_absolute_error: 0.1192 - mean_squared_error: 0.0315 - val_loss: 0.1560 - val_mean_absolute_error: 0.1560 - val_mean_squared_error: 0.0492
Epoch 51/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1196 - mean_absolute_error: 0.1196 - mean_squared_error: 0.0311
Epoch 00051: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 76us/sample - loss: 0.1197 - mean_absolute_error: 0.1201 - mean_squared_error: 0.0316 - val_loss: 0.1475 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0436
Epoch 52/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1196 - mean_absolute_error: 0.1196 - mean_squared_error: 0.0305
Epoch 00052: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 75us/sample - loss: 0.1195 - mean_absolute_error: 0.1193 - mean_squared_error: 0.0304 - val_loss: 0.1612 - val_mean_absolute_error: 0.1612 - val_mean_squared_error: 0.0500
Epoch 53/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1182 - mean_absolute_error: 0.1182 - mean_squared_error: 0.0303
Epoch 00053: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 76us/sample - loss: 0.1182 - mean_absolute_error: 0.1182 - mean_squared_error: 0.0302 - val_loss: 0.1565 - val_mean_absolute_error: 0.1564 - val_mean_squared_error: 0.0486
Epoch 54/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.1166 - mean_absolute_error: 0.1166 - mean_squared_error: 0.0295Restoring model weights from the end of the best epoch.

```

Epoch 00054: val_loss did not improve from 0.14051
10471/10471 [=====] - 1s 79us/sample - loss: 0.1166 - mean_absolute_error: 0.1166 - mean_squared_error: 0.0295 - val_loss: 0.1508 - val_mean_absolute_error: 0.1508 - val_mean_squared_error: 0.0450
Epoch 00054: early stopping
MAE: 0.14049438
RMSE: 0.20218296
Adding initial Dense layers with 512
Adding Dense layer with 256
Adding Dense layer with 128
Adding Dense layer with 64
Adding Dense layer with 32
Adding Dense layer with 16
Adding Dense layer with 8
Adding last layer with 4
Outputting predictive model - Tabular
Model: "model_94"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_95 (InputLayer)	[(None, 61)]	0
dense_700 (Dense)	(None, 512)	31744
dense_701 (Dense)	(None, 256)	131328
dense_702 (Dense)	(None, 128)	32896
dense_703 (Dense)	(None, 64)	8256
dense_704 (Dense)	(None, 32)	2080
dense_705 (Dense)	(None, 16)	528
dense_706 (Dense)	(None, 8)	136
dense_707 (Dense)	(None, 4)	36
dropout_18 (Dropout)	(None, 4)	0
dense_708 (Dense)	(None, 1)	5
<hr/>		
Total params: 207,009		
Trainable params: 207,009		
Non-trainable params: 0		

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10208/10471 [=====>.] - ETA: 0s - loss: 4.0017 - mean_absolute_error: 4.0017 - mean_squared_error: 26.1999

Epoch 00001: val_loss improved from inf to 0.71363, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 135us/sample - loss: 3.9746 - mean_absolute_error: 3.9738 - mean_squared_error: 25.8593 - val_loss: 0.7136 - val_mean_absolute_error: 0.7136 - val_mean_squared_error: 0.8239

Epoch 2/500

10208/10471 [=====>.] - ETA: 0s - loss: 2.2608 - mean_absolute_error: 2.2608 - mean_squared_error: 8.2544

Epoch 00002: val_loss did not improve from 0.71363

```
10471/10471 [=====] - 1s 80us/sample - loss: 2.2431 - mean_absolute_error: 2.2429 - mean_squared_error: 8.1433 - val_loss: 1.2949 - val_mean_absolute_error: 1.2953 - val_mean_squared_error: 1.8316
Epoch 3/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.7933 - mean_absolute_error: 0.7933 - mean_squared_error: 1.1803
Epoch 00003: val_loss improved from 0.71363 to 0.22842, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 83us/sample - loss: 0.7867 - mean_absolute_error: 0.7858 - mean_squared_error: 1.1647 - val_loss: 0.2284 - val_mean_absolute_error: 0.2284 - val_mean_squared_error: 0.0922
Epoch 4/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.2359 - mean_absolute_error: 0.2359 - mean_squared_error: 0.0988
Epoch 00004: val_loss improved from 0.22842 to 0.18622, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 83us/sample - loss: 0.2357 - mean_absolute_error: 0.2357 - mean_squared_error: 0.0988 - val_loss: 0.1862 - val_mean_absolute_error: 0.1862 - val_mean_squared_error: 0.0651
Epoch 5/500
9728/10471 [=====.>...] - ETA: 0s - loss: 0.2177 - mean_absolute_error: 0.2177 - mean_squared_error: 0.0872
Epoch 00005: val_loss improved from 0.18622 to 0.17873, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 76us/sample - loss: 0.2177 - mean_absolute_error: 0.2176 - mean_squared_error: 0.0876 - val_loss: 0.1787 - val_mean_absolute_error: 0.1787 - val_mean_squared_error: 0.0617
Epoch 6/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.2155 - mean_absolute_error: 0.2155 - mean_squared_error: 0.0872
Epoch 00006: val_loss improved from 0.17873 to 0.17851, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.2158 - mean_absolute_error: 0.2160 - mean_squared_error: 0.0875 - val_loss: 0.1785 - val_mean_absolute_error: 0.1785 - val_mean_squared_error: 0.0622
Epoch 7/500
10016/10471 [=====.>..] - ETA: 0s - loss: 0.2112 - mean_absolute_error: 0.2112 - mean_squared_error: 0.0824
Epoch 00007: val_loss did not improve from 0.17851
10471/10471 [=====] - 1s 76us/sample - loss: 0.2106 - mean_absolute_error: 0.2106 - mean_squared_error: 0.0820 - val_loss: 0.1877 - val_mean_absolute_error: 0.1877 - val_mean_squared_error: 0.0668
Epoch 8/500
10016/10471 [=====.>..] - ETA: 0s - loss: 0.2065 - mean_absolute_error: 0.2065 - mean_squared_error: 0.0797
Epoch 00008: val_loss improved from 0.17851 to 0.17162, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 86us/sample - loss: 0.2066 - mean_absolute_error: 0.2068 - mean_squared_error: 0.0799 - val_loss: 0.1716 - val_mean_absolute_error: 0.1716 - val_mean_squared_error: 0.0589
Epoch 9/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.2085 - mean_absolute_error: 0.2085 - mean_squared_error: 0.0818
Epoch 00009: val_loss did not improve from 0.17162
10471/10471 [=====] - 1s 79us/sample - loss: 0.2085 - mean_absolute_error: 0.2084 - mean_squared_error: 0.0816 - val_loss: 0.1954 - val_mean_absolute_error: 0.1955 - val_mean_squared_error: 0.0703
Epoch 10/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.2090 - mean_absolute_error: 0.2090 - mean_squared_error: 0.0828
Epoch 00010: val_loss did not improve from 0.17162
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10471/10471 [=====] - 1s 80us/sample - loss: 0.2089 - mean_absolute_error: 0.2089 - mean_squared_error: 0.0827 - val_loss: 0.1727 - val_mean_absolute_error: 0.1726 - val_mean_squared_error: 0.0588
Epoch 11/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.2079 - mean_absolute_error: 0.2079 - mean_squared_error: 0.0814
Epoch 00011: val_loss did not improve from 0.17162
10471/10471 [=====] - 1s 82us/sample - loss: 0.2068 - mean_absolute_error: 0.2065 - mean_squared_error: 0.0804 - val_loss: 0.2002 - val_mean_absolute_error: 0.2002 - val_mean_squared_error: 0.0724
Epoch 12/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.2041 - mean_absolute_error: 0.2041 - mean_squared_error: 0.0796
Epoch 00012: val_loss did not improve from 0.17162
10471/10471 [=====] - 1s 80us/sample - loss: 0.2042 - mean_absolute_error: 0.2043 - mean_squared_error: 0.0796 - val_loss: 0.1725 - val_mean_absolute_error: 0.1725 - val_mean_squared_error: 0.0585
Epoch 13/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.2066 - mean_absolute_error: 0.2066 - mean_squared_error: 0.0818
Epoch 00013: val_loss did not improve from 0.17162
10471/10471 [=====] - 1s 80us/sample - loss: 0.2061 - mean_absolute_error: 0.2060 - mean_squared_error: 0.0814 - val_loss: 0.1982 - val_mean_absolute_error: 0.1982 - val_mean_squared_error: 0.0725
Epoch 14/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.2049 - mean_absolute_error: 0.2049 - mean_squared_error: 0.0799
Epoch 00014: val_loss did not improve from 0.17162
10471/10471 [=====] - 1s 78us/sample - loss: 0.2054 - mean_absolute_error: 0.2056 - mean_squared_error: 0.0807 - val_loss: 0.1930 - val_mean_absolute_error: 0.1930 - val_mean_squared_error: 0.0681
Epoch 15/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.2057 - mean_absolute_error: 0.2057 - mean_squared_error: 0.0811
Epoch 00015: val_loss did not improve from 0.17162
10471/10471 [=====] - 1s 78us/sample - loss: 0.2056 - mean_absolute_error: 0.2056 - mean_squared_error: 0.0808 - val_loss: 0.1823 - val_mean_absolute_error: 0.1823 - val_mean_squared_error: 0.0628
Epoch 16/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.2019 - mean_absolute_error: 0.2019 - mean_squared_error: 0.0781
Epoch 00016: val_loss did not improve from 0.17162
10471/10471 [=====] - 1s 79us/sample - loss: 0.2018 - mean_absolute_error: 0.2017 - mean_squared_error: 0.0779 - val_loss: 0.1816 - val_mean_absolute_error: 0.1816 - val_mean_squared_error: 0.0617
Epoch 17/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.2024 - mean_absolute_error: 0.2024 - mean_squared_error: 0.0784
Epoch 00017: val_loss did not improve from 0.17162
10471/10471 [=====] - 1s 79us/sample - loss: 0.2023 - mean_absolute_error: 0.2023 - mean_squared_error: 0.0782 - val_loss: 0.1978 - val_mean_absolute_error: 0.1978 - val_mean_squared_error: 0.0703
Epoch 18/500
10368/10471 [=====>..] - ETA: 0s - loss: 0.2016 - mean_absolute_error: 0.2016 - mean_squared_error: 0.0793
Epoch 00018: val_loss did not improve from 0.17162
10471/10471 [=====] - 1s 79us/sample - loss: 0.2016 - mean_absolute_error: 0.2020 - mean_squared_error: 0.0798 - val_loss: 0.1992 - val_mean_absolute_error: 0.1992 - val_mean_squared_error: 0.0701
Epoch 19/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.2009 - mean_absolute_error:
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ror: 0.2009 - mean_squared_error: 0.0777
Epoch 00019: val_loss did not improve from 0.17162
10471/10471 [=====] - 1s 82us/sample - loss: 0.2013 - mean_absolute_error: 0.2010 - mean_squared_error: 0.0778 - val_loss: 0.2046 - val_mean_absolute_error: 0.2046 - val_mean_squared_error: 0.0747
Epoch 20/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1995 - mean_absolute_error: 0.1995 - mean_squared_error: 0.0766
Epoch 00020: val_loss improved from 0.17162 to 0.17093, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 84us/sample - loss: 0.1996 - mean_absolute_error: 0.1998 - mean_squared_error: 0.0770 - val_loss: 0.1709 - val_mean_absolute_error: 0.1709 - val_mean_squared_error: 0.0587
Epoch 21/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1988 - mean_absolute_error: 0.1988 - mean_squared_error: 0.0770
Epoch 00021: val_loss did not improve from 0.17093
10471/10471 [=====] - 1s 80us/sample - loss: 0.1989 - mean_absolute_error: 0.1988 - mean_squared_error: 0.0769 - val_loss: 0.1987 - val_mean_absolute_error: 0.1987 - val_mean_squared_error: 0.0716
Epoch 22/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1975 - mean_absolute_error: 0.1975 - mean_squared_error: 0.0752
Epoch 00022: val_loss improved from 0.17093 to 0.17042, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 82us/sample - loss: 0.1977 - mean_absolute_error: 0.1974 - mean_squared_error: 0.0753 - val_loss: 0.1704 - val_mean_absolute_error: 0.1704 - val_mean_squared_error: 0.0568
Epoch 23/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1995 - mean_absolute_error: 0.1995 - mean_squared_error: 0.0765
Epoch 00023: val_loss did not improve from 0.17042
10471/10471 [=====] - 1s 80us/sample - loss: 0.1996 - mean_absolute_error: 0.1995 - mean_squared_error: 0.0764 - val_loss: 0.1775 - val_mean_absolute_error: 0.1775 - val_mean_squared_error: 0.0584
Epoch 24/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1986 - mean_absolute_error: 0.1986 - mean_squared_error: 0.0760
Epoch 00024: val_loss did not improve from 0.17042
10471/10471 [=====] - 1s 81us/sample - loss: 0.1988 - mean_absolute_error: 0.1991 - mean_squared_error: 0.0765 - val_loss: 0.1908 - val_mean_absolute_error: 0.1909 - val_mean_squared_error: 0.0669
Epoch 25/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1960 - mean_absolute_error: 0.1960 - mean_squared_error: 0.0745
Epoch 00025: val_loss did not improve from 0.17042
10471/10471 [=====] - 1s 80us/sample - loss: 0.1962 - mean_absolute_error: 0.1964 - mean_squared_error: 0.0752 - val_loss: 0.1721 - val_mean_absolute_error: 0.1720 - val_mean_squared_error: 0.0584
Epoch 26/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1989 - mean_absolute_error: 0.1989 - mean_squared_error: 0.0765
Epoch 00026: val_loss did not improve from 0.17042
10471/10471 [=====] - 1s 78us/sample - loss: 0.1982 - mean_absolute_error: 0.1983 - mean_squared_error: 0.0762 - val_loss: 0.1969 - val_mean_absolute_error: 0.1969 - val_mean_squared_error: 0.0673
Epoch 27/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1978 - mean_absolute_error: 0.1978 - mean_squared_error: 0.0755
Epoch 00027: val_loss did not improve from 0.17042
10471/10471 [=====] - 1s 82us/sample - loss: 0.1980 - mean_absolute_error:
```

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lute_error: 0.1981 - mean_squared_error: 0.0759 - val_loss: 0.1714 - val_mean_absolute_e
rror: 0.1713 - val_mean_squared_error: 0.0575
Epoch 28/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1958 - mean_absolute_er
ror: 0.1958 - mean_squared_error: 0.0747
Epoch 00028: val_loss improved from 0.17042 to 0.16572, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 83us/sample - loss: 0.1961 - mean_abso
lute_error: 0.1961 - mean_squared_error: 0.0748 - val_loss: 0.1657 - val_mean_absolute_e
rror: 0.1656 - val_mean_squared_error: 0.0558
Epoch 29/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1958 - mean_absolute_er
ror: 0.1958 - mean_squared_error: 0.0742
Epoch 00029: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 80us/sample - loss: 0.1963 - mean_abso
lute_error: 0.1964 - mean_squared_error: 0.0744 - val_loss: 0.1887 - val_mean_absolute_e
rror: 0.1886 - val_mean_squared_error: 0.0635
Epoch 30/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1961 - mean_absolute_er
ror: 0.1961 - mean_squared_error: 0.0758
Epoch 00030: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 80us/sample - loss: 0.1959 - mean_abso
lute_error: 0.1957 - mean_squared_error: 0.0755 - val_loss: 0.1906 - val_mean_absolute_e
rror: 0.1905 - val_mean_squared_error: 0.0670
Epoch 31/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1942 - mean_absolute_er
ror: 0.1942 - mean_squared_error: 0.0731
Epoch 00031: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 79us/sample - loss: 0.1942 - mean_abso
lute_error: 0.1941 - mean_squared_error: 0.0729 - val_loss: 0.1737 - val_mean_absolute_e
rror: 0.1736 - val_mean_squared_error: 0.0586
Epoch 32/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1930 - mean_absolute_e
rror: 0.1930 - mean_squared_error: 0.0738
Epoch 00032: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 79us/sample - loss: 0.1933 - mean_abso
lute_error: 0.1931 - mean_squared_error: 0.0740 - val_loss: 0.1694 - val_mean_absolute_e
rror: 0.1693 - val_mean_squared_error: 0.0571
Epoch 33/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1965 - mean_absolute_e
rror: 0.1965 - mean_squared_error: 0.0765
Epoch 00033: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 80us/sample - loss: 0.1966 - mean_abso
lute_error: 0.1967 - mean_squared_error: 0.0766 - val_loss: 0.1841 - val_mean_absolute_e
rror: 0.1840 - val_mean_squared_error: 0.0627
Epoch 34/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1937 - mean_absolute_e
rror: 0.1937 - mean_squared_error: 0.0736
Epoch 00034: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 78us/sample - loss: 0.1943 - mean_abso
lute_error: 0.1941 - mean_squared_error: 0.0741 - val_loss: 0.1679 - val_mean_absolute_e
rror: 0.1678 - val_mean_squared_error: 0.0559
Epoch 35/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1918 - mean_absolute_e
rror: 0.1918 - mean_squared_error: 0.0724
Epoch 00035: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 79us/sample - loss: 0.1918 - mean_abso
lute_error: 0.1916 - mean_squared_error: 0.0722 - val_loss: 0.1734 - val_mean_absolute_e
rror: 0.1734 - val_mean_squared_error: 0.0578
Epoch 36/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1942 - mean_absolute_e
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ror: 0.1942 - mean_squared_error: 0.0742
Epoch 00036: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 78us/sample - loss: 0.1942 - mean_absolute_error: 0.1941 - mean_squared_error: 0.0741 - val_loss: 0.1898 - val_mean_absolute_error: 0.1897 - val_mean_squared_error: 0.0632
Epoch 37/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1943 - mean_absolute_error: 0.1943 - mean_squared_error: 0.0738
Epoch 00037: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 80us/sample - loss: 0.1936 - mean_absolute_error: 0.1937 - mean_squared_error: 0.0732 - val_loss: 0.1710 - val_mean_absolute_error: 0.1709 - val_mean_squared_error: 0.0574
Epoch 38/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1922 - mean_absolute_error: 0.1922 - mean_squared_error: 0.0715
Epoch 00038: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 78us/sample - loss: 0.1922 - mean_absolute_error: 0.1920 - mean_squared_error: 0.0714 - val_loss: 0.1791 - val_mean_absolute_error: 0.1790 - val_mean_squared_error: 0.0620
Epoch 39/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1928 - mean_absolute_error: 0.1928 - mean_squared_error: 0.0733
Epoch 00039: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 80us/sample - loss: 0.1925 - mean_absolute_error: 0.1923 - mean_squared_error: 0.0729 - val_loss: 0.1798 - val_mean_absolute_error: 0.1797 - val_mean_squared_error: 0.0595
Epoch 40/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1919 - mean_absolute_error: 0.1919 - mean_squared_error: 0.0717
Epoch 00040: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 80us/sample - loss: 0.1917 - mean_absolute_error: 0.1916 - mean_squared_error: 0.0714 - val_loss: 0.2007 - val_mean_absolute_error: 0.2007 - val_mean_squared_error: 0.0710
Epoch 41/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1930 - mean_absolute_error: 0.1930 - mean_squared_error: 0.0730
Epoch 00041: val_loss did not improve from 0.16572
10471/10471 [=====] - 1s 79us/sample - loss: 0.1923 - mean_absolute_error: 0.1922 - mean_squared_error: 0.0724 - val_loss: 0.1751 - val_mean_absolute_error: 0.1750 - val_mean_squared_error: 0.0590
Epoch 42/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1904 - mean_absolute_error: 0.1904 - mean_squared_error: 0.0729
Epoch 00042: val_loss improved from 0.16572 to 0.16421, saving model to best_basic_mode.1.hdf5
10471/10471 [=====] - 1s 81us/sample - loss: 0.1903 - mean_absolute_error: 0.1903 - mean_squared_error: 0.0730 - val_loss: 0.1642 - val_mean_absolute_error: 0.1641 - val_mean_squared_error: 0.0545
Epoch 43/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1922 - mean_absolute_error: 0.1922 - mean_squared_error: 0.0730
Epoch 00043: val_loss did not improve from 0.16421
10471/10471 [=====] - 1s 78us/sample - loss: 0.1919 - mean_absolute_error: 0.1916 - mean_squared_error: 0.0727 - val_loss: 0.1756 - val_mean_absolute_error: 0.1755 - val_mean_squared_error: 0.0597
Epoch 44/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1910 - mean_absolute_error: 0.1910 - mean_squared_error: 0.0707
Epoch 00044: val_loss did not improve from 0.16421
10471/10471 [=====] - 1s 74us/sample - loss: 0.1911 - mean_absolute_error: 0.1910 - mean_squared_error: 0.0708 - val_loss: 0.1699 - val_mean_absolute_error: 0.1698 - val_mean_squared_error: 0.0596
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rror: 0.1698 - val_mean_squared_error: 0.0561
Epoch 45/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1931 - mean_absolute_error: 0.1931 - mean_squared_error: 0.0733
Epoch 00045: val_loss did not improve from 0.16421
10471/10471 [=====] - 1s 74us/sample - loss: 0.1933 - mean_absolute_error: 0.1934 - mean_squared_error: 0.0736 - val_loss: 0.1947 - val_mean_absolute_error: 0.1947 - val_mean_squared_error: 0.0684
Epoch 46/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1877 - mean_absolute_error: 0.1877 - mean_squared_error: 0.0696
Epoch 00046: val_loss did not improve from 0.16421
10471/10471 [=====] - 1s 75us/sample - loss: 0.1881 - mean_absolute_error: 0.1881 - mean_squared_error: 0.0700 - val_loss: 0.1790 - val_mean_absolute_error: 0.1789 - val_mean_squared_error: 0.0609
Epoch 47/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1905 - mean_absolute_error: 0.1905 - mean_squared_error: 0.0720
Epoch 00047: val_loss did not improve from 0.16421
10471/10471 [=====] - 1s 80us/sample - loss: 0.1911 - mean_absolute_error: 0.1911 - mean_squared_error: 0.0724 - val_loss: 0.1740 - val_mean_absolute_error: 0.1739 - val_mean_squared_error: 0.0602
Epoch 48/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1897 - mean_absolute_error: 0.1897 - mean_squared_error: 0.0714
Epoch 00048: val_loss did not improve from 0.16421
10471/10471 [=====] - 1s 79us/sample - loss: 0.1897 - mean_absolute_error: 0.1897 - mean_squared_error: 0.0714 - val_loss: 0.1644 - val_mean_absolute_error: 0.1643 - val_mean_squared_error: 0.0542
Epoch 49/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1900 - mean_absolute_error: 0.1900 - mean_squared_error: 0.0724
Epoch 00049: val_loss did not improve from 0.16421
10471/10471 [=====] - 1s 81us/sample - loss: 0.1901 - mean_absolute_error: 0.1898 - mean_squared_error: 0.0721 - val_loss: 0.1802 - val_mean_absolute_error: 0.1802 - val_mean_squared_error: 0.0612
Epoch 50/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1899 - mean_absolute_error: 0.1899 - mean_squared_error: 0.0716
Epoch 00050: val_loss improved from 0.16421 to 0.16392, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 81us/sample - loss: 0.1899 - mean_absolute_error: 0.1898 - mean_squared_error: 0.0715 - val_loss: 0.1639 - val_mean_absolute_error: 0.1639 - val_mean_squared_error: 0.0541
Epoch 51/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1864 - mean_absolute_error: 0.1864 - mean_squared_error: 0.0690
Epoch 00051: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 79us/sample - loss: 0.1863 - mean_absolute_error: 0.1863 - mean_squared_error: 0.0689 - val_loss: 0.1668 - val_mean_absolute_error: 0.1668 - val_mean_squared_error: 0.0562
Epoch 52/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1905 - mean_absolute_error: 0.1905 - mean_squared_error: 0.0712
Epoch 00052: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 81us/sample - loss: 0.1902 - mean_absolute_error: 0.1903 - mean_squared_error: 0.0709 - val_loss: 0.1695 - val_mean_absolute_error: 0.1694 - val_mean_squared_error: 0.0575
Epoch 53/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1874 - mean_absolute_error: 0.1874 - mean_squared_error: 0.0686
```

```
Epoch 00053: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 79us/sample - loss: 0.1875 - mean_absolute_error: 0.1876 - mean_squared_error: 0.0688 - val_loss: 0.1817 - val_mean_absolute_error: 0.1817 - val_mean_squared_error: 0.0619
Epoch 54/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1870 - mean_absolute_error: 0.1870 - mean_squared_error: 0.0700
Epoch 00054: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 79us/sample - loss: 0.1870 - mean_absolute_error: 0.1869 - mean_squared_error: 0.0700 - val_loss: 0.1840 - val_mean_absolute_error: 0.1839 - val_mean_squared_error: 0.0645
Epoch 55/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1863 - mean_absolute_error: 0.1863 - mean_squared_error: 0.0697
Epoch 00055: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 78us/sample - loss: 0.1863 - mean_absolute_error: 0.1862 - mean_squared_error: 0.0696 - val_loss: 0.1650 - val_mean_absolute_error: 0.1650 - val_mean_squared_error: 0.0553
Epoch 56/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1867 - mean_absolute_error: 0.1867 - mean_squared_error: 0.0695
Epoch 00056: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 78us/sample - loss: 0.1867 - mean_absolute_error: 0.1867 - mean_squared_error: 0.0695 - val_loss: 0.1723 - val_mean_absolute_error: 0.1723 - val_mean_squared_error: 0.0578
Epoch 57/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1855 - mean_absolute_error: 0.1855 - mean_squared_error: 0.0688
Epoch 00057: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 81us/sample - loss: 0.1852 - mean_absolute_error: 0.1850 - mean_squared_error: 0.0683 - val_loss: 0.1662 - val_mean_absolute_error: 0.1661 - val_mean_squared_error: 0.0550
Epoch 58/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1840 - mean_absolute_error: 0.1840 - mean_squared_error: 0.0674
Epoch 00058: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 79us/sample - loss: 0.1840 - mean_absolute_error: 0.1839 - mean_squared_error: 0.0674 - val_loss: 0.1782 - val_mean_absolute_error: 0.1782 - val_mean_squared_error: 0.0603
Epoch 59/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1853 - mean_absolute_error: 0.1853 - mean_squared_error: 0.0693
Epoch 00059: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 78us/sample - loss: 0.1855 - mean_absolute_error: 0.1854 - mean_squared_error: 0.0692 - val_loss: 0.1778 - val_mean_absolute_error: 0.1777 - val_mean_squared_error: 0.0600
Epoch 60/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1859 - mean_absolute_error: 0.1859 - mean_squared_error: 0.0681
Epoch 00060: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 80us/sample - loss: 0.1857 - mean_absolute_error: 0.1855 - mean_squared_error: 0.0678 - val_loss: 0.1790 - val_mean_absolute_error: 0.1790 - val_mean_squared_error: 0.0617
Epoch 61/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1861 - mean_absolute_error: 0.1861 - mean_squared_error: 0.0690
Epoch 00061: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 80us/sample - loss: 0.1860 - mean_absolute_error: 0.1864 - mean_squared_error: 0.0692 - val_loss: 0.1953 - val_mean_absolute_error: 0.1952 - val_mean_squared_error: 0.0685
Epoch 62/500
```

9760/10471 [=====>...] - ETA: 0s - loss: 0.1856 - mean_absolute_error: 0.1856 - mean_squared_error: 0.0702
Epoch 00062: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 78us/sample - loss: 0.1860 - mean_absolute_error: 0.1860 - mean_squared_error: 0.0702 - val_loss: 0.1752 - val_mean_absolute_error: 0.1752 - val_mean_squared_error: 0.0595
Epoch 63/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1830 - mean_absolute_error: 0.1830 - mean_squared_error: 0.0670
Epoch 00063: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 80us/sample - loss: 0.1826 - mean_absolute_error: 0.1825 - mean_squared_error: 0.0667 - val_loss: 0.1728 - val_mean_absolute_error: 0.1728 - val_mean_squared_error: 0.0588
Epoch 64/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1843 - mean_absolute_error: 0.1843 - mean_squared_error: 0.0686
Epoch 00064: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 79us/sample - loss: 0.1843 - mean_absolute_error: 0.1841 - mean_squared_error: 0.0685 - val_loss: 0.1698 - val_mean_absolute_error: 0.1697 - val_mean_squared_error: 0.0568
Epoch 65/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1835 - mean_absolute_error: 0.1835 - mean_squared_error: 0.0670
Epoch 00065: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 79us/sample - loss: 0.1835 - mean_absolute_error: 0.1838 - mean_squared_error: 0.0673 - val_loss: 0.1810 - val_mean_absolute_error: 0.1809 - val_mean_squared_error: 0.0617
Epoch 66/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1838 - mean_absolute_error: 0.1838 - mean_squared_error: 0.0677
Epoch 00066: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 79us/sample - loss: 0.1838 - mean_absolute_error: 0.1836 - mean_squared_error: 0.0675 - val_loss: 0.1713 - val_mean_absolute_error: 0.1712 - val_mean_squared_error: 0.0582
Epoch 67/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1861 - mean_absolute_error: 0.1861 - mean_squared_error: 0.0696
Epoch 00067: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 77us/sample - loss: 0.1861 - mean_absolute_error: 0.1861 - mean_squared_error: 0.0693 - val_loss: 0.1762 - val_mean_absolute_error: 0.1762 - val_mean_squared_error: 0.0592
Epoch 68/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1853 - mean_absolute_error: 0.1853 - mean_squared_error: 0.0692
Epoch 00068: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 80us/sample - loss: 0.1851 - mean_absolute_error: 0.1849 - mean_squared_error: 0.0689 - val_loss: 0.1820 - val_mean_absolute_error: 0.1819 - val_mean_squared_error: 0.0608
Epoch 69/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1819 - mean_absolute_error: 0.1819 - mean_squared_error: 0.0664
Epoch 00069: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 81us/sample - loss: 0.1822 - mean_absolute_error: 0.1821 - mean_squared_error: 0.0664 - val_loss: 0.1886 - val_mean_absolute_error: 0.1886 - val_mean_squared_error: 0.0651
Epoch 70/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1869 - mean_absolute_error: 0.1869 - mean_squared_error: 0.0700
Epoch 00070: val_loss did not improve from 0.16392
10471/10471 [=====] - 1s 78us/sample - loss: 0.1869 - mean_absolute_error: 0.1867 - mean_squared_error: 0.0699 - val_loss: 0.1679 - val_mean_absolute_error: 0.1679 - val_mean_squared_error: 0.0588

rror: 0.1678 - val_mean_squared_error: 0.0559
 Epoch 71/500
 9824/10471 [=====>..] - ETA: 0s - loss: 0.1836 - mean_absolute_error: 0.1836 - mean_squared_error: 0.0686
 Epoch 00071: val_loss did not improve from 0.16392
 10471/10471 [=====] - 1s 78us/sample - loss: 0.1844 - mean_absolute_error: 0.1843 - mean_squared_error: 0.0692 - val_loss: 0.2209 - val_mean_absolute_error: 0.2209 - val_mean_squared_error: 0.0834
 Epoch 72/500
 10304/10471 [=====>.] - ETA: 0s - loss: 0.1805 - mean_absolute_error: 0.1805 - mean_squared_error: 0.0652
 Epoch 00072: val_loss did not improve from 0.16392
 10471/10471 [=====] - 1s 79us/sample - loss: 0.1810 - mean_absolute_error: 0.1810 - mean_squared_error: 0.0654 - val_loss: 0.1749 - val_mean_absolute_error: 0.1749 - val_mean_squared_error: 0.0583
 Epoch 73/500
 10272/10471 [=====>.] - ETA: 0s - loss: 0.1835 - mean_absolute_error: 0.1835 - mean_squared_error: 0.0684
 Epoch 00073: val_loss did not improve from 0.16392
 10471/10471 [=====] - 1s 80us/sample - loss: 0.1832 - mean_absolute_error: 0.1832 - mean_squared_error: 0.0682 - val_loss: 0.1704 - val_mean_absolute_error: 0.1703 - val_mean_squared_error: 0.0576
 Epoch 74/500
 10016/10471 [=====>..] - ETA: 0s - loss: 0.1855 - mean_absolute_error: 0.1855 - mean_squared_error: 0.0691
 Epoch 00074: val_loss did not improve from 0.16392
 10471/10471 [=====] - 1s 81us/sample - loss: 0.1855 - mean_absolute_error: 0.1854 - mean_squared_error: 0.0690 - val_loss: 0.1830 - val_mean_absolute_error: 0.1830 - val_mean_squared_error: 0.0627
 Epoch 75/500
 10336/10471 [=====>.] - ETA: 0s - loss: 0.1806 - mean_absolute_error: 0.1806 - mean_squared_error: 0.0653Restoring model weights from the end of the best epoch.

 Epoch 00075: val_loss did not improve from 0.16392
 10471/10471 [=====] - 1s 80us/sample - loss: 0.1806 - mean_absolute_error: 0.1808 - mean_squared_error: 0.0654 - val_loss: 0.1745 - val_mean_absolute_error: 0.1745 - val_mean_squared_error: 0.0587
 Epoch 00075: early stopping
 MAE: 0.16386284
 RMSE: 0.23255987
 Adding initial Dense layers with 32
 Adding Dense layer with 32
 Adding Dense layer with 32
 Adding Dense layer with 32
 Adding last layer with 32
 Outputting predictive model - Tabular
 Model: "model_95"

Layer (type)	Output Shape	Param #
<hr/>		
input_96 (InputLayer)	[(None, 61)]	0
dense_709 (Dense)	(None, 32)	1984
dense_710 (Dense)	(None, 32)	1056
dense_711 (Dense)	(None, 32)	1056
dense_712 (Dense)	(None, 32)	1056

dense_713 (Dense)	(None, 32)	1056
dropout_19 (Dropout)	(None, 32)	0
dense_714 (Dense)	(None, 1)	33
=====		
Total params: 6,241		
Trainable params: 6,241		
Non-trainable params: 0		

None

```
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10432/10471 [=====>.] - ETA: 0s - loss: 2.4465 - mean_absolute_error: 2.4465 - mean_squared_error: 13.4377
Epoch 00001: val_loss improved from inf to 0.68032, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 113us/sample - loss: 2.4427 - mean_absolute_error: 2.4407 - mean_squared_error: 13.3752 - val_loss: 0.6803 - val_mean_absolute_error: 0.6801 - val_mean_squared_error: 0.7475
Epoch 2/500
10080/10471 [=====>..] - ETA: 0s - loss: 1.2682 - mean_absolute_error: 1.2682 - mean_squared_error: 2.5434
Epoch 00002: val_loss improved from 0.68032 to 0.35611, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 73us/sample - loss: 1.2607 - mean_absolute_error: 1.2607 - mean_squared_error: 2.5144 - val_loss: 0.3561 - val_mean_absolute_error: 0.3563 - val_mean_squared_error: 0.1919
Epoch 3/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.9315 - mean_absolute_error: 0.9315 - mean_squared_error: 1.3694
Epoch 00003: val_loss improved from 0.35611 to 0.30610, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 70us/sample - loss: 0.9314 - mean_absolute_error: 0.9312 - mean_squared_error: 1.3679 - val_loss: 0.3061 - val_mean_absolute_error: 0.3062 - val_mean_squared_error: 0.1417
Epoch 4/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.7273 - mean_absolute_error: 0.7273 - mean_squared_error: 0.8461
Epoch 00004: val_loss improved from 0.30610 to 0.19870, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 71us/sample - loss: 0.7271 - mean_absolute_error: 0.7266 - mean_squared_error: 0.8445 - val_loss: 0.1987 - val_mean_absolute_error: 0.1987 - val_mean_squared_error: 0.0712
Epoch 5/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.5147 - mean_absolute_error: 0.5147 - mean_squared_error: 0.4243
Epoch 00005: val_loss improved from 0.19870 to 0.19205, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 70us/sample - loss: 0.5136 - mean_absolute_error: 0.5137 - mean_squared_error: 0.4225 - val_loss: 0.1920 - val_mean_absolute_error: 0.1920 - val_mean_squared_error: 0.0656
Epoch 6/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.3268 - mean_absolute_error: 0.3268 - mean_squared_error: 0.1772
Epoch 00006: val_loss improved from 0.19205 to 0.17639, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 71us/sample - loss: 0.3254 - mean_absolute_error: 0.3253 - mean_squared_error: 0.1757 - val_loss: 0.1764 - val_mean_absolute_error: 0.1763 - val_mean_squared_error: 0.0603
```

Epoch 7/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.2115 - mean_absolute_error: 0.2115 - mean_squared_error: 0.0778
Epoch 00007: val_loss improved from 0.17639 to 0.17022, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 69us/sample - loss: 0.2089 - mean_absolute_error: 0.2090 - mean_squared_error: 0.0761 - val_loss: 0.1702 - val_mean_absolute_error: 0.1702 - val_mean_squared_error: 0.0551
Epoch 8/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1775 - mean_absolute_error: 0.1775 - mean_squared_error: 0.0584
Epoch 00008: val_loss improved from 0.17022 to 0.16342, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1774 - mean_absolute_error: 0.1773 - mean_squared_error: 0.0583 - val_loss: 0.1634 - val_mean_absolute_error: 0.1634 - val_mean_squared_error: 0.0534
Epoch 9/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1710 - mean_absolute_error: 0.1710 - mean_squared_error: 0.0556
Epoch 00009: val_loss improved from 0.16342 to 0.15949, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1709 - mean_absolute_error: 0.1708 - mean_squared_error: 0.0555 - val_loss: 0.1595 - val_mean_absolute_error: 0.1595 - val_mean_squared_error: 0.0512
Epoch 10/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1649 - mean_absolute_error: 0.1649 - mean_squared_error: 0.0523
Epoch 00010: val_loss did not improve from 0.15949
10471/10471 [=====] - 1s 63us/sample - loss: 0.1649 - mean_absolute_error: 0.1646 - mean_squared_error: 0.0522 - val_loss: 0.1626 - val_mean_absolute_error: 0.1626 - val_mean_squared_error: 0.0523
Epoch 11/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1605 - mean_absolute_error: 0.1605 - mean_squared_error: 0.0503
Epoch 00011: val_loss improved from 0.15949 to 0.15554, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 69us/sample - loss: 0.1601 - mean_absolute_error: 0.1600 - mean_squared_error: 0.0498 - val_loss: 0.1555 - val_mean_absolute_error: 0.1555 - val_mean_squared_error: 0.0477
Epoch 12/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1570 - mean_absolute_error: 0.1570 - mean_squared_error: 0.0494
Epoch 00012: val_loss improved from 0.15554 to 0.15039, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 72us/sample - loss: 0.1568 - mean_absolute_error: 0.1567 - mean_squared_error: 0.0491 - val_loss: 0.1504 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0472
Epoch 13/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1562 - mean_absolute_error: 0.1562 - mean_squared_error: 0.0493
Epoch 00013: val_loss did not improve from 0.15039
10471/10471 [=====] - 1s 69us/sample - loss: 0.1561 - mean_absolute_error: 0.1560 - mean_squared_error: 0.0492 - val_loss: 0.1601 - val_mean_absolute_error: 0.1602 - val_mean_squared_error: 0.0499
Epoch 14/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1545 - mean_absolute_error: 0.1545 - mean_squared_error: 0.0489
Epoch 00014: val_loss did not improve from 0.15039
10471/10471 [=====] - 1s 69us/sample - loss: 0.1542 - mean_absolute_error: 0.1541 - mean_squared_error: 0.0486 - val_loss: 0.1525 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0481

Epoch 15/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1525 - mean_absolute_error: 0.1525 - mean_squared_error: 0.0476
Epoch 00015: val_loss improved from 0.15039 to 0.14845, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 69us/sample - loss: 0.1527 - mean_absolute_error: 0.1527 - mean_squared_error: 0.0475 - val_loss: 0.1484 - val_mean_absolute_error: 0.1484 - val_mean_squared_error: 0.0462
Epoch 16/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1510 - mean_absolute_error: 0.1510 - mean_squared_error: 0.0471
Epoch 00016: val_loss improved from 0.14845 to 0.14684, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 69us/sample - loss: 0.1509 - mean_absolute_error: 0.1510 - mean_squared_error: 0.0471 - val_loss: 0.1468 - val_mean_absolute_error: 0.1468 - val_mean_squared_error: 0.0457
Epoch 17/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.1505 - mean_absolute_error: 0.1505 - mean_squared_error: 0.0471
Epoch 00017: val_loss did not improve from 0.14684
10471/10471 [=====] - 1s 68us/sample - loss: 0.1504 - mean_absolute_error: 0.1503 - mean_squared_error: 0.0470 - val_loss: 0.1485 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0455
Epoch 18/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1527 - mean_absolute_error: 0.1527 - mean_squared_error: 0.0481
Epoch 00018: val_loss did not improve from 0.14684
10471/10471 [=====] - 1s 67us/sample - loss: 0.1521 - mean_absolute_error: 0.1521 - mean_squared_error: 0.0476 - val_loss: 0.1575 - val_mean_absolute_error: 0.1575 - val_mean_squared_error: 0.0496
Epoch 19/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.1492 - mean_absolute_error: 0.1492 - mean_squared_error: 0.0461
Epoch 00019: val_loss improved from 0.14684 to 0.14508, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 70us/sample - loss: 0.1492 - mean_absolute_error: 0.1490 - mean_squared_error: 0.0459 - val_loss: 0.1451 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0445
Epoch 20/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1495 - mean_absolute_error: 0.1495 - mean_squared_error: 0.0466
Epoch 00020: val_loss did not improve from 0.14508
10471/10471 [=====] - 1s 69us/sample - loss: 0.1494 - mean_absolute_error: 0.1493 - mean_squared_error: 0.0464 - val_loss: 0.1474 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0461
Epoch 21/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1490 - mean_absolute_error: 0.1490 - mean_squared_error: 0.0461
Epoch 00021: val_loss did not improve from 0.14508
10471/10471 [=====] - 1s 68us/sample - loss: 0.1492 - mean_absolute_error: 0.1495 - mean_squared_error: 0.0467 - val_loss: 0.1525 - val_mean_absolute_error: 0.1526 - val_mean_squared_error: 0.0473
Epoch 22/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1483 - mean_absolute_error: 0.1483 - mean_squared_error: 0.0459
Epoch 00022: val_loss improved from 0.14508 to 0.14385, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 71us/sample - loss: 0.1480 - mean_absolute_error: 0.1481 - mean_squared_error: 0.0457 - val_loss: 0.1439 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0439
Epoch 23/500

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10432/10471 [=====>.] - ETA: 0s - loss: 0.1467 - mean_absolute_error: 0.1467 - mean_squared_error: 0.0455
Epoch 00023: val_loss did not improve from 0.14385
10471/10471 [=====] - 1s 68us/sample - loss: 0.1465 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0454 - val_loss: 0.1446 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0443
Epoch 24/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1467 - mean_absolute_error: 0.1467 - mean_squared_error: 0.0452
Epoch 00024: val_loss did not improve from 0.14385
10471/10471 [=====] - 1s 71us/sample - loss: 0.1467 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0452 - val_loss: 0.1450 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0442
Epoch 25/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1466 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0451
Epoch 00025: val_loss did not improve from 0.14385
10471/10471 [=====] - 1s 69us/sample - loss: 0.1465 - mean_absolute_error: 0.1464 - mean_squared_error: 0.0449 - val_loss: 0.1490 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0454
Epoch 26/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1469 - mean_absolute_error: 0.1469 - mean_squared_error: 0.0451
Epoch 00026: val_loss did not improve from 0.14385
10471/10471 [=====] - 1s 69us/sample - loss: 0.1468 - mean_absolute_error: 0.1470 - mean_squared_error: 0.0451 - val_loss: 0.1495 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0465
Epoch 27/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1460 - mean_absolute_error: 0.1460 - mean_squared_error: 0.0447
Epoch 00027: val_loss did not improve from 0.14385
10471/10471 [=====] - 1s 68us/sample - loss: 0.1460 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0447 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0454
Epoch 28/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1457 - mean_absolute_error: 0.1457 - mean_squared_error: 0.0455
Epoch 00028: val_loss did not improve from 0.14385
10471/10471 [=====] - 1s 68us/sample - loss: 0.1453 - mean_absolute_error: 0.1455 - mean_squared_error: 0.0453 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0444
Epoch 29/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1448 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0447
Epoch 00029: val_loss did not improve from 0.14385
10471/10471 [=====] - 1s 69us/sample - loss: 0.1446 - mean_absolute_error: 0.1445 - mean_squared_error: 0.0445 - val_loss: 0.1452 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0435
Epoch 30/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1456 - mean_absolute_error: 0.1456 - mean_squared_error: 0.0449
Epoch 00030: val_loss did not improve from 0.14385
10471/10471 [=====] - 1s 67us/sample - loss: 0.1457 - mean_absolute_error: 0.1455 - mean_squared_error: 0.0451 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0463
Epoch 31/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1448 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0448
Epoch 00031: val_loss did not improve from 0.14385
10471/10471 [=====] - 1s 70us/sample - loss: 0.1450 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0450 - val_loss: 0.1514 - val_mean_absolute_error: 0.1514 - val_mean_squared_error: 0.0466
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rror: 0.1514 - val_mean_squared_error: 0.0448
Epoch 32/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1446 - mean_absolute_error: 0.1446 - mean_squared_error: 0.0450
Epoch 00032: val_loss improved from 0.14385 to 0.14205, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 68us/sample - loss: 0.1444 - mean_absolute_error: 0.1444 - mean_squared_error: 0.0448 - val_loss: 0.1420 - val_mean_absolute_error: 0.1420 - val_mean_squared_error: 0.0425
Epoch 33/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1428 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0435
Epoch 00033: val_loss did not improve from 0.14205
10471/10471 [=====] - 1s 68us/sample - loss: 0.1432 - mean_absolute_error: 0.1431 - mean_squared_error: 0.0435 - val_loss: 0.1467 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0444
Epoch 34/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1425 - mean_absolute_error: 0.1425 - mean_squared_error: 0.0439
Epoch 00034: val_loss improved from 0.14205 to 0.14163, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 71us/sample - loss: 0.1419 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0435 - val_loss: 0.1416 - val_mean_absolute_error: 0.1416 - val_mean_squared_error: 0.0423
Epoch 35/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1428 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0441
Epoch 00035: val_loss did not improve from 0.14163
10471/10471 [=====] - 1s 69us/sample - loss: 0.1424 - mean_absolute_error: 0.1423 - mean_squared_error: 0.0437 - val_loss: 0.1505 - val_mean_absolute_error: 0.1505 - val_mean_squared_error: 0.0454
Epoch 36/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1435 - mean_absolute_error: 0.1435 - mean_squared_error: 0.0443
Epoch 00036: val_loss did not improve from 0.14163
10471/10471 [=====] - 1s 68us/sample - loss: 0.1425 - mean_absolute_error: 0.1426 - mean_squared_error: 0.0438 - val_loss: 0.1438 - val_mean_absolute_error: 0.1437 - val_mean_squared_error: 0.0433
Epoch 37/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1422 - mean_absolute_error: 0.1422 - mean_squared_error: 0.0432
Epoch 00037: val_loss did not improve from 0.14163
10471/10471 [=====] - 1s 69us/sample - loss: 0.1422 - mean_absolute_error: 0.1422 - mean_squared_error: 0.0432 - val_loss: 0.1435 - val_mean_absolute_error: 0.1435 - val_mean_squared_error: 0.0425
Epoch 38/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1414 - mean_absolute_error: 0.1414 - mean_squared_error: 0.0431
Epoch 00038: val_loss did not improve from 0.14163
10471/10471 [=====] - 1s 68us/sample - loss: 0.1415 - mean_absolute_error: 0.1413 - mean_squared_error: 0.0432 - val_loss: 0.1432 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0444
Epoch 39/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1423 - mean_absolute_error: 0.1423 - mean_squared_error: 0.0438
Epoch 00039: val_loss did not improve from 0.14163
10471/10471 [=====] - 1s 70us/sample - loss: 0.1421 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0436 - val_loss: 0.1428 - val_mean_absolute_error: 0.1428 - val_mean_squared_error: 0.0431
Epoch 40/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1415 - mean_absolute_error:
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ror: 0.1415 - mean_squared_error: 0.0431
Epoch 00040: val_loss did not improve from 0.14163
10471/10471 [=====] - 1s 69us/sample - loss: 0.1416 - mean_absolute_error: 0.1417 - mean_squared_error: 0.0431 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0440
Epoch 41/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1406 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0435
Epoch 00041: val_loss did not improve from 0.14163
10471/10471 [=====] - 1s 68us/sample - loss: 0.1403 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0429 - val_loss: 0.1454 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0442
Epoch 42/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1412 - mean_absolute_error: 0.1412 - mean_squared_error: 0.0435
Epoch 00042: val_loss improved from 0.14163 to 0.14031, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 70us/sample - loss: 0.1411 - mean_absolute_error: 0.1412 - mean_squared_error: 0.0435 - val_loss: 0.1403 - val_mean_absolute_error: 0.1403 - val_mean_squared_error: 0.0418
Epoch 43/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1400 - mean_absolute_error: 0.1400 - mean_squared_error: 0.0426
Epoch 00043: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 69us/sample - loss: 0.1399 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0424 - val_loss: 0.1430 - val_mean_absolute_error: 0.1430 - val_mean_squared_error: 0.0431
Epoch 44/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1417 - mean_absolute_error: 0.1417 - mean_squared_error: 0.0437
Epoch 00044: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 67us/sample - loss: 0.1408 - mean_absolute_error: 0.1409 - mean_squared_error: 0.0429 - val_loss: 0.1469 - val_mean_absolute_error: 0.1469 - val_mean_squared_error: 0.0448
Epoch 45/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1386 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0421
Epoch 00045: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 68us/sample - loss: 0.1391 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0422 - val_loss: 0.1540 - val_mean_absolute_error: 0.1540 - val_mean_squared_error: 0.0471
Epoch 46/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1403 - mean_absolute_error: 0.1403 - mean_squared_error: 0.0425
Epoch 00046: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 68us/sample - loss: 0.1403 - mean_absolute_error: 0.1402 - mean_squared_error: 0.0424 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0429
Epoch 47/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1395 - mean_absolute_error: 0.1395 - mean_squared_error: 0.0426
Epoch 00047: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 68us/sample - loss: 0.1390 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0419 - val_loss: 0.1404 - val_mean_absolute_error: 0.1404 - val_mean_squared_error: 0.0419
Epoch 48/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1397 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0424
Epoch 00048: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 69us/sample - loss: 0.1396 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0425 - val_loss: 0.1408 - val_mean_absolute_error: 0.1408 - val_mean_squared_error: 0.0420
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rror: 0.1408 - val_mean_squared_error: 0.0427
Epoch 49/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1381 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0416
Epoch 00049: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 69us/sample - loss: 0.1382 - mean_absolute_error: 0.1382 - mean_squared_error: 0.0417 - val_loss: 0.1429 - val_mean_absolute_error: 0.1429 - val_mean_squared_error: 0.0424
Epoch 50/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0419
Epoch 00050: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 70us/sample - loss: 0.1397 - mean_absolute_error: 0.1398 - mean_squared_error: 0.0420 - val_loss: 0.1434 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0434
Epoch 51/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1405 - mean_absolute_error: 0.1405 - mean_squared_error: 0.0423
Epoch 00051: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 69us/sample - loss: 0.1404 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0422 - val_loss: 0.1436 - val_mean_absolute_error: 0.1436 - val_mean_squared_error: 0.0432
Epoch 52/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1385 - mean_absolute_error: 0.1385 - mean_squared_error: 0.0418
Epoch 00052: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 66us/sample - loss: 0.1388 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0421 - val_loss: 0.1425 - val_mean_absolute_error: 0.1425 - val_mean_squared_error: 0.0431
Epoch 53/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1386 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0424
Epoch 00053: val_loss did not improve from 0.14031
10471/10471 [=====] - 1s 63us/sample - loss: 0.1386 - mean_absolute_error: 0.1389 - mean_squared_error: 0.0425 - val_loss: 0.1655 - val_mean_absolute_error: 0.1655 - val_mean_squared_error: 0.0519
Epoch 54/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1397 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0424
Epoch 00054: val_loss improved from 0.14031 to 0.14029, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.1397 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0425 - val_loss: 0.1403 - val_mean_absolute_error: 0.1403 - val_mean_squared_error: 0.0427
Epoch 55/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1388 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0426
Epoch 00055: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 64us/sample - loss: 0.1388 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0426 - val_loss: 0.1496 - val_mean_absolute_error: 0.1496 - val_mean_squared_error: 0.0453
Epoch 56/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1382 - mean_absolute_error: 0.1382 - mean_squared_error: 0.0420
Epoch 00056: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 67us/sample - loss: 0.1386 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0421 - val_loss: 0.1416 - val_mean_absolute_error: 0.1416 - val_mean_squared_error: 0.0420
Epoch 57/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1372 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0409
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Epoch 00057: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 69us/sample - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0410 - val_loss: 0.1411 - val_mean_absolute_error: 0.1411 - val_mean_squared_error: 0.0421
Epoch 58/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1367 - mean_absolute_error: 0.1367 - mean_squared_error: 0.0407
Epoch 00058: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 70us/sample - loss: 0.1366 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0406 - val_loss: 0.1443 - val_mean_absolute_error: 0.1443 - val_mean_squared_error: 0.0444
Epoch 59/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0409
Epoch 00059: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 69us/sample - loss: 0.1371 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0409 - val_loss: 0.1443 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0428
Epoch 60/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1366 - mean_absolute_error: 0.1366 - mean_squared_error: 0.0408
Epoch 00060: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 69us/sample - loss: 0.1366 - mean_absolute_error: 0.1365 - mean_squared_error: 0.0408 - val_loss: 0.1409 - val_mean_absolute_error: 0.1409 - val_mean_squared_error: 0.0416
Epoch 61/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1369 - mean_absolute_error: 0.1369 - mean_squared_error: 0.0415
Epoch 00061: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 68us/sample - loss: 0.1368 - mean_absolute_error: 0.1367 - mean_squared_error: 0.0412 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0443
Epoch 62/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1378 - mean_absolute_error: 0.1378 - mean_squared_error: 0.0414
Epoch 00062: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 68us/sample - loss: 0.1378 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0413 - val_loss: 0.1448 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0432
Epoch 63/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1377 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0416
Epoch 00063: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 67us/sample - loss: 0.1370 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0410 - val_loss: 0.1515 - val_mean_absolute_error: 0.1516 - val_mean_squared_error: 0.0450
Epoch 64/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1357 - mean_absolute_error: 0.1357 - mean_squared_error: 0.0406
Epoch 00064: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 68us/sample - loss: 0.1354 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0403 - val_loss: 0.1438 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0436
Epoch 65/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0411
Epoch 00065: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 69us/sample - loss: 0.1364 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0410 - val_loss: 0.1451 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0442
Epoch 66/500
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9760/10471 [=====>...] - ETA: 0s - loss: 0.1358 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0399
Epoch 00066: val_loss did not improve from 0.14029
10471/10471 [=====] - 1s 68us/sample - loss: 0.1364 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0406 - val_loss: 0.1444 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0433
Epoch 67/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1365 - mean_absolute_error: 0.1365 - mean_squared_error: 0.0407
Epoch 00067: val_loss improved from 0.14029 to 0.13939, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 71us/sample - loss: 0.1365 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0410 - val_loss: 0.1394 - val_mean_absolute_error: 0.1394 - val_mean_squared_error: 0.0421
Epoch 68/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1358 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0405
Epoch 00068: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 68us/sample - loss: 0.1360 - mean_absolute_error: 0.1359 - mean_squared_error: 0.0408 - val_loss: 0.1423 - val_mean_absolute_error: 0.1422 - val_mean_squared_error: 0.0431
Epoch 69/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0405
Epoch 00069: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 69us/sample - loss: 0.1359 - mean_absolute_error: 0.1357 - mean_squared_error: 0.0402 - val_loss: 0.1410 - val_mean_absolute_error: 0.1410 - val_mean_squared_error: 0.0424
Epoch 70/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0410
Epoch 00070: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 69us/sample - loss: 0.1362 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0409 - val_loss: 0.1447 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0433
Epoch 71/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1348 - mean_absolute_error: 0.1348 - mean_squared_error: 0.0402
Epoch 00071: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 68us/sample - loss: 0.1349 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0401 - val_loss: 0.1410 - val_mean_absolute_error: 0.1410 - val_mean_squared_error: 0.0424
Epoch 72/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1343 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0396
Epoch 00072: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 69us/sample - loss: 0.1344 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0401 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0454
Epoch 73/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1348 - mean_absolute_error: 0.1348 - mean_squared_error: 0.0401
Epoch 00073: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 67us/sample - loss: 0.1350 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0406 - val_loss: 0.1441 - val_mean_absolute_error: 0.1440 - val_mean_squared_error: 0.0434
Epoch 74/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0396
Epoch 00074: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 68us/sample - loss: 0.1347 - mean_absolute_error:

lute_error: 0.1351 - mean_squared_error: 0.0401 - val_loss: 0.1442 - val_mean_absolute_error: 0.1442 - val_mean_squared_error: 0.0437
Epoch 75/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1338 - mean_absolute_error: 0.1338 - mean_squared_error: 0.0393
Epoch 00075: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 68us/sample - loss: 0.1337 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0392 - val_loss: 0.1479 - val_mean_absolute_error: 0.1480 - val_mean_squared_error: 0.0449
Epoch 76/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1330 - mean_absolute_error: 0.1330 - mean_squared_error: 0.0389
Epoch 00076: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 67us/sample - loss: 0.1338 - mean_absolute_error: 0.1338 - mean_squared_error: 0.0391 - val_loss: 0.1572 - val_mean_absolute_error: 0.1573 - val_mean_squared_error: 0.0487
Epoch 77/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1349 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0396
Epoch 00077: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 68us/sample - loss: 0.1349 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0396 - val_loss: 0.1450 - val_mean_absolute_error: 0.1449 - val_mean_squared_error: 0.0438
Epoch 78/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0399
Epoch 00078: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 73us/sample - loss: 0.1345 - mean_absolute_error: 0.1344 - mean_squared_error: 0.0397 - val_loss: 0.1445 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0435
Epoch 79/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1325 - mean_absolute_error: 0.1325 - mean_squared_error: 0.0391
Epoch 00079: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 69us/sample - loss: 0.1325 - mean_absolute_error: 0.1327 - mean_squared_error: 0.0391 - val_loss: 0.1405 - val_mean_absolute_error: 0.1405 - val_mean_squared_error: 0.0417
Epoch 80/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0396
Epoch 00080: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 70us/sample - loss: 0.1340 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0395 - val_loss: 0.1426 - val_mean_absolute_error: 0.1426 - val_mean_squared_error: 0.0440
Epoch 81/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0396
Epoch 00081: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 69us/sample - loss: 0.1347 - mean_absolute_error: 0.1348 - mean_squared_error: 0.0396 - val_loss: 0.1566 - val_mean_absolute_error: 0.1566 - val_mean_squared_error: 0.0493
Epoch 82/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1331 - mean_absolute_error: 0.1331 - mean_squared_error: 0.0394
Epoch 00082: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 67us/sample - loss: 0.1335 - mean_absolute_error: 0.1335 - mean_squared_error: 0.0396 - val_loss: 0.1437 - val_mean_absolute_error: 0.1436 - val_mean_squared_error: 0.0439
Epoch 83/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1331 - mean_absolute_error: 0.1331 - mean_squared_error: 0.0393

```
Epoch 00083: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 69us/sample - loss: 0.1331 - mean_absolute_error: 0.1330 - mean_squared_error: 0.0392 - val_loss: 0.1394 - val_mean_absolute_error: 0.1394 - val_mean_squared_error: 0.0421
Epoch 84/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0401
Epoch 00084: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 69us/sample - loss: 0.1345 - mean_absolute_error: 0.1344 - mean_squared_error: 0.0398 - val_loss: 0.1429 - val_mean_absolute_error: 0.1429 - val_mean_squared_error: 0.0437
Epoch 85/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1336 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0398
Epoch 00085: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 69us/sample - loss: 0.1335 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0396 - val_loss: 0.1416 - val_mean_absolute_error: 0.1416 - val_mean_squared_error: 0.0421
Epoch 86/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1319 - mean_absolute_error: 0.1319 - mean_squared_error: 0.0387
Epoch 00086: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 68us/sample - loss: 0.1323 - mean_absolute_error: 0.1324 - mean_squared_error: 0.0391 - val_loss: 0.1423 - val_mean_absolute_error: 0.1423 - val_mean_squared_error: 0.0431
Epoch 87/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1352 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0400
Epoch 00087: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 68us/sample - loss: 0.1344 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0396 - val_loss: 0.1410 - val_mean_absolute_error: 0.1410 - val_mean_squared_error: 0.0422
Epoch 88/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1321 - mean_absolute_error: 0.1321 - mean_squared_error: 0.0385
Epoch 00088: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 67us/sample - loss: 0.1319 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0383 - val_loss: 0.1500 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0463
Epoch 89/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1323 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0388
Epoch 00089: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 68us/sample - loss: 0.1323 - mean_absolute_error: 0.1325 - mean_squared_error: 0.0388 - val_loss: 0.1406 - val_mean_absolute_error: 0.1406 - val_mean_squared_error: 0.0427
Epoch 90/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1332 - mean_absolute_error: 0.1332 - mean_squared_error: 0.0390
Epoch 00090: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 67us/sample - loss: 0.1338 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0392 - val_loss: 0.1417 - val_mean_absolute_error: 0.1417 - val_mean_squared_error: 0.0433
Epoch 91/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1319 - mean_absolute_error: 0.1319 - mean_squared_error: 0.0387
Epoch 00091: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 67us/sample - loss: 0.1318 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0387 - val_loss: 0.1546 - val_mean_absolute_error: 0.1546 - val_mean_squared_error: 0.0480
Epoch 92/500
```

```
10208/10471 [=====>.] - ETA: 0s - loss: 0.1332 - mean_absolute_error: 0.1332 - mean_squared_error: 0.0393Restoring model weights from the end of the best epoch.
```

```
Epoch 00092: val_loss did not improve from 0.13939
10471/10471 [=====] - 1s 70us/sample - loss: 0.1331 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0393 - val_loss: 0.1409 - val_mean_absolute_error: 0.1409 - val_mean_squared_error: 0.0434
Epoch 00092: early stopping
MAE: 0.13937658
RMSE: 0.20520906
Adding initial Dense layers with 32
Adding Dense layer with 32
Adding last layer with 32
Outputting predictive model - Tabular
Model: "model_96"
```

Layer (type)	Output Shape	Param #
=====		
input_97 (InputLayer)	[(None, 61)]	0
dense_715 (Dense)	(None, 32)	1984
dense_716 (Dense)	(None, 32)	1056
dense_717 (Dense)	(None, 32)	1056
dense_718 (Dense)	(None, 32)	1056
dense_719 (Dense)	(None, 32)	1056
dense_720 (Dense)	(None, 32)	1056
dense_721 (Dense)	(None, 32)	1056
dense_722 (Dense)	(None, 32)	1056
dropout_20 (Dropout)	(None, 32)	0
dense_723 (Dense)	(None, 1)	33
=====		

```
Total params: 9,409
```

```
Trainable params: 9,409
```

```
Non-trainable params: 0
```

```
None
```

```
[INFO] training model...
```

```
Train on 10471 samples, validate on 1309 samples
```

```
Epoch 1/500
```

```
10016/10471 [=====>..] - ETA: 0s - loss: 2.6637 - mean_absolute_error: 2.6637 - mean_squared_error: 14.5778
```

```
Epoch 00001: val_loss improved from inf to 0.95945, saving model to best_basic_model.hdf5
```

```
10471/10471 [=====] - 1s 130us/sample - loss: 2.6196 - mean_absolute_error: 2.6184 - mean_squared_error: 14.1193 - val_loss: 0.9594 - val_mean_absolute_error: 0.9596 - val_mean_squared_error: 1.1046
```

Epoch 2/500
10016/10471 [=====>..] - ETA: 0s - loss: 1.5384 - mean_absolute_error: 1.5384 - mean_squared_error: 3.7148
Epoch 00002: val_loss improved from 0.95945 to 0.50391, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 79us/sample - loss: 1.5313 - mean_absolute_error: 1.5304 - mean_squared_error: 3.6786 - val_loss: 0.5039 - val_mean_absolute_error: 0.5041 - val_mean_squared_error: 0.3304
Epoch 3/500
9920/10471 [=====>..] - ETA: 0s - loss: 1.1108 - mean_absolute_error: 1.1108 - mean_squared_error: 1.9632
Epoch 00003: val_loss improved from 0.50391 to 0.35220, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 1.0990 - mean_absolute_error: 1.0981 - mean_squared_error: 1.9244 - val_loss: 0.3522 - val_mean_absolute_error: 0.3524 - val_mean_squared_error: 0.1775
Epoch 4/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.7159 - mean_absolute_error: 0.7159 - mean_squared_error: 0.8326
Epoch 00004: val_loss improved from 0.35220 to 0.22368, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 79us/sample - loss: 0.7052 - mean_absolute_error: 0.7041 - mean_squared_error: 0.8077 - val_loss: 0.2237 - val_mean_absolute_error: 0.2237 - val_mean_squared_error: 0.0835
Epoch 5/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.3554 - mean_absolute_error: 0.3554 - mean_squared_error: 0.2152
Epoch 00005: val_loss improved from 0.22368 to 0.18330, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.3495 - mean_absolute_error: 0.3492 - mean_squared_error: 0.2089 - val_loss: 0.1833 - val_mean_absolute_error: 0.1833 - val_mean_squared_error: 0.0618
Epoch 6/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1956 - mean_absolute_error: 0.1956 - mean_squared_error: 0.0693
Epoch 00006: val_loss improved from 0.18330 to 0.17037, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1946 - mean_absolute_error: 0.1945 - mean_squared_error: 0.0686 - val_loss: 0.1704 - val_mean_absolute_error: 0.1703 - val_mean_squared_error: 0.0557
Epoch 7/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1768 - mean_absolute_error: 0.1768 - mean_squared_error: 0.0588
Epoch 00007: val_loss improved from 0.17037 to 0.16676, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 81us/sample - loss: 0.1755 - mean_absolute_error: 0.1755 - mean_squared_error: 0.0581 - val_loss: 0.1668 - val_mean_absolute_error: 0.1667 - val_mean_squared_error: 0.0545
Epoch 8/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1718 - mean_absolute_error: 0.1718 - mean_squared_error: 0.0566
Epoch 00008: val_loss improved from 0.16676 to 0.15680, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 83us/sample - loss: 0.1718 - mean_absolute_error: 0.1719 - mean_squared_error: 0.0569 - val_loss: 0.1568 - val_mean_absolute_error: 0.1567 - val_mean_squared_error: 0.0497
Epoch 9/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1659 - mean_absolute_error: 0.1659 - mean_squared_error: 0.0526
Epoch 00009: val_loss did not improve from 0.15680
10471/10471 [=====] - 1s 78us/sample - loss: 0.1661 - mean_absolute_error:

```
lute_error: 0.1661 - mean_squared_error: 0.0533 - val_loss: 0.1603 - val_mean_absolute_e
rror: 0.1603 - val_mean_squared_error: 0.0518
Epoch 10/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1628 - mean_absolute_er
ror: 0.1628 - mean_squared_error: 0.0524
Epoch 00010: val_loss did not improve from 0.15680
10471/10471 [=====] - 1s 78us/sample - loss: 0.1627 - mean_abso
lute_error: 0.1627 - mean_squared_error: 0.0521 - val_loss: 0.1597 - val_mean_absolute_e
rror: 0.1597 - val_mean_squared_error: 0.0488
Epoch 11/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1602 - mean_absolute_er
ror: 0.1602 - mean_squared_error: 0.0510
Epoch 00011: val_loss did not improve from 0.15680
10471/10471 [=====] - 1s 79us/sample - loss: 0.1601 - mean_abso
lute_error: 0.1601 - mean_squared_error: 0.0510 - val_loss: 0.1641 - val_mean_absolute_e
rror: 0.1641 - val_mean_squared_error: 0.0526
Epoch 12/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1595 - mean_absolute_er
ror: 0.1595 - mean_squared_error: 0.0510
Epoch 00012: val_loss did not improve from 0.15680
10471/10471 [=====] - 1s 80us/sample - loss: 0.1591 - mean_abso
lute_error: 0.1590 - mean_squared_error: 0.0507 - val_loss: 0.1577 - val_mean_absolute_e
rror: 0.1577 - val_mean_squared_error: 0.0489
Epoch 13/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1574 - mean_absolute_er
ror: 0.1574 - mean_squared_error: 0.0501
Epoch 00013: val_loss did not improve from 0.15680
10471/10471 [=====] - 1s 77us/sample - loss: 0.1576 - mean_abso
lute_error: 0.1575 - mean_squared_error: 0.0500 - val_loss: 0.1572 - val_mean_absolute_e
rror: 0.1572 - val_mean_squared_error: 0.0503
Epoch 14/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1558 - mean_absolute_er
ror: 0.1558 - mean_squared_error: 0.0493
Epoch 00014: val_loss improved from 0.15680 to 0.15399, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 79us/sample - loss: 0.1556 - mean_abso
lute_error: 0.1553 - mean_squared_error: 0.0493 - val_loss: 0.1540 - val_mean_absolute_e
rror: 0.1540 - val_mean_squared_error: 0.0472
Epoch 15/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1533 - mean_absolute_er
ror: 0.1533 - mean_squared_error: 0.0484
Epoch 00015: val_loss improved from 0.15399 to 0.14732, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 0.1535 - mean_abso
lute_error: 0.1535 - mean_squared_error: 0.0486 - val_loss: 0.1473 - val_mean_absolute_e
rror: 0.1473 - val_mean_squared_error: 0.0457
Epoch 16/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1525 - mean_absolute_er
ror: 0.1525 - mean_squared_error: 0.0483
Epoch 00016: val_loss did not improve from 0.14732
10471/10471 [=====] - 1s 78us/sample - loss: 0.1527 - mean_abso
lute_error: 0.1527 - mean_squared_error: 0.0481 - val_loss: 0.1526 - val_mean_absolute_e
rror: 0.1526 - val_mean_squared_error: 0.0478
Epoch 17/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1530 - mean_absolute_er
ror: 0.1530 - mean_squared_error: 0.0487
Epoch 00017: val_loss improved from 0.14732 to 0.14713, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 79us/sample - loss: 0.1530 - mean_abso
lute_error: 0.1531 - mean_squared_error: 0.0487 - val_loss: 0.1471 - val_mean_absolute_e
rror: 0.1471 - val_mean_squared_error: 0.0449
```

Epoch 18/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1514 - mean_absolute_error: 0.1514 - mean_squared_error: 0.0474
Epoch 00018: val_loss improved from 0.14713 to 0.14667, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 79us/sample - loss: 0.1514 - mean_absolute_error: 0.1512 - mean_squared_error: 0.0473 - val_loss: 0.1467 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0447
Epoch 19/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1514 - mean_absolute_error: 0.1514 - mean_squared_error: 0.0474
Epoch 00019: val_loss did not improve from 0.14667
10471/10471 [=====] - 1s 78us/sample - loss: 0.1513 - mean_absolute_error: 0.1512 - mean_squared_error: 0.0472 - val_loss: 0.1471 - val_mean_absolute_error: 0.1471 - val_mean_squared_error: 0.0446
Epoch 20/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1485 - mean_absolute_error: 0.1485 - mean_squared_error: 0.0467
Epoch 00020: val_loss improved from 0.14667 to 0.14374, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 0.1487 - mean_absolute_error: 0.1487 - mean_squared_error: 0.0466 - val_loss: 0.1437 - val_mean_absolute_error: 0.1437 - val_mean_squared_error: 0.0425
Epoch 21/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1491 - mean_absolute_error: 0.1491 - mean_squared_error: 0.0463
Epoch 00021: val_loss did not improve from 0.14374
10471/10471 [=====] - 1s 76us/sample - loss: 0.1494 - mean_absolute_error: 0.1493 - mean_squared_error: 0.0468 - val_loss: 0.1501 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0463
Epoch 22/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1511 - mean_absolute_error: 0.1511 - mean_squared_error: 0.0472
Epoch 00022: val_loss did not improve from 0.14374
10471/10471 [=====] - 1s 78us/sample - loss: 0.1511 - mean_absolute_error: 0.1511 - mean_squared_error: 0.0473 - val_loss: 0.1777 - val_mean_absolute_error: 0.1777 - val_mean_squared_error: 0.0566
Epoch 23/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1483 - mean_absolute_error: 0.1483 - mean_squared_error: 0.0461
Epoch 00023: val_loss did not improve from 0.14374
10471/10471 [=====] - 1s 80us/sample - loss: 0.1482 - mean_absolute_error: 0.1481 - mean_squared_error: 0.0460 - val_loss: 0.1515 - val_mean_absolute_error: 0.1515 - val_mean_squared_error: 0.0456
Epoch 24/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1482 - mean_absolute_error: 0.1482 - mean_squared_error: 0.0457
Epoch 00024: val_loss did not improve from 0.14374
10471/10471 [=====] - 1s 78us/sample - loss: 0.1484 - mean_absolute_error: 0.1485 - mean_squared_error: 0.0457 - val_loss: 0.1438 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0435
Epoch 25/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1478 - mean_absolute_error: 0.1478 - mean_squared_error: 0.0454
Epoch 00025: val_loss did not improve from 0.14374
10471/10471 [=====] - 1s 77us/sample - loss: 0.1479 - mean_absolute_error: 0.1479 - mean_squared_error: 0.0455 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0463
Epoch 26/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1490 - mean_absolute_error: 0.1490 - mean_squared_error: 0.0470

```
Epoch 00026: val_loss improved from 0.14374 to 0.14312, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 80us/sample - loss: 0.1482 - mean_absolute_error: 0.1481 - mean_squared_error: 0.0463 - val_loss: 0.1431 - val_mean_absolute_error: 0.1431 - val_mean_squared_error: 0.0436
Epoch 27/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1451 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0442
Epoch 00027: val_loss did not improve from 0.14312
10471/10471 [=====] - 1s 78us/sample - loss: 0.1457 - mean_absolute_error: 0.1457 - mean_squared_error: 0.0449 - val_loss: 0.1454 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0432
Epoch 28/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1446 - mean_absolute_error: 0.1446 - mean_squared_error: 0.0438
Epoch 00028: val_loss improved from 0.14312 to 0.14035, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 79us/sample - loss: 0.1450 - mean_absolute_error: 0.1452 - mean_squared_error: 0.0445 - val_loss: 0.1404 - val_mean_absolute_error: 0.1403 - val_mean_squared_error: 0.0420
Epoch 29/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.1464 - mean_absolute_error: 0.1464 - mean_squared_error: 0.0453
Epoch 00029: val_loss did not improve from 0.14035
10471/10471 [=====] - 1s 79us/sample - loss: 0.1465 - mean_absolute_error: 0.1466 - mean_squared_error: 0.0453 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0450
Epoch 30/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1461 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0455
Epoch 00030: val_loss did not improve from 0.14035
10471/10471 [=====] - 1s 78us/sample - loss: 0.1465 - mean_absolute_error: 0.1464 - mean_squared_error: 0.0455 - val_loss: 0.1430 - val_mean_absolute_error: 0.1430 - val_mean_squared_error: 0.0436
Epoch 31/500
10336/10471 [=====>..] - ETA: 0s - loss: 0.1477 - mean_absolute_error: 0.1477 - mean_squared_error: 0.0457
Epoch 00031: val_loss did not improve from 0.14035
10471/10471 [=====] - 1s 79us/sample - loss: 0.1476 - mean_absolute_error: 0.1474 - mean_squared_error: 0.0456 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0433
Epoch 32/500
9760/10471 [=====>..] - ETA: 0s - loss: 0.1441 - mean_absolute_error: 0.1441 - mean_squared_error: 0.0439
Epoch 00032: val_loss did not improve from 0.14035
10471/10471 [=====] - 1s 78us/sample - loss: 0.1444 - mean_absolute_error: 0.1444 - mean_squared_error: 0.0444 - val_loss: 0.1420 - val_mean_absolute_error: 0.1419 - val_mean_squared_error: 0.0429
Epoch 33/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1446 - mean_absolute_error: 0.1446 - mean_squared_error: 0.0443
Epoch 00033: val_loss did not improve from 0.14035
10471/10471 [=====] - 1s 77us/sample - loss: 0.1448 - mean_absolute_error: 0.1453 - mean_squared_error: 0.0457 - val_loss: 0.1451 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0437
Epoch 34/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1448 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0444
Epoch 00034: val_loss did not improve from 0.14035
10471/10471 [=====] - 1s 77us/sample - loss: 0.1447 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0443 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0436
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rror: 0.1456 - val_mean_squared_error: 0.0447
Epoch 35/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1433 - mean_absolute_error: 0.1433 - mean_squared_error: 0.0440
Epoch 00035: val_loss did not improve from 0.14035
10471/10471 [=====] - 1s 76us/sample - loss: 0.1431 - mean_absolute_error: 0.1433 - mean_squared_error: 0.0439 - val_loss: 0.1484 - val_mean_absolute_error: 0.1484 - val_mean_squared_error: 0.0454
Epoch 36/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1428 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0434
Epoch 00036: val_loss improved from 0.14035 to 0.13992, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 83us/sample - loss: 0.1427 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0433 - val_loss: 0.1399 - val_mean_absolute_error: 0.1399 - val_mean_squared_error: 0.0418
Epoch 37/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.1416 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0427
Epoch 00037: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 79us/sample - loss: 0.1416 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0426 - val_loss: 0.1525 - val_mean_absolute_error: 0.1524 - val_mean_squared_error: 0.0482
Epoch 38/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1432 - mean_absolute_error: 0.1432 - mean_squared_error: 0.0436
Epoch 00038: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 77us/sample - loss: 0.1430 - mean_absolute_error: 0.1429 - mean_squared_error: 0.0435 - val_loss: 0.1405 - val_mean_absolute_error: 0.1405 - val_mean_squared_error: 0.0422
Epoch 39/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1422 - mean_absolute_error: 0.1422 - mean_squared_error: 0.0431
Epoch 00039: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 75us/sample - loss: 0.1421 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0430 - val_loss: 0.1462 - val_mean_absolute_error: 0.1461 - val_mean_squared_error: 0.0453
Epoch 40/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1414 - mean_absolute_error: 0.1414 - mean_squared_error: 0.0429
Epoch 00040: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 77us/sample - loss: 0.1414 - mean_absolute_error: 0.1413 - mean_squared_error: 0.0427 - val_loss: 0.1507 - val_mean_absolute_error: 0.1508 - val_mean_squared_error: 0.0440
Epoch 41/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1417 - mean_absolute_error: 0.1417 - mean_squared_error: 0.0434
Epoch 00041: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 76us/sample - loss: 0.1416 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0431 - val_loss: 0.1473 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0453
Epoch 42/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1421 - mean_absolute_error: 0.1421 - mean_squared_error: 0.0431
Epoch 00042: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 77us/sample - loss: 0.1417 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0433 - val_loss: 0.1413 - val_mean_absolute_error: 0.1413 - val_mean_squared_error: 0.0427
Epoch 43/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1424 - mean_absolute_error: 0.1424 - mean_squared_error: 0.0436
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Epoch 00043: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 77us/sample - loss: 0.1416 - mean_absolute_error: 0.1418 - mean_squared_error: 0.0432 - val_loss: 0.1500 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0458
Epoch 44/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1400 - mean_absolute_error: 0.1400 - mean_squared_error: 0.0418
Epoch 00044: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 70us/sample - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0419 - val_loss: 0.1436 - val_mean_absolute_error: 0.1436 - val_mean_squared_error: 0.0427
Epoch 45/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0425
Epoch 00045: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 70us/sample - loss: 0.1416 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0428 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0444
Epoch 46/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1397 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0423
Epoch 00046: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 71us/sample - loss: 0.1404 - mean_absolute_error: 0.1403 - mean_squared_error: 0.0427 - val_loss: 0.1474 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0451
Epoch 47/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1407 - mean_absolute_error: 0.1407 - mean_squared_error: 0.0428
Epoch 00047: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 78us/sample - loss: 0.1414 - mean_absolute_error: 0.1414 - mean_squared_error: 0.0430 - val_loss: 0.1425 - val_mean_absolute_error: 0.1424 - val_mean_squared_error: 0.0427
Epoch 48/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1399 - mean_absolute_error: 0.1399 - mean_squared_error: 0.0421
Epoch 00048: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 78us/sample - loss: 0.1397 - mean_absolute_error: 0.1396 - mean_squared_error: 0.0419 - val_loss: 0.1406 - val_mean_absolute_error: 0.1406 - val_mean_squared_error: 0.0415
Epoch 49/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1419 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0426
Epoch 00049: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 80us/sample - loss: 0.1420 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0426 - val_loss: 0.1503 - val_mean_absolute_error: 0.1503 - val_mean_squared_error: 0.0440
Epoch 50/500
9792/10471 [=====>..] - ETA: 0s - loss: 0.1396 - mean_absolute_error: 0.1396 - mean_squared_error: 0.0413
Epoch 00050: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 78us/sample - loss: 0.1393 - mean_absolute_error: 0.1398 - mean_squared_error: 0.0418 - val_loss: 0.1473 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0441
Epoch 51/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1403 - mean_absolute_error: 0.1403 - mean_squared_error: 0.0420
Epoch 00051: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 79us/sample - loss: 0.1405 - mean_absolute_error: 0.1405 - mean_squared_error: 0.0420 - val_loss: 0.1461 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0439
Epoch 52/500
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9984/10471 [=====>..] - ETA: 0s - loss: 0.1397 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0423
Epoch 00052: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 76us/sample - loss: 0.1394 - mean_absolute_error: 0.1393 - mean_squared_error: 0.0420 - val_loss: 0.1438 - val_mean_absolute_error: 0.1437 - val_mean_squared_error: 0.0432
Epoch 53/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1373 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0407
Epoch 00053: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 80us/sample - loss: 0.1375 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0410 - val_loss: 0.1446 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0444
Epoch 54/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1379 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0408
Epoch 00054: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 77us/sample - loss: 0.1384 - mean_absolute_error: 0.1385 - mean_squared_error: 0.0413 - val_loss: 0.1420 - val_mean_absolute_error: 0.1420 - val_mean_squared_error: 0.0419
Epoch 55/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1392 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0416
Epoch 00055: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 76us/sample - loss: 0.1394 - mean_absolute_error: 0.1396 - mean_squared_error: 0.0419 - val_loss: 0.1420 - val_mean_absolute_error: 0.1420 - val_mean_squared_error: 0.0423
Epoch 56/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1392 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0419
Epoch 00056: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 77us/sample - loss: 0.1395 - mean_absolute_error: 0.1395 - mean_squared_error: 0.0420 - val_loss: 0.1439 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0437
Epoch 57/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1369 - mean_absolute_error: 0.1369 - mean_squared_error: 0.0399
Epoch 00057: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 77us/sample - loss: 0.1375 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0405 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0442
Epoch 58/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1388 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0412
Epoch 00058: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 78us/sample - loss: 0.1391 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0415 - val_loss: 0.1434 - val_mean_absolute_error: 0.1434 - val_mean_squared_error: 0.0419
Epoch 59/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1388 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0416
Epoch 00059: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 78us/sample - loss: 0.1388 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0415 - val_loss: 0.1430 - val_mean_absolute_error: 0.1430 - val_mean_squared_error: 0.0427
Epoch 60/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.1364 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0404
Epoch 00060: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 79us/sample - loss: 0.1364 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0403 - val_loss: 0.1449 - val_mean_absolute_error: 0.1449 - val_mean_squared_error: 0.0431
```

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rror: 0.1448 - val_mean_squared_error: 0.0444
Epoch 61/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1377 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0410Restoring model weights from the end of the best epoch.

Epoch 00061: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 75us/sample - loss: 0.1376 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0409 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0434
Epoch 00061: early stopping
MAE: 0.1399053
RMSE: 0.2043711
Adding initial Dense layers with 32
Adding Dense layer with 32
Adding last layer with 32
Outputting predictive model - Tabular
Model: "model_97"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_98 (InputLayer)	[(None, 61)]	0
dense_724 (Dense)	(None, 32)	1984
dense_725 (Dense)	(None, 32)	1056
dense_726 (Dense)	(None, 32)	1056
dense_727 (Dense)	(None, 32)	1056
dense_728 (Dense)	(None, 32)	1056
dense_729 (Dense)	(None, 32)	1056
dense_730 (Dense)	(None, 32)	1056
dense_731 (Dense)	(None, 32)	1056
dense_732 (Dense)	(None, 32)	1056
dense_733 (Dense)	(None, 32)	1056
dense_734 (Dense)	(None, 32)	1056
dense_735 (Dense)	(None, 32)	1056
dropout_21 (Dropout)	(None, 32)	0
dense_736 (Dense)	(None, 1)	33
<hr/>		
Total params: 13,633		

```
Trainable params: 13,633
Non-trainable params: 0
```

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10400/10471 [=====>.] - ETA: 0s - loss: 2.2448 - mean_absolute_error: 2.2448 - mean_squared_error: 9.4121
Epoch 00001: val_loss improved from inf to 1.90785, saving model to best_basic_model.hdf5
10471/10471 [=====] - 2s 146us/sample - loss: 2.2423 - mean_absolute_error: 2.2415 - mean_squared_error: 9.3706 - val_loss: 1.9078 - val_mean_absolute_error: 1.9082 - val_mean_squared_error: 3.7862
Epoch 2/500
10464/10471 [=====>.] - ETA: 0s - loss: 1.4961 - mean_absolute_error: 1.4961 - mean_squared_error: 3.5282
Epoch 00002: val_loss improved from 1.90785 to 0.47958, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 92us/sample - loss: 1.4957 - mean_absolute_error: 1.4945 - mean_squared_error: 3.5226 - val_loss: 0.4796 - val_mean_absolute_error: 0.4798 - val_mean_squared_error: 0.3060
Epoch 3/500
9984/10471 [=====>..] - ETA: 0s - loss: 1.1195 - mean_absolute_error: 1.1195 - mean_squared_error: 1.9672
Epoch 00003: val_loss improved from 0.47958 to 0.21610, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 95us/sample - loss: 1.1054 - mean_absolute_error: 1.1047 - mean_squared_error: 1.9225 - val_loss: 0.2161 - val_mean_absolute_error: 0.2161 - val_mean_squared_error: 0.0826
Epoch 4/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.7436 - mean_absolute_error: 0.7436 - mean_squared_error: 0.8883
Epoch 00004: val_loss did not improve from 0.21610
10471/10471 [=====] - 1s 86us/sample - loss: 0.7390 - mean_absolute_error: 0.7386 - mean_squared_error: 0.8763 - val_loss: 0.3404 - val_mean_absolute_error: 0.3406 - val_mean_squared_error: 0.1608
Epoch 5/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.4160 - mean_absolute_error: 0.4160 - mean_squared_error: 0.2890
Epoch 00005: val_loss did not improve from 0.21610
10471/10471 [=====] - 1s 85us/sample - loss: 0.4132 - mean_absolute_error: 0.4130 - mean_squared_error: 0.2856 - val_loss: 0.2209 - val_mean_absolute_error: 0.2210 - val_mean_squared_error: 0.0808
Epoch 6/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.2177 - mean_absolute_error: 0.2177 - mean_squared_error: 0.0840
Epoch 00006: val_loss improved from 0.21610 to 0.19008, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 89us/sample - loss: 0.2171 - mean_absolute_error: 0.2174 - mean_squared_error: 0.0838 - val_loss: 0.1901 - val_mean_absolute_error: 0.1901 - val_mean_squared_error: 0.0659
Epoch 7/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1826 - mean_absolute_error: 0.1826 - mean_squared_error: 0.0620
Epoch 00007: val_loss improved from 0.19008 to 0.17190, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 89us/sample - loss: 0.1823 - mean_absolute_error: 0.1821 - mean_squared_error: 0.0617 - val_loss: 0.1719 - val_mean_absolute_error: 0.1719 - val_mean_squared_error: 0.0574
Epoch 8/500
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10208/10471 [=====>.] - ETA: 0s - loss: 0.1723 - mean_absolute_error: 0.1723 - mean_squared_error: 0.0567
Epoch 00008: val_loss improved from 0.17190 to 0.16680, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 89us/sample - loss: 0.1720 - mean_absolute_error: 0.1720 - mean_squared_error: 0.0565 - val_loss: 0.1668 - val_mean_absolute_error: 0.1668 - val_mean_squared_error: 0.0539
Epoch 9/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1690 - mean_absolute_error: 0.1690 - mean_squared_error: 0.0549
Epoch 00009: val_loss improved from 0.16680 to 0.16110, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 89us/sample - loss: 0.1687 - mean_absolute_error: 0.1686 - mean_squared_error: 0.0546 - val_loss: 0.1611 - val_mean_absolute_error: 0.1611 - val_mean_squared_error: 0.0510
Epoch 10/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1631 - mean_absolute_error: 0.1631 - mean_squared_error: 0.0521
Epoch 00010: val_loss did not improve from 0.16110
10471/10471 [=====] - 1s 86us/sample - loss: 0.1626 - mean_absolute_error: 0.1625 - mean_squared_error: 0.0516 - val_loss: 0.1649 - val_mean_absolute_error: 0.1649 - val_mean_squared_error: 0.0540
Epoch 11/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1614 - mean_absolute_error: 0.1614 - mean_squared_error: 0.0509
Epoch 00011: val_loss improved from 0.16110 to 0.15414, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 92us/sample - loss: 0.1611 - mean_absolute_error: 0.1611 - mean_squared_error: 0.0508 - val_loss: 0.1541 - val_mean_absolute_error: 0.1542 - val_mean_squared_error: 0.0481
Epoch 12/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1604 - mean_absolute_error: 0.1604 - mean_squared_error: 0.0515
Epoch 00012: val_loss did not improve from 0.15414
10471/10471 [=====] - 1s 87us/sample - loss: 0.1601 - mean_absolute_error: 0.1603 - mean_squared_error: 0.0513 - val_loss: 0.1562 - val_mean_absolute_error: 0.1562 - val_mean_squared_error: 0.0503
Epoch 13/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1577 - mean_absolute_error: 0.1577 - mean_squared_error: 0.0495
Epoch 00013: val_loss did not improve from 0.15414
10471/10471 [=====] - 1s 87us/sample - loss: 0.1579 - mean_absolute_error: 0.1578 - mean_squared_error: 0.0497 - val_loss: 0.1558 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0497
Epoch 14/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1581 - mean_absolute_error: 0.1581 - mean_squared_error: 0.0500
Epoch 00014: val_loss improved from 0.15414 to 0.15007, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 93us/sample - loss: 0.1580 - mean_absolute_error: 0.1579 - mean_squared_error: 0.0499 - val_loss: 0.1501 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0464
Epoch 15/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1559 - mean_absolute_error: 0.1559 - mean_squared_error: 0.0490
Epoch 00015: val_loss improved from 0.15007 to 0.14837, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.1555 - mean_absolute_error: 0.1558 - mean_squared_error: 0.0490 - val_loss: 0.1484 - val_mean_absolute_error: 0.1484 - val_mean_squared_error: 0.0457
Epoch 16/500
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10464/10471 [=====>.] - ETA: 0s - loss: 0.1516 - mean_absolute_error: 0.1516 - mean_squared_error: 0.0475
Epoch 00016: val_loss improved from 0.14837 to 0.14785, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 88us/sample - loss: 0.1516 - mean_absolute_error: 0.1516 - mean_squared_error: 0.0474 - val_loss: 0.1478 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0456
Epoch 17/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1525 - mean_absolute_error: 0.1525 - mean_squared_error: 0.0474
Epoch 00017: val_loss did not improve from 0.14785
10471/10471 [=====] - 1s 85us/sample - loss: 0.1523 - mean_absolute_error: 0.1525 - mean_squared_error: 0.0473 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0464
Epoch 18/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1513 - mean_absolute_error: 0.1513 - mean_squared_error: 0.0475
Epoch 00018: val_loss did not improve from 0.14785
10471/10471 [=====] - 1s 86us/sample - loss: 0.1516 - mean_absolute_error: 0.1514 - mean_squared_error: 0.0477 - val_loss: 0.1502 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0477
Epoch 19/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1529 - mean_absolute_error: 0.1529 - mean_squared_error: 0.0477
Epoch 00019: val_loss did not improve from 0.14785
10471/10471 [=====] - 1s 85us/sample - loss: 0.1526 - mean_absolute_error: 0.1527 - mean_squared_error: 0.0476 - val_loss: 0.1493 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0457
Epoch 20/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1502 - mean_absolute_error: 0.1502 - mean_squared_error: 0.0470
Epoch 00020: val_loss improved from 0.14785 to 0.14604, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 88us/sample - loss: 0.1504 - mean_absolute_error: 0.1505 - mean_squared_error: 0.0471 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0449
Epoch 21/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1502 - mean_absolute_error: 0.1502 - mean_squared_error: 0.0464
Epoch 00021: val_loss did not improve from 0.14604
10471/10471 [=====] - 1s 86us/sample - loss: 0.1503 - mean_absolute_error: 0.1505 - mean_squared_error: 0.0465 - val_loss: 0.1504 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0471
Epoch 22/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1475 - mean_absolute_error: 0.1475 - mean_squared_error: 0.0455
Epoch 00022: val_loss improved from 0.14604 to 0.14603, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 88us/sample - loss: 0.1475 - mean_absolute_error: 0.1476 - mean_squared_error: 0.0454 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0453
Epoch 23/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1483 - mean_absolute_error: 0.1483 - mean_squared_error: 0.0460
Epoch 00023: val_loss did not improve from 0.14603
10471/10471 [=====] - 1s 84us/sample - loss: 0.1482 - mean_absolute_error: 0.1483 - mean_squared_error: 0.0460 - val_loss: 0.1476 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0462
Epoch 24/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1485 - mean_absolute_error: 0.1485 - mean_squared_error: 0.0457
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Epoch 00024: val_loss did not improve from 0.14603
10471/10471 [=====] - 1s 85us/sample - loss: 0.1486 - mean_absolute_error: 0.1487 - mean_squared_error: 0.0457 - val_loss: 0.1524 - val_mean_absolute_error: 0.1524 - val_mean_squared_error: 0.0464
Epoch 25/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1471 - mean_absolute_error: 0.1471 - mean_squared_error: 0.0459
Epoch 00025: val_loss improved from 0.14603 to 0.14521, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 88us/sample - loss: 0.1469 - mean_absolute_error: 0.1470 - mean_squared_error: 0.0458 - val_loss: 0.1452 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0446
Epoch 26/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1461 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0446
Epoch 00026: val_loss did not improve from 0.14521
10471/10471 [=====] - 1s 85us/sample - loss: 0.1461 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0445 - val_loss: 0.1494 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0471
Epoch 27/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1460 - mean_absolute_error: 0.1460 - mean_squared_error: 0.0456
Epoch 00027: val_loss improved from 0.14521 to 0.14325, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 88us/sample - loss: 0.1459 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0454 - val_loss: 0.1433 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0442
Epoch 28/500
10112/10471 [=====.>..] - ETA: 0s - loss: 0.1461 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0453
Epoch 00028: val_loss did not improve from 0.14325
10471/10471 [=====] - 1s 86us/sample - loss: 0.1458 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0450 - val_loss: 0.1522 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0472
Epoch 29/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1448 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0444
Epoch 00029: val_loss did not improve from 0.14325
10471/10471 [=====] - 1s 85us/sample - loss: 0.1444 - mean_absolute_error: 0.1445 - mean_squared_error: 0.0443 - val_loss: 0.1545 - val_mean_absolute_error: 0.1545 - val_mean_squared_error: 0.0487
Epoch 30/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1446 - mean_absolute_error: 0.1446 - mean_squared_error: 0.0445
Epoch 00030: val_loss did not improve from 0.14325
10471/10471 [=====] - 1s 85us/sample - loss: 0.1449 - mean_absolute_error: 0.1449 - mean_squared_error: 0.0447 - val_loss: 0.1571 - val_mean_absolute_error: 0.1571 - val_mean_squared_error: 0.0502
Epoch 31/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1435 - mean_absolute_error: 0.1435 - mean_squared_error: 0.0443
Epoch 00031: val_loss did not improve from 0.14325
10471/10471 [=====] - 1s 85us/sample - loss: 0.1434 - mean_absolute_error: 0.1436 - mean_squared_error: 0.0442 - val_loss: 0.1458 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0445
Epoch 32/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1448 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0445
Epoch 00032: val_loss did not improve from 0.14325
10471/10471 [=====] - 1s 84us/sample - loss: 0.1449 - mean_absolute_error: 0.1452 - mean_squared_error: 0.0450 - val_loss: 0.1578 - val_mean_absolute_error: 0.1578 - val_mean_squared_error: 0.0502
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rror: 0.1578 - val_mean_squared_error: 0.0503
Epoch 33/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1442 - mean_absolute_error: 0.1442 - mean_squared_error: 0.0445
Epoch 00033: val_loss did not improve from 0.14325
10471/10471 [=====] - 1s 85us/sample - loss: 0.1444 - mean_absolute_error: 0.1443 - mean_squared_error: 0.0445 - val_loss: 0.1511 - val_mean_absolute_error: 0.1511 - val_mean_squared_error: 0.0461
Epoch 34/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1441 - mean_absolute_error: 0.1441 - mean_squared_error: 0.0446
Epoch 00034: val_loss improved from 0.14325 to 0.14204, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 89us/sample - loss: 0.1443 - mean_absolute_error: 0.1444 - mean_squared_error: 0.0447 - val_loss: 0.1420 - val_mean_absolute_error: 0.1420 - val_mean_squared_error: 0.0431
Epoch 35/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1418 - mean_absolute_error: 0.1418 - mean_squared_error: 0.0430
Epoch 00035: val_loss improved from 0.14204 to 0.13941, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 88us/sample - loss: 0.1417 - mean_absolute_error: 0.1416 - mean_squared_error: 0.0428 - val_loss: 0.1394 - val_mean_absolute_error: 0.1394 - val_mean_squared_error: 0.0424
Epoch 36/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1434 - mean_absolute_error: 0.1434 - mean_squared_error: 0.0432
Epoch 00036: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1437 - mean_absolute_error: 0.1437 - mean_squared_error: 0.0437 - val_loss: 0.1423 - val_mean_absolute_error: 0.1423 - val_mean_squared_error: 0.0430
Epoch 37/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1436 - mean_absolute_error: 0.1436 - mean_squared_error: 0.0443
Epoch 00037: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 84us/sample - loss: 0.1434 - mean_absolute_error: 0.1434 - mean_squared_error: 0.0441 - val_loss: 0.1432 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0439
Epoch 38/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1425 - mean_absolute_error: 0.1425 - mean_squared_error: 0.0436
Epoch 00038: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1426 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0438 - val_loss: 0.1462 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0447
Epoch 39/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1429 - mean_absolute_error: 0.1429 - mean_squared_error: 0.0439
Epoch 00039: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1430 - mean_absolute_error: 0.1429 - mean_squared_error: 0.0439 - val_loss: 0.1492 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0445
Epoch 40/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1428 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0435
Epoch 00040: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1426 - mean_absolute_error: 0.1427 - mean_squared_error: 0.0433 - val_loss: 0.1422 - val_mean_absolute_error: 0.1422 - val_mean_squared_error: 0.0434
Epoch 41/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1421 - mean_absolute_error:
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ror: 0.1421 - mean_squared_error: 0.0438
Epoch 00041: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 84us/sample - loss: 0.1419 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0436 - val_loss: 0.1534 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0475
Epoch 42/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1419 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0435
Epoch 00042: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1418 - mean_absolute_error: 0.1418 - mean_squared_error: 0.0433 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0462
Epoch 43/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1434 - mean_absolute_error: 0.1434 - mean_squared_error: 0.0437
Epoch 00043: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1435 - mean_absolute_error: 0.1433 - mean_squared_error: 0.0438 - val_loss: 0.1411 - val_mean_absolute_error: 0.1411 - val_mean_squared_error: 0.0429
Epoch 44/500
9952/10471 [=====.>..] - ETA: 0s - loss: 0.1400 - mean_absolute_error: 0.1400 - mean_squared_error: 0.0424
Epoch 00044: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 87us/sample - loss: 0.1407 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0428 - val_loss: 0.1398 - val_mean_absolute_error: 0.1398 - val_mean_squared_error: 0.0426
Epoch 45/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0421
Epoch 00045: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 84us/sample - loss: 0.1397 - mean_absolute_error: 0.1397 - mean_squared_error: 0.0424 - val_loss: 0.1419 - val_mean_absolute_error: 0.1419 - val_mean_squared_error: 0.0429
Epoch 46/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0428
Epoch 00046: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1407 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0431 - val_loss: 0.1557 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0482
Epoch 47/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1406 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0431
Epoch 00047: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1406 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0434 - val_loss: 0.1450 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0439
Epoch 48/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0418
Epoch 00048: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1387 - mean_absolute_error: 0.1385 - mean_squared_error: 0.0416 - val_loss: 0.1435 - val_mean_absolute_error: 0.1435 - val_mean_squared_error: 0.0435
Epoch 49/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0422
Epoch 00049: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1393 - mean_absolute_error: 0.1393 - mean_squared_error: 0.0420 - val_loss: 0.1398 - val_mean_absolute_error: 0.1398 - val_mean_squared_error: 0.0420
```

Epoch 50/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1390 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0425
Epoch 00050: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1389 - mean_absolute_error: 0.1395 - mean_squared_error: 0.0429 - val_loss: 0.1417 - val_mean_absolute_error: 0.1417 - val_mean_squared_error: 0.0433
Epoch 51/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1390 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0416
Epoch 00051: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 84us/sample - loss: 0.1389 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0415 - val_loss: 0.1595 - val_mean_absolute_error: 0.1594 - val_mean_squared_error: 0.0509
Epoch 52/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1385 - mean_absolute_error: 0.1385 - mean_squared_error: 0.0421
Epoch 00052: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 84us/sample - loss: 0.1387 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0421 - val_loss: 0.1405 - val_mean_absolute_error: 0.1405 - val_mean_squared_error: 0.0418
Epoch 53/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1390 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0420
Epoch 00053: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 84us/sample - loss: 0.1389 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0420 - val_loss: 0.1465 - val_mean_absolute_error: 0.1465 - val_mean_squared_error: 0.0448
Epoch 54/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0420
Epoch 00054: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 84us/sample - loss: 0.1395 - mean_absolute_error: 0.1395 - mean_squared_error: 0.0421 - val_loss: 0.1484 - val_mean_absolute_error: 0.1483 - val_mean_squared_error: 0.0458
Epoch 55/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0403
Epoch 00055: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 86us/sample - loss: 0.1370 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0411 - val_loss: 0.1398 - val_mean_absolute_error: 0.1398 - val_mean_squared_error: 0.0415
Epoch 56/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1391 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0420
Epoch 00056: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1389 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0420 - val_loss: 0.1441 - val_mean_absolute_error: 0.1441 - val_mean_squared_error: 0.0440
Epoch 57/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0416
Epoch 00057: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1377 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0413 - val_loss: 0.1455 - val_mean_absolute_error: 0.1455 - val_mean_squared_error: 0.0446
Epoch 58/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1391 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0420
Epoch 00058: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 86us/sample - loss: 0.1392 - mean_absolute_error:

```

lute_error: 0.1392 - mean_squared_error: 0.0421 - val_loss: 0.1443 - val_mean_absolute_e
rror: 0.1443 - val_mean_squared_error: 0.0445
Epoch 59/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1376 - mean_absolute_er
ror: 0.1376 - mean_squared_error: 0.0411
Epoch 00059: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 84us/sample - loss: 0.1374 - mean_abso
lute_error: 0.1374 - mean_squared_error: 0.0410 - val_loss: 0.1495 - val_mean_absolute_e
rror: 0.1495 - val_mean_squared_error: 0.0464
Epoch 60/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1394 - mean_absolute_er
ror: 0.1394 - mean_squared_error: 0.0423Restoring model weights from the end of the best
epoch.

Epoch 00060: val_loss did not improve from 0.13941
10471/10471 [=====] - 1s 85us/sample - loss: 0.1391 - mean_abso
lute_error: 0.1390 - mean_squared_error: 0.0421 - val_loss: 0.1426 - val_mean_absolute_e
rror: 0.1426 - val_mean_squared_error: 0.0432
Epoch 00060: early stopping
MAE: 0.13941175
RMSE: 0.20592229
Adding initial Dense layers with 64
Adding Dense layer with 64
Adding Dense layer with 64
Adding Dense layer with 64
Adding last layer with 64
Outputting predictive model - Tabular
Model: "model_98"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_99 (InputLayer)	[(None, 61)]	0
dense_737 (Dense)	(None, 64)	3968
dense_738 (Dense)	(None, 64)	4160
dense_739 (Dense)	(None, 64)	4160
dense_740 (Dense)	(None, 64)	4160
dense_741 (Dense)	(None, 64)	4160
dropout_22 (Dropout)	(None, 64)	0
dense_742 (Dense)	(None, 1)	65
<hr/>		

```

Total params: 20,673
Trainable params: 20,673
Non-trainable params: 0

```

```

None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
9696/10471 [=====>...] - ETA: 0s - loss: 2.3597 - mean_absolute_e
rror: 2.3597 - mean_squared_error: 12.3983
Epoch 00001: val_loss improved from inf to 2.05637, saving model to best_basic_model.hdf
5
10471/10471 [=====] - 1s 106us/sample - loss: 2.2876 - mean_abso
lute_error: 2.2833 - mean_squared_error: 11.6757 - val_loss: 2.0564 - val_mean_absolute

```

```
_error: 2.0559 - val_mean_squared_error: 4.8571
Epoch 2/500
10336/10471 [=====>.] - ETA: 0s - loss: 1.1892 - mean_absolute_error: 1.1892 - mean_squared_error: 2.2654
Epoch 00002: val_loss improved from 2.05637 to 0.32852, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 1.1856 - mean_absolute_error: 1.1849 - mean_squared_error: 2.2502 - val_loss: 0.3285 - val_mean_absolute_error: 0.3284 - val_mean_squared_error: 0.1707
Epoch 3/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.9066 - mean_absolute_error: 0.9066 - mean_squared_error: 1.2972
Epoch 00003: val_loss improved from 0.32852 to 0.28495, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 66us/sample - loss: 0.9055 - mean_absolute_error: 0.9048 - mean_squared_error: 1.2915 - val_loss: 0.2850 - val_mean_absolute_error: 0.2848 - val_mean_squared_error: 0.1301
Epoch 4/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.7116 - mean_absolute_error: 0.7116 - mean_squared_error: 0.8034
Epoch 00004: val_loss did not improve from 0.28495
10471/10471 [=====] - 1s 63us/sample - loss: 0.7117 - mean_absolute_error: 0.7122 - mean_squared_error: 0.8039 - val_loss: 0.4012 - val_mean_absolute_error: 0.4014 - val_mean_squared_error: 0.2143
Epoch 5/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.5530 - mean_absolute_error: 0.5530 - mean_squared_error: 0.4895
Epoch 00005: val_loss improved from 0.28495 to 0.18210, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.5445 - mean_absolute_error: 0.5444 - mean_squared_error: 0.4755 - val_loss: 0.1821 - val_mean_absolute_error: 0.1821 - val_mean_squared_error: 0.0621
Epoch 6/500
9952/10471 [=====>...] - ETA: 0s - loss: 0.3888 - mean_absolute_error: 0.3888 - mean_squared_error: 0.2446
Epoch 00006: val_loss did not improve from 0.18210
10471/10471 [=====] - 1s 67us/sample - loss: 0.3857 - mean_absolute_error: 0.3856 - mean_squared_error: 0.2409 - val_loss: 0.2166 - val_mean_absolute_error: 0.2166 - val_mean_squared_error: 0.0733
Epoch 7/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.2618 - mean_absolute_error: 0.2618 - mean_squared_error: 0.1150
Epoch 00007: val_loss improved from 0.18210 to 0.17381, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.2611 - mean_absolute_error: 0.2610 - mean_squared_error: 0.1144 - val_loss: 0.1738 - val_mean_absolute_error: 0.1738 - val_mean_squared_error: 0.0544
Epoch 8/500
10112/10471 [=====>...] - ETA: 0s - loss: 0.1911 - mean_absolute_error: 0.1911 - mean_squared_error: 0.0661
Epoch 00008: val_loss improved from 0.17381 to 0.17276, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 67us/sample - loss: 0.1904 - mean_absolute_error: 0.1903 - mean_squared_error: 0.0656 - val_loss: 0.1728 - val_mean_absolute_error: 0.1727 - val_mean_squared_error: 0.0584
Epoch 9/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1664 - mean_absolute_error: 0.1664 - mean_squared_error: 0.0534
Epoch 00009: val_loss improved from 0.17276 to 0.15829, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1661 - mean_absolute_error:
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lute_error: 0.1660 - mean_squared_error: 0.0531 - val_loss: 0.1583 - val_mean_absolute_e
rror: 0.1583 - val_mean_squared_error: 0.0504
Epoch 10/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1587 - mean_absolute_er
ror: 0.1587 - mean_squared_error: 0.0502
Epoch 00010: val_loss improved from 0.15829 to 0.15369, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1585 - mean_abso
lute_error: 0.1583 - mean_squared_error: 0.0499 - val_loss: 0.1537 - val_mean_absolute_e
rror: 0.1537 - val_mean_squared_error: 0.0471
Epoch 11/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1553 - mean_absolute_er
ror: 0.1553 - mean_squared_error: 0.0490
Epoch 00011: val_loss did not improve from 0.15369
10471/10471 [=====] - 1s 64us/sample - loss: 0.1553 - mean_abso
lute_error: 0.1552 - mean_squared_error: 0.0490 - val_loss: 0.1543 - val_mean_absolute_e
rror: 0.1543 - val_mean_squared_error: 0.0463
Epoch 12/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1505 - mean_absolute_er
ror: 0.1505 - mean_squared_error: 0.0464
Epoch 00012: val_loss did not improve from 0.15369
10471/10471 [=====] - 1s 64us/sample - loss: 0.1505 - mean_abso
lute_error: 0.1505 - mean_squared_error: 0.0464 - val_loss: 0.1651 - val_mean_absolute_e
rror: 0.1651 - val_mean_squared_error: 0.0513
Epoch 13/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1487 - mean_absolute_er
ror: 0.1487 - mean_squared_error: 0.0457
Epoch 00013: val_loss improved from 0.15369 to 0.14867, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1488 - mean_abso
lute_error: 0.1488 - mean_squared_error: 0.0457 - val_loss: 0.1487 - val_mean_absolute_e
rror: 0.1486 - val_mean_squared_error: 0.0458
Epoch 14/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1475 - mean_absolute_er
ror: 0.1475 - mean_squared_error: 0.0457
Epoch 00014: val_loss did not improve from 0.14867
10471/10471 [=====] - 1s 64us/sample - loss: 0.1477 - mean_abso
lute_error: 0.1477 - mean_squared_error: 0.0459 - val_loss: 0.1509 - val_mean_absolute_e
rror: 0.1509 - val_mean_squared_error: 0.0470
Epoch 15/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1461 - mean_absolute_er
ror: 0.1461 - mean_squared_error: 0.0453
Epoch 00015: val_loss did not improve from 0.14867
10471/10471 [=====] - 1s 62us/sample - loss: 0.1453 - mean_abso
lute_error: 0.1454 - mean_squared_error: 0.0449 - val_loss: 0.1517 - val_mean_absolute_e
rror: 0.1516 - val_mean_squared_error: 0.0470
Epoch 16/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1445 - mean_absolute_er
ror: 0.1445 - mean_squared_error: 0.0447
Epoch 00016: val_loss improved from 0.14867 to 0.14570, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1444 - mean_abso
lute_error: 0.1442 - mean_squared_error: 0.0445 - val_loss: 0.1457 - val_mean_absolute_e
rror: 0.1457 - val_mean_squared_error: 0.0444
Epoch 17/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1426 - mean_absolute_er
ror: 0.1426 - mean_squared_error: 0.0437
Epoch 00017: val_loss did not improve from 0.14570
10471/10471 [=====] - 1s 64us/sample - loss: 0.1425 - mean_abso
lute_error: 0.1425 - mean_squared_error: 0.0436 - val_loss: 0.1473 - val_mean_absolute_e
rror: 0.1473 - val_mean_squared_error: 0.0444
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Epoch 18/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1402 - mean_absolute_error: 0.1402 - mean_squared_error: 0.0429
Epoch 00018: val_loss improved from 0.14570 to 0.14546, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1401 - mean_absolute_error: 0.1401 - mean_squared_error: 0.0429 - val_loss: 0.1455 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0442
Epoch 19/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0431
Epoch 00019: val_loss improved from 0.14546 to 0.14531, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1413 - mean_absolute_error: 0.1414 - mean_squared_error: 0.0435 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0432
Epoch 20/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1390 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0417
Epoch 00020: val_loss improved from 0.14531 to 0.14382, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 64us/sample - loss: 0.1395 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0419 - val_loss: 0.1438 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0429
Epoch 21/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1376 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0408
Epoch 00021: val_loss did not improve from 0.14382
10471/10471 [=====] - 1s 64us/sample - loss: 0.1377 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0411 - val_loss: 0.1490 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0445
Epoch 22/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1373 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0415
Epoch 00022: val_loss did not improve from 0.14382
10471/10471 [=====] - 1s 63us/sample - loss: 0.1373 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0414 - val_loss: 0.1444 - val_mean_absolute_error: 0.1443 - val_mean_squared_error: 0.0438
Epoch 23/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1377 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0415
Epoch 00023: val_loss improved from 0.14382 to 0.14116, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1378 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0417 - val_loss: 0.1412 - val_mean_absolute_error: 0.1411 - val_mean_squared_error: 0.0424
Epoch 24/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1367 - mean_absolute_error: 0.1367 - mean_squared_error: 0.0412
Epoch 00024: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 64us/sample - loss: 0.1366 - mean_absolute_error: 0.1365 - mean_squared_error: 0.0411 - val_loss: 0.1423 - val_mean_absolute_error: 0.1423 - val_mean_squared_error: 0.0430
Epoch 25/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1364 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0411
Epoch 00025: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 62us/sample - loss: 0.1363 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0409 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0431
Epoch 26/500

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10368/10471 [=====>.] - ETA: 0s - loss: 0.1369 - mean_absolute_error: 0.1369 - mean_squared_error: 0.0408
Epoch 00026: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 64us/sample - loss: 0.1366 - mean_absolute_error: 0.1365 - mean_squared_error: 0.0405 - val_loss: 0.1427 - val_mean_absolute_error: 0.1426 - val_mean_squared_error: 0.0427
Epoch 27/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0404
Epoch 00027: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 63us/sample - loss: 0.1345 - mean_absolute_error: 0.1345 - mean_squared_error: 0.0404 - val_loss: 0.1481 - val_mean_absolute_error: 0.1481 - val_mean_squared_error: 0.0454
Epoch 28/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1349 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0395
Epoch 00028: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 62us/sample - loss: 0.1350 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0394 - val_loss: 0.1459 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0443
Epoch 29/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1327 - mean_absolute_error: 0.1327 - mean_squared_error: 0.0387
Epoch 00029: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 65us/sample - loss: 0.1326 - mean_absolute_error: 0.1326 - mean_squared_error: 0.0386 - val_loss: 0.1518 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0463
Epoch 30/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1334 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0395
Epoch 00030: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 65us/sample - loss: 0.1336 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0394 - val_loss: 0.1421 - val_mean_absolute_error: 0.1421 - val_mean_squared_error: 0.0427
Epoch 31/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1333 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0392
Epoch 00031: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 63us/sample - loss: 0.1333 - mean_absolute_error: 0.1331 - mean_squared_error: 0.0391 - val_loss: 0.1447 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0435
Epoch 32/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1321 - mean_absolute_error: 0.1321 - mean_squared_error: 0.0392
Epoch 00032: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 65us/sample - loss: 0.1318 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0390 - val_loss: 0.1431 - val_mean_absolute_error: 0.1431 - val_mean_squared_error: 0.0429
Epoch 33/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1310 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0384
Epoch 00033: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 63us/sample - loss: 0.1309 - mean_absolute_error: 0.1308 - mean_squared_error: 0.0383 - val_loss: 0.1501 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0446
Epoch 34/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1306 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0381
Epoch 00034: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 63us/sample - loss: 0.1306 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0382 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0454
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rror: 0.1460 - val_mean_squared_error: 0.0438
Epoch 35/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1304 - mean_absolute_error: 0.1304 - mean_squared_error: 0.0380
Epoch 00035: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 63us/sample - loss: 0.1306 - mean_absolute_error: 0.1307 - mean_squared_error: 0.0385 - val_loss: 0.1422 - val_mean_absolute_error: 0.1422 - val_mean_squared_error: 0.0436
Epoch 36/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1304 - mean_absolute_error: 0.1304 - mean_squared_error: 0.0384
Epoch 00036: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 64us/sample - loss: 0.1305 - mean_absolute_error: 0.1305 - mean_squared_error: 0.0384 - val_loss: 0.1438 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0432
Epoch 37/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1299 - mean_absolute_error: 0.1299 - mean_squared_error: 0.0378
Epoch 00037: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 63us/sample - loss: 0.1299 - mean_absolute_error: 0.1298 - mean_squared_error: 0.0377 - val_loss: 0.1481 - val_mean_absolute_error: 0.1480 - val_mean_squared_error: 0.0449
Epoch 38/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1290 - mean_absolute_error: 0.1290 - mean_squared_error: 0.0377
Epoch 00038: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 62us/sample - loss: 0.1291 - mean_absolute_error: 0.1293 - mean_squared_error: 0.0375 - val_loss: 0.1427 - val_mean_absolute_error: 0.1427 - val_mean_squared_error: 0.0419
Epoch 39/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1283 - mean_absolute_error: 0.1283 - mean_squared_error: 0.0369
Epoch 00039: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 63us/sample - loss: 0.1282 - mean_absolute_error: 0.1281 - mean_squared_error: 0.0368 - val_loss: 0.1417 - val_mean_absolute_error: 0.1417 - val_mean_squared_error: 0.0420
Epoch 40/500
9696/10471 [=====>...] - ETA: 0s - loss: 0.1278 - mean_absolute_error: 0.1278 - mean_squared_error: 0.0363
Epoch 00040: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 62us/sample - loss: 0.1281 - mean_absolute_error: 0.1280 - mean_squared_error: 0.0366 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0439
Epoch 41/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1271 - mean_absolute_error: 0.1271 - mean_squared_error: 0.0367
Epoch 00041: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 63us/sample - loss: 0.1274 - mean_absolute_error: 0.1273 - mean_squared_error: 0.0366 - val_loss: 0.1532 - val_mean_absolute_error: 0.1531 - val_mean_squared_error: 0.0469
Epoch 42/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1275 - mean_absolute_error: 0.1275 - mean_squared_error: 0.0368
Epoch 00042: val_loss did not improve from 0.14116
10471/10471 [=====] - 1s 64us/sample - loss: 0.1274 - mean_absolute_error: 0.1274 - mean_squared_error: 0.0366 - val_loss: 0.1452 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0435
Epoch 43/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.1268 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0360
Epoch 00043: val_loss improved from 0.14116 to 0.14059, saving model to best_basic_mode
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1.hdf5

10471/10471 [=====] - 1s 64us/sample - loss: 0.1274 - mean_absolute_error: 0.1275 - mean_squared_error: 0.0364 - val_loss: 0.1406 - val_mean_absolute_error: 0.1406 - val_mean_squared_error: 0.0410

Epoch 44/500

10336/10471 [=====.>.] - ETA: 0s - loss: 0.1260 - mean_absolute_error: 0.1260 - mean_squared_error: 0.0361

Epoch 00044: val_loss did not improve from 0.14059

10471/10471 [=====] - 1s 64us/sample - loss: 0.1263 - mean_absolute_error: 0.1263 - mean_squared_error: 0.0362 - val_loss: 0.1463 - val_mean_absolute_error: 0.1463 - val_mean_squared_error: 0.0439

Epoch 45/500

10400/10471 [=====.>.] - ETA: 0s - loss: 0.1272 - mean_absolute_error: 0.1272 - mean_squared_error: 0.0366

Epoch 00045: val_loss did not improve from 0.14059

10471/10471 [=====] - 1s 64us/sample - loss: 0.1274 - mean_absolute_error: 0.1277 - mean_squared_error: 0.0368 - val_loss: 0.1426 - val_mean_absolute_error: 0.1425 - val_mean_squared_error: 0.0423

Epoch 46/500

9632/10471 [=====.>...] - ETA: 0s - loss: 0.1264 - mean_absolute_error: 0.1264 - mean_squared_error: 0.0360

Epoch 00046: val_loss did not improve from 0.14059

10471/10471 [=====] - 1s 63us/sample - loss: 0.1264 - mean_absolute_error: 0.1263 - mean_squared_error: 0.0359 - val_loss: 0.1426 - val_mean_absolute_error: 0.1426 - val_mean_squared_error: 0.0427

Epoch 47/500

10176/10471 [=====.>.] - ETA: 0s - loss: 0.1262 - mean_absolute_error: 0.1262 - mean_squared_error: 0.0360

Epoch 00047: val_loss did not improve from 0.14059

10471/10471 [=====] - 1s 64us/sample - loss: 0.1260 - mean_absolute_error: 0.1261 - mean_squared_error: 0.0358 - val_loss: 0.1452 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0444

Epoch 48/500

10432/10471 [=====.>.] - ETA: 0s - loss: 0.1239 - mean_absolute_error: 0.1239 - mean_squared_error: 0.0353

Epoch 00048: val_loss did not improve from 0.14059

10471/10471 [=====] - 1s 63us/sample - loss: 0.1239 - mean_absolute_error: 0.1239 - mean_squared_error: 0.0352 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0434

Epoch 49/500

9664/10471 [=====.>...] - ETA: 0s - loss: 0.1274 - mean_absolute_error: 0.1274 - mean_squared_error: 0.0366

Epoch 00049: val_loss did not improve from 0.14059

10471/10471 [=====] - 1s 62us/sample - loss: 0.1271 - mean_absolute_error: 0.1270 - mean_squared_error: 0.0365 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0452

Epoch 50/500

10432/10471 [=====.>.] - ETA: 0s - loss: 0.1234 - mean_absolute_error: 0.1234 - mean_squared_error: 0.0348

Epoch 00050: val_loss did not improve from 0.14059

10471/10471 [=====] - 1s 63us/sample - loss: 0.1236 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0349 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0434

Epoch 51/500

10400/10471 [=====.>.] - ETA: 0s - loss: 0.1241 - mean_absolute_error: 0.1241 - mean_squared_error: 0.0353

Epoch 00051: val_loss did not improve from 0.14059

10471/10471 [=====] - 1s 64us/sample - loss: 0.1241 - mean_absolute_error: 0.1239 - mean_squared_error: 0.0352 - val_loss: 0.1461 - val_mean_absolute_error: 0.1461 - val_mean_squared_error: 0.0430

Epoch 52/500

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10304/10471 [=====>.] - ETA: 0s - loss: 0.1232 - mean_absolute_error: 0.1232 - mean_squared_error: 0.0349
Epoch 00052: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 64us/sample - loss: 0.1233 - mean_absolute_error: 0.1232 - mean_squared_error: 0.0348 - val_loss: 0.1495 - val_mean_absolute_error: 0.1495 - val_mean_squared_error: 0.0443
Epoch 53/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1245 - mean_absolute_error: 0.1245 - mean_squared_error: 0.0350
Epoch 00053: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 65us/sample - loss: 0.1244 - mean_absolute_error: 0.1243 - mean_squared_error: 0.0350 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0441
Epoch 54/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1234 - mean_absolute_error: 0.1234 - mean_squared_error: 0.0347
Epoch 00054: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 63us/sample - loss: 0.1233 - mean_absolute_error: 0.1233 - mean_squared_error: 0.0346 - val_loss: 0.1532 - val_mean_absolute_error: 0.1532 - val_mean_squared_error: 0.0470
Epoch 55/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1230 - mean_absolute_error: 0.1230 - mean_squared_error: 0.0347
Epoch 00055: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 63us/sample - loss: 0.1230 - mean_absolute_error: 0.1229 - mean_squared_error: 0.0346 - val_loss: 0.1463 - val_mean_absolute_error: 0.1463 - val_mean_squared_error: 0.0434
Epoch 56/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1240 - mean_absolute_error: 0.1240 - mean_squared_error: 0.0347
Epoch 00056: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 64us/sample - loss: 0.1238 - mean_absolute_error: 0.1237 - mean_squared_error: 0.0345 - val_loss: 0.1529 - val_mean_absolute_error: 0.1529 - val_mean_squared_error: 0.0467
Epoch 57/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1236 - mean_absolute_error: 0.1236 - mean_squared_error: 0.0350
Epoch 00057: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 63us/sample - loss: 0.1236 - mean_absolute_error: 0.1234 - mean_squared_error: 0.0348 - val_loss: 0.1444 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0436
Epoch 58/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1238 - mean_absolute_error: 0.1238 - mean_squared_error: 0.0346
Epoch 00058: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 63us/sample - loss: 0.1238 - mean_absolute_error: 0.1237 - mean_squared_error: 0.0346 - val_loss: 0.1492 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0461
Epoch 59/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1204 - mean_absolute_error: 0.1204 - mean_squared_error: 0.0338
Epoch 00059: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 63us/sample - loss: 0.1204 - mean_absolute_error: 0.1204 - mean_squared_error: 0.0337 - val_loss: 0.1433 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0428
Epoch 60/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1211 - mean_absolute_error: 0.1211 - mean_squared_error: 0.0338
Epoch 00060: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 64us/sample - loss: 0.1210 - mean_absolute_error: 0.1210 - mean_squared_error: 0.0337 - val_loss: 0.1451 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0434
```

```
rror: 0.1451 - val_mean_squared_error: 0.0433
Epoch 61/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1211 - mean_absolute_error: 0.1211 - mean_squared_error: 0.0339
Epoch 00061: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 64us/sample - loss: 0.1211 - mean_absolute_error: 0.1212 - mean_squared_error: 0.0339 - val_loss: 0.1457 - val_mean_absolute_error: 0.1457 - val_mean_squared_error: 0.0436
Epoch 62/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1218 - mean_absolute_error: 0.1218 - mean_squared_error: 0.0340
Epoch 00062: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 63us/sample - loss: 0.1219 - mean_absolute_error: 0.1219 - mean_squared_error: 0.0340 - val_loss: 0.1461 - val_mean_absolute_error: 0.1461 - val_mean_squared_error: 0.0435
Epoch 63/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1202 - mean_absolute_error: 0.1202 - mean_squared_error: 0.0336
Epoch 00063: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 62us/sample - loss: 0.1196 - mean_absolute_error: 0.1196 - mean_squared_error: 0.0330 - val_loss: 0.1472 - val_mean_absolute_error: 0.1471 - val_mean_squared_error: 0.0447
Epoch 64/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1220 - mean_absolute_error: 0.1220 - mean_squared_error: 0.0342
Epoch 00064: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 63us/sample - loss: 0.1220 - mean_absolute_error: 0.1220 - mean_squared_error: 0.0341 - val_loss: 0.1468 - val_mean_absolute_error: 0.1468 - val_mean_squared_error: 0.0439
Epoch 65/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1191 - mean_absolute_error: 0.1191 - mean_squared_error: 0.0332
Epoch 00065: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 63us/sample - loss: 0.1190 - mean_absolute_error: 0.1190 - mean_squared_error: 0.0331 - val_loss: 0.1421 - val_mean_absolute_error: 0.1420 - val_mean_squared_error: 0.0425
Epoch 66/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1190 - mean_absolute_error: 0.1190 - mean_squared_error: 0.0327
Epoch 00066: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 63us/sample - loss: 0.1191 - mean_absolute_error: 0.1188 - mean_squared_error: 0.0328 - val_loss: 0.1502 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0455
Epoch 67/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1205 - mean_absolute_error: 0.1205 - mean_squared_error: 0.0333
Epoch 00067: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 62us/sample - loss: 0.1202 - mean_absolute_error: 0.1202 - mean_squared_error: 0.0330 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0448
Epoch 68/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1188 - mean_absolute_error: 0.1188 - mean_squared_error: 0.0332Restoring model weights from the end of the best epoch.

Epoch 00068: val_loss did not improve from 0.14059
10471/10471 [=====] - 1s 64us/sample - loss: 0.1189 - mean_absolute_error: 0.1190 - mean_squared_error: 0.0332 - val_loss: 0.1460 - val_mean_absolute_error: 0.1459 - val_mean_squared_error: 0.0436
Epoch 00068: early stopping
MAE: 0.14058414
```

RMSE: 0.2025645
 Adding initial Dense layers with 64
 Adding Dense layer with 64
 Adding last layer with 64
 Outputting predictive model - Tabular
 Model: "model_99"

Layer (type)	Output Shape	Param #
<hr/>		
input_100 (InputLayer)	[(None, 61)]	0
dense_743 (Dense)	(None, 64)	3968
dense_744 (Dense)	(None, 64)	4160
dense_745 (Dense)	(None, 64)	4160
dense_746 (Dense)	(None, 64)	4160
dense_747 (Dense)	(None, 64)	4160
dense_748 (Dense)	(None, 64)	4160
dense_749 (Dense)	(None, 64)	4160
dense_750 (Dense)	(None, 64)	4160
dropout_23 (Dropout)	(None, 64)	0
dense_751 (Dense)	(None, 1)	65
<hr/>		
Total params: 33,153		
Trainable params: 33,153		
Non-trainable params: 0		

None
 [INFO] training model...
 Train on 10471 samples, validate on 1309 samples
 Epoch 1/500
 10016/10471 [=====>..] - ETA: 0s - loss: 2.1590 - mean_absolute_error: 2.1590 - mean_squared_error: 9.3011
 Epoch 00001: val_loss improved from inf to 0.47260, saving model to best_basic_model.hdf5
 10471/10471 [=====] - 1s 123us/sample - loss: 2.1333 - mean_absolute_error: 2.1301 - mean_squared_error: 9.0445 - val_loss: 0.4726 - val_mean_absolute_error: 0.4727 - val_mean_squared_error: 0.3785
 Epoch 2/500
 10016/10471 [=====>..] - ETA: 0s - loss: 1.2596 - mean_absolute_error: 1.2596 - mean_squared_error: 2.5216
 Epoch 00002: val_loss did not improve from 0.47260
 10471/10471 [=====] - 1s 71us/sample - loss: 1.2571 - mean_absolute_error: 1.2564 - mean_squared_error: 2.5029 - val_loss: 1.2576 - val_mean_absolute_error: 1.2580 - val_mean_squared_error: 1.7141
 Epoch 3/500
 9888/10471 [=====>..] - ETA: 0s - loss: 0.9715 - mean_absolute_error: 0.9715 - mean_squared_error: 1.5021

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Epoch 00003: val_loss improved from 0.47260 to 0.37964, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.9691 - mean_absolute_error: 0.9693 - mean_squared_error: 1.4956 - val_loss: 0.3796 - val_mean_absolute_error: 0.3797 - val_mean_squared_error: 0.1961
Epoch 4/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.7556 - mean_absolute_error: 0.7556 - mean_squared_error: 0.9016
Epoch 00004: val_loss improved from 0.37964 to 0.31093, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.7518 - mean_absolute_error: 0.7518 - mean_squared_error: 0.8920 - val_loss: 0.3109 - val_mean_absolute_error: 0.3110 - val_mean_squared_error: 0.1368
Epoch 5/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.5419 - mean_absolute_error: 0.5419 - mean_squared_error: 0.4668
Epoch 00005: val_loss improved from 0.31093 to 0.22371, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.5345 - mean_absolute_error: 0.5340 - mean_squared_error: 0.4550 - val_loss: 0.2237 - val_mean_absolute_error: 0.2238 - val_mean_squared_error: 0.0823
Epoch 6/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.3444 - mean_absolute_error: 0.3444 - mean_squared_error: 0.1958
Epoch 00006: val_loss improved from 0.22371 to 0.19775, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.3403 - mean_absolute_error: 0.3404 - mean_squared_error: 0.1917 - val_loss: 0.1977 - val_mean_absolute_error: 0.1978 - val_mean_squared_error: 0.0697
Epoch 7/500
9728/10471 [=====>..] - ETA: 0s - loss: 0.2129 - mean_absolute_error: 0.2129 - mean_squared_error: 0.0791
Epoch 00007: val_loss improved from 0.19775 to 0.16445, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 75us/sample - loss: 0.2107 - mean_absolute_error: 0.2107 - mean_squared_error: 0.0775 - val_loss: 0.1644 - val_mean_absolute_error: 0.1644 - val_mean_squared_error: 0.0532
Epoch 8/500
9760/10471 [=====>..] - ETA: 0s - loss: 0.1735 - mean_absolute_error: 0.1735 - mean_squared_error: 0.0559
Epoch 00008: val_loss improved from 0.16445 to 0.16107, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 75us/sample - loss: 0.1732 - mean_absolute_error: 0.1730 - mean_squared_error: 0.0557 - val_loss: 0.1611 - val_mean_absolute_error: 0.1610 - val_mean_squared_error: 0.0520
Epoch 9/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1604 - mean_absolute_error: 0.1604 - mean_squared_error: 0.0506
Epoch 00009: val_loss improved from 0.16107 to 0.16046, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1598 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0504 - val_loss: 0.1605 - val_mean_absolute_error: 0.1604 - val_mean_squared_error: 0.0532
Epoch 10/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1552 - mean_absolute_error: 0.1552 - mean_squared_error: 0.0478
Epoch 00010: val_loss improved from 0.16046 to 0.15678, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1548 - mean_absolute_error: 0.1547 - mean_squared_error: 0.0477 - val_loss: 0.1568 - val_mean_absolute_error: 0.1568 - val_mean_squared_error: 0.0506
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Epoch 11/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1530 - mean_absolute_error: 0.1530 - mean_squared_error: 0.0473
Epoch 00011: val_loss improved from 0.15678 to 0.15445, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1529 - mean_absolute_error: 0.1531 - mean_squared_error: 0.0474 - val_loss: 0.1545 - val_mean_absolute_error: 0.1545 - val_mean_squared_error: 0.0491
Epoch 12/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1532 - mean_absolute_error: 0.1532 - mean_squared_error: 0.0478
Epoch 00012: val_loss improved from 0.15445 to 0.15023, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1530 - mean_absolute_error: 0.1528 - mean_squared_error: 0.0476 - val_loss: 0.1502 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0472
Epoch 13/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1470 - mean_absolute_error: 0.1470 - mean_squared_error: 0.0447
Epoch 00013: val_loss improved from 0.15023 to 0.14956, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1472 - mean_absolute_error: 0.1470 - mean_squared_error: 0.0447 - val_loss: 0.1496 - val_mean_absolute_error: 0.1496 - val_mean_squared_error: 0.0460
Epoch 14/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1478 - mean_absolute_error: 0.1478 - mean_squared_error: 0.0451
Epoch 00014: val_loss did not improve from 0.14956
10471/10471 [=====] - 1s 71us/sample - loss: 0.1476 - mean_absolute_error: 0.1474 - mean_squared_error: 0.0451 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0479
Epoch 15/500
9760/10471 [=====>..] - ETA: 0s - loss: 0.1473 - mean_absolute_error: 0.1473 - mean_squared_error: 0.0457
Epoch 00015: val_loss improved from 0.14956 to 0.14845, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 75us/sample - loss: 0.1472 - mean_absolute_error: 0.1472 - mean_squared_error: 0.0454 - val_loss: 0.1484 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0471
Epoch 16/500
9824/10471 [=====>..] - ETA: 0s - loss: 0.1430 - mean_absolute_error: 0.1430 - mean_squared_error: 0.0434
Epoch 00016: val_loss improved from 0.14845 to 0.14451, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 75us/sample - loss: 0.1434 - mean_absolute_error: 0.1435 - mean_squared_error: 0.0439 - val_loss: 0.1445 - val_mean_absolute_error: 0.1445 - val_mean_squared_error: 0.0448
Epoch 17/500
9760/10471 [=====>..] - ETA: 0s - loss: 0.1419 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0423
Epoch 00017: val_loss did not improve from 0.14451
10471/10471 [=====] - 1s 72us/sample - loss: 0.1426 - mean_absolute_error: 0.1427 - mean_squared_error: 0.0431 - val_loss: 0.1457 - val_mean_absolute_error: 0.1457 - val_mean_squared_error: 0.0456
Epoch 18/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1409 - mean_absolute_error: 0.1409 - mean_squared_error: 0.0427
Epoch 00018: val_loss improved from 0.14451 to 0.14363, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 73us/sample - loss: 0.1409 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0426 - val_loss: 0.1436 - val_mean_absolute_error: 0.1436 - val_mean_squared_error: 0.0457
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rror: 0.1437 - val_mean_squared_error: 0.0440
Epoch 19/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0421
Epoch 00019: val_loss did not improve from 0.14363
10471/10471 [=====] - 1s 71us/sample - loss: 0.1408 - mean_absolute_error: 0.1407 - mean_squared_error: 0.0420 - val_loss: 0.1440 - val_mean_absolute_error: 0.1440 - val_mean_squared_error: 0.0450
Epoch 20/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1383 - mean_absolute_error: 0.1383 - mean_squared_error: 0.0416
Epoch 00020: val_loss improved from 0.14363 to 0.14273, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 74us/sample - loss: 0.1383 - mean_absolute_error: 0.1382 - mean_squared_error: 0.0415 - val_loss: 0.1427 - val_mean_absolute_error: 0.1427 - val_mean_squared_error: 0.0445
Epoch 21/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1400 - mean_absolute_error: 0.1400 - mean_squared_error: 0.0418
Epoch 00021: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1402 - mean_absolute_error: 0.1404 - mean_squared_error: 0.0422 - val_loss: 0.1445 - val_mean_absolute_error: 0.1445 - val_mean_squared_error: 0.0441
Epoch 22/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1381 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0417
Epoch 00022: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 72us/sample - loss: 0.1377 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0413 - val_loss: 0.1452 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0459
Epoch 23/500
9856/10471 [=====>..] - ETA: 0s - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0411
Epoch 00023: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 72us/sample - loss: 0.1373 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0409 - val_loss: 0.1462 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0441
Epoch 24/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1390 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0414
Epoch 00024: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 72us/sample - loss: 0.1389 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0414 - val_loss: 0.1437 - val_mean_absolute_error: 0.1437 - val_mean_squared_error: 0.0441
Epoch 25/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1367 - mean_absolute_error: 0.1367 - mean_squared_error: 0.0410
Epoch 00025: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1366 - mean_absolute_error: 0.1367 - mean_squared_error: 0.0412 - val_loss: 0.1429 - val_mean_absolute_error: 0.1429 - val_mean_squared_error: 0.0442
Epoch 26/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1343 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0392
Epoch 00026: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1350 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0397 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0451
Epoch 27/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.1349 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0401
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Epoch 00027: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 73us/sample - loss: 0.1350 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0401 - val_loss: 0.1470 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0457
Epoch 28/500
    9856/10471 [=====>..] - ETA: 0s - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0387
Epoch 00028: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 72us/sample - loss: 0.1346 - mean_absolute_error: 0.1344 - mean_squared_error: 0.0393 - val_loss: 0.1481 - val_mean_absolute_error: 0.1481 - val_mean_squared_error: 0.0448
Epoch 29/500
    9888/10471 [=====>..] - ETA: 0s - loss: 0.1344 - mean_absolute_error: 0.1344 - mean_squared_error: 0.0398
Epoch 00029: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 72us/sample - loss: 0.1343 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0396 - val_loss: 0.1429 - val_mean_absolute_error: 0.1429 - val_mean_squared_error: 0.0444
Epoch 30/500
    10112/10471 [=====>..] - ETA: 0s - loss: 0.1319 - mean_absolute_error: 0.1319 - mean_squared_error: 0.0386
Epoch 00030: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1323 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0387 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0443
Epoch 31/500
    9920/10471 [=====>..] - ETA: 0s - loss: 0.1323 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0383
Epoch 00031: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1323 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0383 - val_loss: 0.1437 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0438
Epoch 32/500
    10080/10471 [=====>..] - ETA: 0s - loss: 0.1313 - mean_absolute_error: 0.1313 - mean_squared_error: 0.0381
Epoch 00032: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 70us/sample - loss: 0.1313 - mean_absolute_error: 0.1315 - mean_squared_error: 0.0381 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0458
Epoch 33/500
    9984/10471 [=====>..] - ETA: 0s - loss: 0.1309 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0381
Epoch 00033: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1309 - mean_absolute_error: 0.1308 - mean_squared_error: 0.0380 - val_loss: 0.1493 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0463
Epoch 34/500
    10176/10471 [=====>..] - ETA: 0s - loss: 0.1311 - mean_absolute_error: 0.1311 - mean_squared_error: 0.0379
Epoch 00034: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 70us/sample - loss: 0.1312 - mean_absolute_error: 0.1313 - mean_squared_error: 0.0380 - val_loss: 0.1477 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0464
Epoch 35/500
    10016/10471 [=====>..] - ETA: 0s - loss: 0.1297 - mean_absolute_error: 0.1297 - mean_squared_error: 0.0375
Epoch 00035: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1298 - mean_absolute_error: 0.1298 - mean_squared_error: 0.0373 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0465
Epoch 36/500
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10144/10471 [=====>..] - ETA: 0s - loss: 0.1306 - mean_absolute_error: 0.1306 - mean_squared_error: 0.0379
Epoch 00036: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 70us/sample - loss: 0.1309 - mean_absolute_error: 0.1307 - mean_squared_error: 0.0379 - val_loss: 0.1476 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0455
Epoch 37/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1295 - mean_absolute_error: 0.1295 - mean_squared_error: 0.0374
Epoch 00037: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1295 - mean_absolute_error: 0.1295 - mean_squared_error: 0.0373 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0472
Epoch 38/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1281 - mean_absolute_error: 0.1281 - mean_squared_error: 0.0363
Epoch 00038: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1280 - mean_absolute_error: 0.1282 - mean_squared_error: 0.0367 - val_loss: 0.1440 - val_mean_absolute_error: 0.1440 - val_mean_squared_error: 0.0444
Epoch 39/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1281 - mean_absolute_error: 0.1281 - mean_squared_error: 0.0365
Epoch 00039: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 70us/sample - loss: 0.1278 - mean_absolute_error: 0.1277 - mean_squared_error: 0.0362 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0450
Epoch 40/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1268 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0360
Epoch 00040: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1267 - mean_absolute_error: 0.1267 - mean_squared_error: 0.0358 - val_loss: 0.1458 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0449
Epoch 41/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1269 - mean_absolute_error: 0.1269 - mean_squared_error: 0.0362
Epoch 00041: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1267 - mean_absolute_error: 0.1266 - mean_squared_error: 0.0361 - val_loss: 0.1532 - val_mean_absolute_error: 0.1532 - val_mean_squared_error: 0.0483
Epoch 42/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1268 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0361
Epoch 00042: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 70us/sample - loss: 0.1267 - mean_absolute_error: 0.1267 - mean_squared_error: 0.0360 - val_loss: 0.1524 - val_mean_absolute_error: 0.1524 - val_mean_squared_error: 0.0478
Epoch 43/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1250 - mean_absolute_error: 0.1250 - mean_squared_error: 0.0349
Epoch 00043: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1247 - mean_absolute_error: 0.1247 - mean_squared_error: 0.0346 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0446
Epoch 44/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1248 - mean_absolute_error: 0.1248 - mean_squared_error: 0.0347
Epoch 00044: val_loss did not improve from 0.14273
10471/10471 [=====] - 1s 71us/sample - loss: 0.1252 - mean_absolute_error: 0.1251 - mean_squared_error: 0.0351 - val_loss: 0.1462 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0448
```

rror: 0.1463 - val_mean_squared_error: 0.0437
 Epoch 45/500
 9984/10471 [=====>..] - ETA: 0s - loss: 0.1247 - mean_absolute_error: 0.1247 - mean_squared_error: 0.0354Restoring model weights from the end of the best epoch.

 Epoch 00045: val_loss did not improve from 0.14273
 10471/10471 [=====] - 1s 72us/sample - loss: 0.1243 - mean_absolute_error: 0.1243 - mean_squared_error: 0.0351 - val_loss: 0.1496 - val_mean_absolute_error: 0.1496 - val_mean_squared_error: 0.0468
 Epoch 00045: early stopping
 MAE: 0.14274108
 RMSE: 0.21085075
 Adding initial Dense layers with 64
 Adding Dense layer with 64
 Adding last layer with 64
 Outputting predictive model - Tabular
 Model: "model_100"

Layer (type)	Output Shape	Param #
<hr/>		
input_101 (InputLayer)	[(None, 61)]	0
dense_752 (Dense)	(None, 64)	3968
dense_753 (Dense)	(None, 64)	4160
dense_754 (Dense)	(None, 64)	4160
dense_755 (Dense)	(None, 64)	4160
dense_756 (Dense)	(None, 64)	4160
dense_757 (Dense)	(None, 64)	4160
dense_758 (Dense)	(None, 64)	4160
dense_759 (Dense)	(None, 64)	4160
dense_760 (Dense)	(None, 64)	4160
dense_761 (Dense)	(None, 64)	4160
dense_762 (Dense)	(None, 64)	4160
dense_763 (Dense)	(None, 64)	4160
dropout_24 (Dropout)	(None, 64)	0
dense_764 (Dense)	(None, 1)	65
<hr/>		
Total params: 49,793		

```
Trainable params: 49,793
Non-trainable params: 0
```

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10016/10471 [=====>..] - ETA: 0s - loss: 1.9956 - mean_absolute_error: 1.9956 - mean_squared_error: 7.7635
Epoch 00001: val_loss improved from inf to 0.95821, saving model to best_basic_model.hdf5
10471/10471 [=====] - 2s 150us/sample - loss: 1.9579 - mean_absolute_error: 1.9559 - mean_squared_error: 7.4993 - val_loss: 0.9582 - val_mean_absolute_error: 0.9577 - val_mean_squared_error: 1.1001
Epoch 2/500
9952/10471 [=====>..] - ETA: 0s - loss: 1.1696 - mean_absolute_error: 1.1696 - mean_squared_error: 2.1593
Epoch 00002: val_loss improved from 0.95821 to 0.23718, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 91us/sample - loss: 1.1680 - mean_absolute_error: 1.1680 - mean_squared_error: 2.1514 - val_loss: 0.2372 - val_mean_absolute_error: 0.2372 - val_mean_squared_error: 0.0959
Epoch 3/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.9409 - mean_absolute_error: 0.9409 - mean_squared_error: 1.4121
Epoch 00003: val_loss did not improve from 0.23718
10471/10471 [=====] - 1s 88us/sample - loss: 0.9407 - mean_absolute_error: 0.9400 - mean_squared_error: 1.4095 - val_loss: 0.2482 - val_mean_absolute_error: 0.2483 - val_mean_squared_error: 0.1052
Epoch 4/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.7364 - mean_absolute_error: 0.7364 - mean_squared_error: 0.8637
Epoch 00004: val_loss improved from 0.23718 to 0.21376, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 91us/sample - loss: 0.7320 - mean_absolute_error: 0.7319 - mean_squared_error: 0.8526 - val_loss: 0.2138 - val_mean_absolute_error: 0.2138 - val_mean_squared_error: 0.0763
Epoch 5/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.5611 - mean_absolute_error: 0.5611 - mean_squared_error: 0.4990
Epoch 00005: val_loss did not improve from 0.21376
10471/10471 [=====] - 1s 86us/sample - loss: 0.5589 - mean_absolute_error: 0.5585 - mean_squared_error: 0.4947 - val_loss: 0.3825 - val_mean_absolute_error: 0.3828 - val_mean_squared_error: 0.2040
Epoch 6/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.3995 - mean_absolute_error: 0.3995 - mean_squared_error: 0.2585
Epoch 00006: val_loss improved from 0.21376 to 0.19249, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 91us/sample - loss: 0.3957 - mean_absolute_error: 0.3958 - mean_squared_error: 0.2541 - val_loss: 0.1925 - val_mean_absolute_error: 0.1925 - val_mean_squared_error: 0.0628
Epoch 7/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.2730 - mean_absolute_error: 0.2730 - mean_squared_error: 0.1243
Epoch 00007: val_loss did not improve from 0.19249
10471/10471 [=====] - 1s 86us/sample - loss: 0.2709 - mean_absolute_error: 0.2708 - mean_squared_error: 0.1227 - val_loss: 0.1944 - val_mean_absolute_error: 0.1945 - val_mean_squared_error: 0.0654
Epoch 8/500
10272/10471 [=====>..] - ETA: 0s - loss: 0.1915 - mean_absolute_error:
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ror: 0.1915 - mean_squared_error: 0.0657
Epoch 00008: val_loss improved from 0.19249 to 0.16126, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 89us/sample - loss: 0.1909 - mean_absolute_error: 0.1906 - mean_squared_error: 0.0652 - val_loss: 0.1613 - val_mean_absolute_error: 0.1612 - val_mean_squared_error: 0.0518
Epoch 9/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1661 - mean_absolute_error: 0.1661 - mean_squared_error: 0.0526
Epoch 00009: val_loss did not improve from 0.16126
10471/10471 [=====] - 1s 86us/sample - loss: 0.1655 - mean_absolute_error: 0.1653 - mean_squared_error: 0.0523 - val_loss: 0.1641 - val_mean_absolute_error: 0.1641 - val_mean_squared_error: 0.0526
Epoch 10/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1563 - mean_absolute_error: 0.1563 - mean_squared_error: 0.0484
Epoch 00010: val_loss improved from 0.16126 to 0.15482, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.1563 - mean_absolute_error: 0.1562 - mean_squared_error: 0.0484 - val_loss: 0.1548 - val_mean_absolute_error: 0.1548 - val_mean_squared_error: 0.0491
Epoch 11/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1539 - mean_absolute_error: 0.1539 - mean_squared_error: 0.0481
Epoch 00011: val_loss improved from 0.15482 to 0.15395, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.1540 - mean_absolute_error: 0.1541 - mean_squared_error: 0.0483 - val_loss: 0.1540 - val_mean_absolute_error: 0.1539 - val_mean_squared_error: 0.0474
Epoch 12/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1489 - mean_absolute_error: 0.1489 - mean_squared_error: 0.0455
Epoch 00012: val_loss improved from 0.15395 to 0.14905, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.1489 - mean_absolute_error: 0.1487 - mean_squared_error: 0.0459 - val_loss: 0.1491 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0461
Epoch 13/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1463 - mean_absolute_error: 0.1463 - mean_squared_error: 0.0449
Epoch 00013: val_loss improved from 0.14905 to 0.14886, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.1463 - mean_absolute_error: 0.1462 - mean_squared_error: 0.0448 - val_loss: 0.1489 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0468
Epoch 14/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1461 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0450
Epoch 00014: val_loss did not improve from 0.14886
10471/10471 [=====] - 1s 87us/sample - loss: 0.1460 - mean_absolute_error: 0.1460 - mean_squared_error: 0.0449 - val_loss: 0.1494 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0459
Epoch 15/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1445 - mean_absolute_error: 0.1445 - mean_squared_error: 0.0441
Epoch 00015: val_loss improved from 0.14886 to 0.14712, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 91us/sample - loss: 0.1442 - mean_absolute_error: 0.1443 - mean_squared_error: 0.0441 - val_loss: 0.1471 - val_mean_absolute_error: 0.1471 - val_mean_squared_error: 0.0454
Epoch 16/500
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10048/10471 [=====>..] - ETA: 0s - loss: 0.1428 - mean_absolute_error: 0.1428 - mean_squared_error: 0.0438
Epoch 00016: val_loss improved from 0.14712 to 0.14543, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.1424 - mean_absolute_error: 0.1423 - mean_squared_error: 0.0433 - val_loss: 0.1454 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0437
Epoch 17/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1417 - mean_absolute_error: 0.1417 - mean_squared_error: 0.0432
Epoch 00017: val_loss improved from 0.14543 to 0.14503, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.1415 - mean_absolute_error: 0.1412 - mean_squared_error: 0.0429 - val_loss: 0.1450 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0442
Epoch 18/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.1393 - mean_absolute_error: 0.1393 - mean_squared_error: 0.0419
Epoch 00018: val_loss did not improve from 0.14503
10471/10471 [=====] - 1s 89us/sample - loss: 0.1393 - mean_absolute_error: 0.1393 - mean_squared_error: 0.0419 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0465
Epoch 19/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1402 - mean_absolute_error: 0.1402 - mean_squared_error: 0.0419
Epoch 00019: val_loss did not improve from 0.14503
10471/10471 [=====] - 1s 87us/sample - loss: 0.1406 - mean_absolute_error: 0.1407 - mean_squared_error: 0.0424 - val_loss: 0.1534 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0485
Epoch 20/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1386 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0418
Epoch 00020: val_loss did not improve from 0.14503
10471/10471 [=====] - 1s 86us/sample - loss: 0.1388 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0416 - val_loss: 0.1580 - val_mean_absolute_error: 0.1580 - val_mean_squared_error: 0.0505
Epoch 21/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1378 - mean_absolute_error: 0.1378 - mean_squared_error: 0.0416
Epoch 00021: val_loss did not improve from 0.14503
10471/10471 [=====] - 1s 88us/sample - loss: 0.1377 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0416 - val_loss: 0.1523 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0471
Epoch 22/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1354 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0406
Epoch 00022: val_loss did not improve from 0.14503
10471/10471 [=====] - 1s 86us/sample - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0405 - val_loss: 0.1639 - val_mean_absolute_error: 0.1640 - val_mean_squared_error: 0.0530
Epoch 23/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1373 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0411
Epoch 00023: val_loss did not improve from 0.14503
10471/10471 [=====] - 1s 87us/sample - loss: 0.1373 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0410 - val_loss: 0.1607 - val_mean_absolute_error: 0.1607 - val_mean_squared_error: 0.0506
Epoch 24/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0403
Epoch 00024: val_loss did not improve from 0.14503
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10471/10471 [=====] - 1s 85us/sample - loss: 0.1364 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0405 - val_loss: 0.1458 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0446
Epoch 25/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1332 - mean_absolute_error: 0.1332 - mean_squared_error: 0.0398
Epoch 00025: val_loss did not improve from 0.14503
10471/10471 [=====] - 1s 88us/sample - loss: 0.1332 - mean_absolute_error: 0.1332 - mean_squared_error: 0.0398 - val_loss: 0.1475 - val_mean_absolute_error: 0.1475 - val_mean_squared_error: 0.0444
Epoch 26/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0394
Epoch 00026: val_loss improved from 0.14503 to 0.14418, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 91us/sample - loss: 0.1343 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0396 - val_loss: 0.1442 - val_mean_absolute_error: 0.1441 - val_mean_squared_error: 0.0440
Epoch 27/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1341 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0395
Epoch 00027: val_loss did not improve from 0.14418
10471/10471 [=====] - 1s 87us/sample - loss: 0.1340 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0393 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0476
Epoch 28/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1322 - mean_absolute_error: 0.1322 - mean_squared_error: 0.0389
Epoch 00028: val_loss did not improve from 0.14418
10471/10471 [=====] - 1s 87us/sample - loss: 0.1324 - mean_absolute_error: 0.1323 - mean_squared_error: 0.0388 - val_loss: 0.1537 - val_mean_absolute_error: 0.1536 - val_mean_squared_error: 0.0477
Epoch 29/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1337 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0395
Epoch 00029: val_loss did not improve from 0.14418
10471/10471 [=====] - 1s 87us/sample - loss: 0.1337 - mean_absolute_error: 0.1337 - mean_squared_error: 0.0394 - val_loss: 0.1464 - val_mean_absolute_error: 0.1463 - val_mean_squared_error: 0.0444
Epoch 30/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1309 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0387
Epoch 00030: val_loss did not improve from 0.14418
10471/10471 [=====] - 1s 88us/sample - loss: 0.1309 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0386 - val_loss: 0.1485 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0447
Epoch 31/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1311 - mean_absolute_error: 0.1311 - mean_squared_error: 0.0381
Epoch 00031: val_loss did not improve from 0.14418
10471/10471 [=====] - 1s 88us/sample - loss: 0.1317 - mean_absolute_error: 0.1317 - mean_squared_error: 0.0389 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0445
Epoch 32/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1292 - mean_absolute_error: 0.1292 - mean_squared_error: 0.0378
Epoch 00032: val_loss did not improve from 0.14418
10471/10471 [=====] - 1s 86us/sample - loss: 0.1291 - mean_absolute_error: 0.1292 - mean_squared_error: 0.0377 - val_loss: 0.1447 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0436
Epoch 33/500
```

9952/10471 [=====>..] - ETA: 0s - loss: 0.1298 - mean_absolute_error: 0.1298 - mean_squared_error: 0.0379
Epoch 00033: val_loss improved from 0.14418 to 0.14151, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 90us/sample - loss: 0.1291 - mean_absolute_error: 0.1290 - mean_squared_error: 0.0373 - val_loss: 0.1415 - val_mean_absolute_error: 0.1415 - val_mean_squared_error: 0.0420
Epoch 34/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1290 - mean_absolute_error: 0.1290 - mean_squared_error: 0.0372
Epoch 00034: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1291 - mean_absolute_error: 0.1291 - mean_squared_error: 0.0372 - val_loss: 0.1429 - val_mean_absolute_error: 0.1428 - val_mean_squared_error: 0.0428
Epoch 35/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1280 - mean_absolute_error: 0.1280 - mean_squared_error: 0.0371
Epoch 00035: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1281 - mean_absolute_error: 0.1279 - mean_squared_error: 0.0372 - val_loss: 0.1423 - val_mean_absolute_error: 0.1422 - val_mean_squared_error: 0.0430
Epoch 36/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1282 - mean_absolute_error: 0.1282 - mean_squared_error: 0.0370
Epoch 00036: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1283 - mean_absolute_error: 0.1282 - mean_squared_error: 0.0369 - val_loss: 0.1418 - val_mean_absolute_error: 0.1418 - val_mean_squared_error: 0.0426
Epoch 37/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.1276 - mean_absolute_error: 0.1276 - mean_squared_error: 0.0370
Epoch 00037: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 88us/sample - loss: 0.1274 - mean_absolute_error: 0.1274 - mean_squared_error: 0.0368 - val_loss: 0.1533 - val_mean_absolute_error: 0.1532 - val_mean_squared_error: 0.0482
Epoch 38/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1265 - mean_absolute_error: 0.1265 - mean_squared_error: 0.0362
Epoch 00038: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 86us/sample - loss: 0.1265 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0364 - val_loss: 0.1474 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0452
Epoch 39/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1280 - mean_absolute_error: 0.1280 - mean_squared_error: 0.0367
Epoch 00039: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 86us/sample - loss: 0.1277 - mean_absolute_error: 0.1277 - mean_squared_error: 0.0364 - val_loss: 0.1452 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0439
Epoch 40/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1257 - mean_absolute_error: 0.1257 - mean_squared_error: 0.0361
Epoch 00040: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 86us/sample - loss: 0.1258 - mean_absolute_error: 0.1258 - mean_squared_error: 0.0362 - val_loss: 0.1432 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0422
Epoch 41/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1247 - mean_absolute_error: 0.1247 - mean_squared_error: 0.0356
Epoch 00041: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1246 - mean_absolute_error: 0.1246 - mean_squared_error: 0.0355

lute_error: 0.1245 - mean_squared_error: 0.0354 - val_loss: 0.1437 - val_mean_absolute_error: 0.1437 - val_mean_squared_error: 0.0424
Epoch 42/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1248 - mean_absolute_error: 0.1248 - mean_squared_error: 0.0356
Epoch 00042: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 86us/sample - loss: 0.1247 - mean_absolute_error: 0.1249 - mean_squared_error: 0.0356 - val_loss: 0.1724 - val_mean_absolute_error: 0.1725 - val_mean_squared_error: 0.0547
Epoch 43/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1253 - mean_absolute_error: 0.1253 - mean_squared_error: 0.0350
Epoch 00043: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 86us/sample - loss: 0.1253 - mean_absolute_error: 0.1252 - mean_squared_error: 0.0352 - val_loss: 0.1553 - val_mean_absolute_error: 0.1553 - val_mean_squared_error: 0.0484
Epoch 44/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1234 - mean_absolute_error: 0.1234 - mean_squared_error: 0.0351
Epoch 00044: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 86us/sample - loss: 0.1234 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0351 - val_loss: 0.1451 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0434
Epoch 45/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1237 - mean_absolute_error: 0.1237 - mean_squared_error: 0.0350
Epoch 00045: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1235 - mean_absolute_error: 0.1234 - mean_squared_error: 0.0347 - val_loss: 0.1468 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0446
Epoch 46/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1233 - mean_absolute_error: 0.1233 - mean_squared_error: 0.0345
Epoch 00046: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1231 - mean_absolute_error: 0.1230 - mean_squared_error: 0.0343 - val_loss: 0.1477 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0448
Epoch 47/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1228 - mean_absolute_error: 0.1228 - mean_squared_error: 0.0344
Epoch 00047: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 88us/sample - loss: 0.1227 - mean_absolute_error: 0.1226 - mean_squared_error: 0.0342 - val_loss: 0.1442 - val_mean_absolute_error: 0.1442 - val_mean_squared_error: 0.0433
Epoch 48/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1212 - mean_absolute_error: 0.1212 - mean_squared_error: 0.0338
Epoch 00048: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 88us/sample - loss: 0.1217 - mean_absolute_error: 0.1216 - mean_squared_error: 0.0340 - val_loss: 0.1512 - val_mean_absolute_error: 0.1512 - val_mean_squared_error: 0.0462
Epoch 49/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1215 - mean_absolute_error: 0.1215 - mean_squared_error: 0.0334
Epoch 00049: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1214 - mean_absolute_error: 0.1216 - mean_squared_error: 0.0335 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0454
Epoch 50/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1231 - mean_absolute_error: 0.1231 - mean_squared_error: 0.0344

```
Epoch 00050: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1234 - mean_absolute_error: 0.1234 - mean_squared_error: 0.0345 - val_loss: 0.1427 - val_mean_absolute_error: 0.1427 - val_mean_squared_error: 0.0429
Epoch 51/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1225 - mean_absolute_error: 0.1225 - mean_squared_error: 0.0337
Epoch 00051: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1223 - mean_absolute_error: 0.1224 - mean_squared_error: 0.0335 - val_loss: 0.1510 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0458
Epoch 52/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1195 - mean_absolute_error: 0.1195 - mean_squared_error: 0.0329
Epoch 00052: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1197 - mean_absolute_error: 0.1197 - mean_squared_error: 0.0329 - val_loss: 0.1444 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0429
Epoch 53/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1193 - mean_absolute_error: 0.1193 - mean_squared_error: 0.0329
Epoch 00053: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 86us/sample - loss: 0.1195 - mean_absolute_error: 0.1196 - mean_squared_error: 0.0331 - val_loss: 0.1486 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0451
Epoch 54/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1203 - mean_absolute_error: 0.1203 - mean_squared_error: 0.0328
Epoch 00054: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1204 - mean_absolute_error: 0.1202 - mean_squared_error: 0.0329 - val_loss: 0.1427 - val_mean_absolute_error: 0.1427 - val_mean_squared_error: 0.0421
Epoch 55/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1198 - mean_absolute_error: 0.1198 - mean_squared_error: 0.0326
Epoch 00055: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 88us/sample - loss: 0.1194 - mean_absolute_error: 0.1192 - mean_squared_error: 0.0322 - val_loss: 0.1459 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0431
Epoch 56/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1200 - mean_absolute_error: 0.1200 - mean_squared_error: 0.0330
Epoch 00056: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 87us/sample - loss: 0.1196 - mean_absolute_error: 0.1195 - mean_squared_error: 0.0326 - val_loss: 0.1444 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0432
Epoch 57/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.1182 - mean_absolute_error: 0.1182 - mean_squared_error: 0.0322
Epoch 00057: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 86us/sample - loss: 0.1181 - mean_absolute_error: 0.1180 - mean_squared_error: 0.0320 - val_loss: 0.1456 - val_mean_absolute_error: 0.1455 - val_mean_squared_error: 0.0437
Epoch 58/500
10144/10471 [=====>..] - ETA: 0s - loss: 0.1172 - mean_absolute_error: 0.1172 - mean_squared_error: 0.0318Restoring model weights from the end of the best epoch.

Epoch 00058: val_loss did not improve from 0.14151
10471/10471 [=====] - 1s 85us/sample - loss: 0.1173 - mean_absolute_error: 0.1173 - mean_squared_error: 0.0317 - val_loss: 0.1505 - val_mean_absolute_error: 0.1505 - val_mean_squared_error: 0.0451
```

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rror: 0.1505 - val_mean_squared_error: 0.0457
Epoch 00058: early stopping
MAE: 0.14147349
RMSE: 0.20485269
Adding initial Dense layers with 128
Adding Dense layer with 128
Adding last layer with 128
Outputting predictive model - Tabular
Model: "model_101"

```

Layer (type)	Output Shape	Param #
<hr/>		
input_102 (InputLayer)	[(None, 61)]	0
dense_765 (Dense)	(None, 128)	7936
dense_766 (Dense)	(None, 128)	16512
dense_767 (Dense)	(None, 128)	16512
dense_768 (Dense)	(None, 128)	16512
dense_769 (Dense)	(None, 128)	16512
dense_770 (Dense)	(None, 128)	16512
dense_771 (Dense)	(None, 128)	16512
dense_772 (Dense)	(None, 128)	16512
dropout_25 (Dropout)	(None, 128)	0
dense_773 (Dense)	(None, 1)	129
<hr/>		
Total params: 123,649		
Trainable params: 123,649		
Non-trainable params: 0		

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

9728/10471 [=====>...] - ETA: 0s - loss: 1.8015 - mean_absolute_error: 1.8015 - mean_squared_error: 6.9864

Epoch 00001: val_loss improved from inf to 0.42414, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 130us/sample - loss: 1.7459 - mean_absolute_error: 1.7447 - mean_squared_error: 6.5933 - val_loss: 0.4241 - val_mean_absolute_error: 0.4239 - val_mean_squared_error: 0.2705

Epoch 2/500

10368/10471 [=====>.] - ETA: 0s - loss: 0.8722 - mean_absolute_error: 0.8722 - mean_squared_error: 1.1915

Epoch 00002: val_loss improved from 0.42414 to 0.39923, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 77us/sample - loss: 0.8725 - mean_absolute_error: 0.8729 - mean_squared_error: 1.1924 - val_loss: 0.3992 - val_mean_absolute_e

```
rror: 0.3993 - val_mean_squared_error: 0.2190
Epoch 3/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.7649 - mean_absolute_error: 0.7649 - mean_squared_error: 0.9173
Epoch 00003: val_loss improved from 0.39923 to 0.31842, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.7628 - mean_absolute_error: 0.7624 - mean_squared_error: 0.9113 - val_loss: 0.3184 - val_mean_absolute_error: 0.3183 - val_mean_squared_error: 0.1535
Epoch 4/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.6398 - mean_absolute_error: 0.6398 - mean_squared_error: 0.6442
Epoch 00004: val_loss improved from 0.31842 to 0.19052, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.6382 - mean_absolute_error: 0.6376 - mean_squared_error: 0.6404 - val_loss: 0.1905 - val_mean_absolute_error: 0.1905 - val_mean_squared_error: 0.0689
Epoch 5/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.5501 - mean_absolute_error: 0.5501 - mean_squared_error: 0.4832
Epoch 00005: val_loss did not improve from 0.19052
10471/10471 [=====] - 1s 74us/sample - loss: 0.5489 - mean_absolute_error: 0.5487 - mean_squared_error: 0.4807 - val_loss: 0.2242 - val_mean_absolute_error: 0.2243 - val_mean_squared_error: 0.0793
Epoch 6/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.4605 - mean_absolute_error: 0.4605 - mean_squared_error: 0.3316
Epoch 00006: val_loss did not improve from 0.19052
10471/10471 [=====] - 1s 76us/sample - loss: 0.4597 - mean_absolute_error: 0.4597 - mean_squared_error: 0.3307 - val_loss: 0.1975 - val_mean_absolute_error: 0.1975 - val_mean_squared_error: 0.0671
Epoch 7/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.3789 - mean_absolute_error: 0.3789 - mean_squared_error: 0.2285
Epoch 00007: val_loss improved from 0.19052 to 0.17750, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 79us/sample - loss: 0.3777 - mean_absolute_error: 0.3774 - mean_squared_error: 0.2270 - val_loss: 0.1775 - val_mean_absolute_error: 0.1775 - val_mean_squared_error: 0.0590
Epoch 8/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.3017 - mean_absolute_error: 0.3017 - mean_squared_error: 0.1478
Epoch 00008: val_loss improved from 0.17750 to 0.16943, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.3012 - mean_absolute_error: 0.3008 - mean_squared_error: 0.1469 - val_loss: 0.1694 - val_mean_absolute_error: 0.1694 - val_mean_squared_error: 0.0571
Epoch 9/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.2412 - mean_absolute_error: 0.2412 - mean_squared_error: 0.0984
Epoch 00009: val_loss improved from 0.16943 to 0.16540, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.2406 - mean_absolute_error: 0.2403 - mean_squared_error: 0.0977 - val_loss: 0.1654 - val_mean_absolute_error: 0.1654 - val_mean_squared_error: 0.0517
Epoch 10/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1997 - mean_absolute_error: 0.1997 - mean_squared_error: 0.0694
Epoch 00010: val_loss improved from 0.16540 to 0.15673, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 78us/sample - loss: 0.1991 - mean_absolute_error: 0.1991 - mean_squared_error: 0.0694
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lute_error: 0.1991 - mean_squared_error: 0.0691 - val_loss: 0.1567 - val_mean_absolute_e
rror: 0.1567 - val_mean_squared_error: 0.0492
Epoch 11/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1675 - mean_absolute_er
ror: 0.1675 - mean_squared_error: 0.0528
Epoch 00011: val_loss improved from 0.15673 to 0.15388, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.1670 - mean_abso
lute_error: 0.1673 - mean_squared_error: 0.0528 - val_loss: 0.1539 - val_mean_absolute_e
rror: 0.1539 - val_mean_squared_error: 0.0482
Epoch 12/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1535 - mean_absolute_er
ror: 0.1535 - mean_squared_error: 0.0467
Epoch 00012: val_loss did not improve from 0.15388
10471/10471 [=====] - 1s 75us/sample - loss: 0.1532 - mean_abso
lute_error: 0.1535 - mean_squared_error: 0.0466 - val_loss: 0.1572 - val_mean_absolute_e
rror: 0.1573 - val_mean_squared_error: 0.0511
Epoch 13/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1467 - mean_absolute_er
ror: 0.1467 - mean_squared_error: 0.0437
Epoch 00013: val_loss improved from 0.15388 to 0.15140, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.1469 - mean_abso
lute_error: 0.1468 - mean_squared_error: 0.0437 - val_loss: 0.1514 - val_mean_absolute_e
rror: 0.1514 - val_mean_squared_error: 0.0481
Epoch 14/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1425 - mean_absolute_er
ror: 0.1425 - mean_squared_error: 0.0421
Epoch 00014: val_loss improved from 0.15140 to 0.14995, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 76us/sample - loss: 0.1423 - mean_abso
lute_error: 0.1422 - mean_squared_error: 0.0420 - val_loss: 0.1499 - val_mean_absolute_e
rror: 0.1500 - val_mean_squared_error: 0.0467
Epoch 15/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1378 - mean_absolute_er
ror: 0.1378 - mean_squared_error: 0.0403
Epoch 00015: val_loss improved from 0.14995 to 0.14675, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 78us/sample - loss: 0.1382 - mean_abso
lute_error: 0.1381 - mean_squared_error: 0.0404 - val_loss: 0.1467 - val_mean_absolute_e
rror: 0.1468 - val_mean_squared_error: 0.0460
Epoch 16/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1348 - mean_absolute_er
ror: 0.1348 - mean_squared_error: 0.0394
Epoch 00016: val_loss did not improve from 0.14675
10471/10471 [=====] - 1s 76us/sample - loss: 0.1349 - mean_abso
lute_error: 0.1351 - mean_squared_error: 0.0398 - val_loss: 0.1472 - val_mean_absolute_e
rror: 0.1472 - val_mean_squared_error: 0.0458
Epoch 17/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1340 - mean_absolute_er
ror: 0.1340 - mean_squared_error: 0.0387
Epoch 00017: val_loss improved from 0.14675 to 0.14542, saving model to best_basic_mode
1.hdf5
10471/10471 [=====] - 1s 77us/sample - loss: 0.1338 - mean_abso
lute_error: 0.1337 - mean_squared_error: 0.0388 - val_loss: 0.1454 - val_mean_absolute_e
rror: 0.1454 - val_mean_squared_error: 0.0461
Epoch 18/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1320 - mean_absolute_er
ror: 0.1320 - mean_squared_error: 0.0386
Epoch 00018: val_loss did not improve from 0.14542
10471/10471 [=====] - 1s 74us/sample - loss: 0.1323 - mean_abso
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lute_error: 0.1324 - mean_squared_error: 0.0387 - val_loss: 0.1474 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0452

Epoch 19/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1293 - mean_absolute_error: 0.1293 - mean_squared_error: 0.0376

Epoch 00019: val_loss did not improve from 0.14542

10471/10471 [=====] - 1s 74us/sample - loss: 0.1291 - mean_absolute_error: 0.1290 - mean_squared_error: 0.0374 - val_loss: 0.1502 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0461

Epoch 20/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1271 - mean_absolute_error: 0.1271 - mean_squared_error: 0.0362

Epoch 00020: val_loss did not improve from 0.14542

10471/10471 [=====] - 1s 73us/sample - loss: 0.1273 - mean_absolute_error: 0.1274 - mean_squared_error: 0.0364 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0454

Epoch 21/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1257 - mean_absolute_error: 0.1257 - mean_squared_error: 0.0363

Epoch 00021: val_loss did not improve from 0.14542

10471/10471 [=====] - 1s 75us/sample - loss: 0.1256 - mean_absolute_error: 0.1256 - mean_squared_error: 0.0362 - val_loss: 0.1559 - val_mean_absolute_error: 0.1560 - val_mean_squared_error: 0.0483

Epoch 22/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1257 - mean_absolute_error: 0.1257 - mean_squared_error: 0.0357

Epoch 00022: val_loss did not improve from 0.14542

10471/10471 [=====] - 1s 74us/sample - loss: 0.1256 - mean_absolute_error: 0.1258 - mean_squared_error: 0.0359 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0456

Epoch 23/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1237 - mean_absolute_error: 0.1237 - mean_squared_error: 0.0349

Epoch 00023: val_loss improved from 0.14542 to 0.14427, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 76us/sample - loss: 0.1237 - mean_absolute_error: 0.1236 - mean_squared_error: 0.0349 - val_loss: 0.1443 - val_mean_absolute_error: 0.1442 - val_mean_squared_error: 0.0443

Epoch 24/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1212 - mean_absolute_error: 0.1212 - mean_squared_error: 0.0336

Epoch 00024: val_loss did not improve from 0.14427

10471/10471 [=====] - 1s 74us/sample - loss: 0.1211 - mean_absolute_error: 0.1211 - mean_squared_error: 0.0336 - val_loss: 0.1469 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0456

Epoch 25/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1204 - mean_absolute_error: 0.1204 - mean_squared_error: 0.0334

Epoch 00025: val_loss did not improve from 0.14427

10471/10471 [=====] - 1s 74us/sample - loss: 0.1205 - mean_absolute_error: 0.1205 - mean_squared_error: 0.0335 - val_loss: 0.1473 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0453

Epoch 26/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1194 - mean_absolute_error: 0.1194 - mean_squared_error: 0.0325

Epoch 00026: val_loss did not improve from 0.14427

10471/10471 [=====] - 1s 73us/sample - loss: 0.1194 - mean_absolute_error: 0.1194 - mean_squared_error: 0.0325 - val_loss: 0.1492 - val_mean_absolute_error: 0.1492 - val_mean_squared_error: 0.0465

Epoch 27/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1183 - mean_absolute_error:

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ror: 0.1183 - mean_squared_error: 0.0323
Epoch 00027: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 74us/sample - loss: 0.1180 - mean_absolute_error: 0.1182 - mean_squared_error: 0.0323 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0463
Epoch 28/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1172 - mean_absolute_error: 0.1172 - mean_squared_error: 0.0316
Epoch 00028: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 74us/sample - loss: 0.1175 - mean_absolute_error: 0.1176 - mean_squared_error: 0.0319 - val_loss: 0.1454 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0455
Epoch 29/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1155 - mean_absolute_error: 0.1155 - mean_squared_error: 0.0310
Epoch 00029: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 74us/sample - loss: 0.1155 - mean_absolute_error: 0.1154 - mean_squared_error: 0.0311 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0448
Epoch 30/500
9760/10471 [=====.>...] - ETA: 0s - loss: 0.1138 - mean_absolute_error: 0.1138 - mean_squared_error: 0.0299
Epoch 00030: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 73us/sample - loss: 0.1143 - mean_absolute_error: 0.1145 - mean_squared_error: 0.0304 - val_loss: 0.1537 - val_mean_absolute_error: 0.1538 - val_mean_squared_error: 0.0475
Epoch 31/500
9728/10471 [=====.>...] - ETA: 0s - loss: 0.1134 - mean_absolute_error: 0.1134 - mean_squared_error: 0.0302
Epoch 00031: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 72us/sample - loss: 0.1142 - mean_absolute_error: 0.1142 - mean_squared_error: 0.0304 - val_loss: 0.1626 - val_mean_absolute_error: 0.1627 - val_mean_squared_error: 0.0500
Epoch 32/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1143 - mean_absolute_error: 0.1143 - mean_squared_error: 0.0304
Epoch 00032: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 74us/sample - loss: 0.1143 - mean_absolute_error: 0.1143 - mean_squared_error: 0.0304 - val_loss: 0.1558 - val_mean_absolute_error: 0.1558 - val_mean_squared_error: 0.0495
Epoch 33/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1120 - mean_absolute_error: 0.1120 - mean_squared_error: 0.0303
Epoch 00033: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 74us/sample - loss: 0.1123 - mean_absolute_error: 0.1124 - mean_squared_error: 0.0304 - val_loss: 0.1493 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0474
Epoch 34/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1112 - mean_absolute_error: 0.1112 - mean_squared_error: 0.0292
Epoch 00034: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 74us/sample - loss: 0.1111 - mean_absolute_error: 0.1111 - mean_squared_error: 0.0291 - val_loss: 0.1473 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0458
Epoch 35/500
9728/10471 [=====.>...] - ETA: 0s - loss: 0.1090 - mean_absolute_error: 0.1090 - mean_squared_error: 0.0286
Epoch 00035: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 73us/sample - loss: 0.1092 - mean_absolute_error: 0.1092 - mean_squared_error: 0.0285 - val_loss: 0.1618 - val_mean_absolute_error: 0.1618 - val_mean_squared_error: 0.0499
```

Epoch 36/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1097 - mean_absolute_error: 0.1097 - mean_squared_error: 0.0285
Epoch 00036: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 73us/sample - loss: 0.1099 - mean_absolute_error: 0.1098 - mean_squared_error: 0.0283 - val_loss: 0.1515 - val_mean_absolute_error: 0.1515 - val_mean_squared_error: 0.0477
Epoch 37/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1074 - mean_absolute_error: 0.1074 - mean_squared_error: 0.0277
Epoch 00037: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 75us/sample - loss: 0.1074 - mean_absolute_error: 0.1074 - mean_squared_error: 0.0276 - val_loss: 0.1568 - val_mean_absolute_error: 0.1568 - val_mean_squared_error: 0.0488
Epoch 38/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1069 - mean_absolute_error: 0.1069 - mean_squared_error: 0.0273
Epoch 00038: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 74us/sample - loss: 0.1068 - mean_absolute_error: 0.1071 - mean_squared_error: 0.0274 - val_loss: 0.1511 - val_mean_absolute_error: 0.1511 - val_mean_squared_error: 0.0474
Epoch 39/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1073 - mean_absolute_error: 0.1073 - mean_squared_error: 0.0272
Epoch 00039: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 73us/sample - loss: 0.1074 - mean_absolute_error: 0.1073 - mean_squared_error: 0.0272 - val_loss: 0.1494 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0465
Epoch 40/500
9760/10471 [=====>...] - ETA: 0s - loss: 0.1054 - mean_absolute_error: 0.1054 - mean_squared_error: 0.0261
Epoch 00040: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 73us/sample - loss: 0.1055 - mean_absolute_error: 0.1055 - mean_squared_error: 0.0259 - val_loss: 0.1489 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0458
Epoch 41/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1045 - mean_absolute_error: 0.1045 - mean_squared_error: 0.0263
Epoch 00041: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 74us/sample - loss: 0.1044 - mean_absolute_error: 0.1044 - mean_squared_error: 0.0262 - val_loss: 0.1541 - val_mean_absolute_error: 0.1541 - val_mean_squared_error: 0.0481
Epoch 42/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1035 - mean_absolute_error: 0.1035 - mean_squared_error: 0.0253
Epoch 00042: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 73us/sample - loss: 0.1036 - mean_absolute_error: 0.1035 - mean_squared_error: 0.0254 - val_loss: 0.1505 - val_mean_absolute_error: 0.1505 - val_mean_squared_error: 0.0472
Epoch 43/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1035 - mean_absolute_error: 0.1035 - mean_squared_error: 0.0255
Epoch 00043: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 74us/sample - loss: 0.1035 - mean_absolute_error: 0.1035 - mean_squared_error: 0.0254 - val_loss: 0.1553 - val_mean_absolute_error: 0.1553 - val_mean_squared_error: 0.0488
Epoch 44/500
9728/10471 [=====>...] - ETA: 0s - loss: 0.1023 - mean_absolute_error: 0.1023 - mean_squared_error: 0.0249
Epoch 00044: val_loss did not improve from 0.14427
10471/10471 [=====] - 1s 73us/sample - loss: 0.1023 - mean_absolute_error:

lute_error: 0.1022 - mean_squared_error: 0.0249 - val_loss: 0.1557 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0492
 Epoch 45/500
 9824/10471 [=====>..] - ETA: 0s - loss: 0.1008 - mean_absolute_error: 0.1008 - mean_squared_error: 0.0238
 Epoch 00045: val_loss did not improve from 0.14427
 10471/10471 [=====] - 1s 72us/sample - loss: 0.1009 - mean_absolute_error: 0.1009 - mean_squared_error: 0.0239 - val_loss: 0.1519 - val_mean_absolute_error: 0.1519 - val_mean_squared_error: 0.0473
 Epoch 46/500
 10272/10471 [=====>.] - ETA: 0s - loss: 0.1015 - mean_absolute_error: 0.1015 - mean_squared_error: 0.0244
 Epoch 00046: val_loss did not improve from 0.14427
 10471/10471 [=====] - 1s 74us/sample - loss: 0.1014 - mean_absolute_error: 0.1015 - mean_squared_error: 0.0244 - val_loss: 0.1509 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0465
 Epoch 47/500
 10400/10471 [=====>.] - ETA: 0s - loss: 0.1010 - mean_absolute_error: 0.1010 - mean_squared_error: 0.0240
 Epoch 00047: val_loss did not improve from 0.14427
 10471/10471 [=====] - 1s 74us/sample - loss: 0.1010 - mean_absolute_error: 0.1011 - mean_squared_error: 0.0240 - val_loss: 0.1503 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0471
 Epoch 48/500
 10336/10471 [=====>.] - ETA: 0s - loss: 0.0978 - mean_absolute_error: 0.0978 - mean_squared_error: 0.0226Restoring model weights from the end of the best epoch.

Epoch 00048: val_loss did not improve from 0.14427
 10471/10471 [=====] - 1s 74us/sample - loss: 0.0979 - mean_absolute_error: 0.0978 - mean_squared_error: 0.0227 - val_loss: 0.1504 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0463
 Epoch 00048: early stopping
 MAE: 0.14423299
 RMSE: 0.21050732
 Adding initial Dense layers with 128
 Adding Dense layer with 128
 Adding Dense layer with 128
 Adding Dense layer with 128
 Adding last layer with 128
 Outputting predictive model - Tabular
 Model: "model_102"

Layer (type)	Output Shape	Param #
<hr/>		
input_103 (InputLayer)	[(None, 61)]	0
dense_774 (Dense)	(None, 128)	7936
dense_775 (Dense)	(None, 128)	16512
dense_776 (Dense)	(None, 128)	16512
dense_777 (Dense)	(None, 128)	16512
dense_778 (Dense)	(None, 128)	16512
dropout_26 (Dropout)	(None, 128)	0
dense_779 (Dense)	(None, 1)	129
<hr/>		

```
Total params: 74,113
Trainable params: 74,113
Non-trainable params: 0
```

```
None
[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10080/10471 [=====>..] - ETA: 0s - loss: 1.8954 - mean_absolute_error: 1.8954 - mean_squared_error: 8.4375
Epoch 00001: val_loss improved from inf to 0.98757, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 109us/sample - loss: 1.8722 - mean_absolute_error: 1.8690 - mean_squared_error: 8.2004 - val_loss: 0.9876 - val_mean_absolute_error: 0.9876 - val_mean_squared_error: 1.3261
Epoch 2/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.9924 - mean_absolute_error: 0.9924 - mean_squared_error: 1.5691
Epoch 00002: val_loss improved from 0.98757 to 0.51905, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 66us/sample - loss: 0.9883 - mean_absolute_error: 0.9877 - mean_squared_error: 1.5551 - val_loss: 0.5191 - val_mean_absolute_error: 0.5191 - val_mean_squared_error: 0.3669
Epoch 3/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.7648 - mean_absolute_error: 0.7648 - mean_squared_error: 0.9245
Epoch 00003: val_loss improved from 0.51905 to 0.22181, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 67us/sample - loss: 0.7670 - mean_absolute_error: 0.7674 - mean_squared_error: 0.9309 - val_loss: 0.2218 - val_mean_absolute_error: 0.2218 - val_mean_squared_error: 0.0866
Epoch 4/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.6310 - mean_absolute_error: 0.6310 - mean_squared_error: 0.6323
Epoch 00004: val_loss improved from 0.22181 to 0.18913, saving model to best_basic_model.hdf5
10471/10471 [=====] - 1s 67us/sample - loss: 0.6276 - mean_absolute_error: 0.6278 - mean_squared_error: 0.6258 - val_loss: 0.1891 - val_mean_absolute_error: 0.1891 - val_mean_squared_error: 0.0658
Epoch 5/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.5276 - mean_absolute_error: 0.5276 - mean_squared_error: 0.4387
Epoch 00005: val_loss did not improve from 0.18913
10471/10471 [=====] - 1s 64us/sample - loss: 0.5262 - mean_absolute_error: 0.5258 - mean_squared_error: 0.4360 - val_loss: 0.2053 - val_mean_absolute_error: 0.2053 - val_mean_squared_error: 0.0729
Epoch 6/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.4406 - mean_absolute_error: 0.4406 - mean_squared_error: 0.3051
Epoch 00006: val_loss did not improve from 0.18913
10471/10471 [=====] - 1s 65us/sample - loss: 0.4398 - mean_absolute_error: 0.4401 - mean_squared_error: 0.3050 - val_loss: 0.2065 - val_mean_absolute_error: 0.2065 - val_mean_squared_error: 0.0717
Epoch 7/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.3577 - mean_absolute_error: 0.3577 - mean_squared_error: 0.2051
Epoch 00007: val_loss did not improve from 0.18913
10471/10471 [=====] - 1s 64us/sample - loss: 0.3564 - mean_absolute_error: 0.3564 - mean_squared_error: 0.2042 - val_loss: 0.1938 - val_mean_absolute_error: 0.1938 - val_mean_squared_error: 0.0636
Epoch 8/500
```

10464/10471 [=====>.] - ETA: 0s - loss: 0.2827 - mean_absolute_error: 0.2827 - mean_squared_error: 0.1304
Epoch 00008: val_loss improved from 0.18913 to 0.16900, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.2827 - mean_absolute_error: 0.2831 - mean_squared_error: 0.1308 - val_loss: 0.1690 - val_mean_absolute_error: 0.1689 - val_mean_squared_error: 0.0549
Epoch 9/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.2300 - mean_absolute_error: 0.2300 - mean_squared_error: 0.0902
Epoch 00009: val_loss improved from 0.16900 to 0.16551, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 67us/sample - loss: 0.2297 - mean_absolute_error: 0.2297 - mean_squared_error: 0.0900 - val_loss: 0.1655 - val_mean_absolute_error: 0.1655 - val_mean_squared_error: 0.0528
Epoch 10/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1878 - mean_absolute_error: 0.1878 - mean_squared_error: 0.0635
Epoch 00010: val_loss improved from 0.16551 to 0.15044, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 67us/sample - loss: 0.1870 - mean_absolute_error: 0.1871 - mean_squared_error: 0.0630 - val_loss: 0.1504 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0467
Epoch 11/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1648 - mean_absolute_error: 0.1648 - mean_squared_error: 0.0520
Epoch 00011: val_loss did not improve from 0.15044
10471/10471 [=====] - 1s 65us/sample - loss: 0.1645 - mean_absolute_error: 0.1647 - mean_squared_error: 0.0518 - val_loss: 0.1505 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0462
Epoch 12/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1529 - mean_absolute_error: 0.1529 - mean_squared_error: 0.0471
Epoch 00012: val_loss did not improve from 0.15044
10471/10471 [=====] - 1s 64us/sample - loss: 0.1527 - mean_absolute_error: 0.1531 - mean_squared_error: 0.0472 - val_loss: 0.1557 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0469
Epoch 13/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1471 - mean_absolute_error: 0.1471 - mean_squared_error: 0.0442
Epoch 00013: val_loss improved from 0.15044 to 0.14933, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 66us/sample - loss: 0.1471 - mean_absolute_error: 0.1472 - mean_squared_error: 0.0445 - val_loss: 0.1493 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0455
Epoch 14/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1435 - mean_absolute_error: 0.1435 - mean_squared_error: 0.0433
Epoch 00014: val_loss improved from 0.14933 to 0.14854, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 66us/sample - loss: 0.1436 - mean_absolute_error: 0.1438 - mean_squared_error: 0.0434 - val_loss: 0.1485 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0461
Epoch 15/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1400 - mean_absolute_error: 0.1400 - mean_squared_error: 0.0422
Epoch 00015: val_loss improved from 0.14854 to 0.14828, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 66us/sample - loss: 0.1404 - mean_absolute_error: 0.1402 - mean_squared_error: 0.0424 - val_loss: 0.1483 - val_mean_absolute_error: 0.1483 - val_mean_squared_error: 0.0458

Epoch 16/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0417
Epoch 00016: val_loss improved from 0.14828 to 0.14578, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 67us/sample - loss: 0.1394 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0416 - val_loss: 0.1458 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0443
Epoch 17/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1357 - mean_absolute_error: 0.1357 - mean_squared_error: 0.0401
Epoch 00017: val_loss improved from 0.14578 to 0.14175, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 66us/sample - loss: 0.1357 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0400 - val_loss: 0.1417 - val_mean_absolute_error: 0.1418 - val_mean_squared_error: 0.0427
Epoch 18/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1352 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0401
Epoch 00018: val_loss did not improve from 0.14175
10471/10471 [=====] - 1s 65us/sample - loss: 0.1351 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0399 - val_loss: 0.1498 - val_mean_absolute_error: 0.1498 - val_mean_squared_error: 0.0449
Epoch 19/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1334 - mean_absolute_error: 0.1334 - mean_squared_error: 0.0394
Epoch 00019: val_loss did not improve from 0.14175
10471/10471 [=====] - 1s 66us/sample - loss: 0.1329 - mean_absolute_error: 0.1328 - mean_squared_error: 0.0389 - val_loss: 0.1493 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0464
Epoch 20/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1311 - mean_absolute_error: 0.1311 - mean_squared_error: 0.0384
Epoch 00020: val_loss did not improve from 0.14175
10471/10471 [=====] - 1s 64us/sample - loss: 0.1311 - mean_absolute_error: 0.1310 - mean_squared_error: 0.0384 - val_loss: 0.1619 - val_mean_absolute_error: 0.1619 - val_mean_squared_error: 0.0508
Epoch 21/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1309 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0382
Epoch 00021: val_loss did not improve from 0.14175
10471/10471 [=====] - 1s 63us/sample - loss: 0.1308 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0382 - val_loss: 0.1447 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0436
Epoch 22/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1283 - mean_absolute_error: 0.1283 - mean_squared_error: 0.0373
Epoch 00022: val_loss did not improve from 0.14175
10471/10471 [=====] - 1s 64us/sample - loss: 0.1283 - mean_absolute_error: 0.1286 - mean_squared_error: 0.0374 - val_loss: 0.1423 - val_mean_absolute_error: 0.1424 - val_mean_squared_error: 0.0435
Epoch 23/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1295 - mean_absolute_error: 0.1295 - mean_squared_error: 0.0370
Epoch 00023: val_loss did not improve from 0.14175
10471/10471 [=====] - 1s 64us/sample - loss: 0.1299 - mean_absolute_error: 0.1300 - mean_squared_error: 0.0374 - val_loss: 0.1522 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0471
Epoch 24/500
9632/10471 [=====>...] - ETA: 0s - loss: 0.1292 - mean_absolute_error: 0.1292 - mean_squared_error: 0.0375

Epoch 00024: val_loss improved from 0.14175 to 0.14154, saving model to best_basic_mode1.hdf5

10471/10471 [=====] - 1s 64us/sample - loss: 0.1281 - mean_absolute_error: 0.1281 - mean_squared_error: 0.0368 - val_loss: 0.1415 - val_mean_absolute_error: 0.1415 - val_mean_squared_error: 0.0421

Epoch 25/500

10240/10471 [=====.>.] - ETA: 0s - loss: 0.1265 - mean_absolute_error: 0.1265 - mean_squared_error: 0.0363

Epoch 00025: val_loss did not improve from 0.14154

10471/10471 [=====] - 1s 64us/sample - loss: 0.1263 - mean_absolute_error: 0.1265 - mean_squared_error: 0.0367 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0427

Epoch 26/500

10208/10471 [=====.>.] - ETA: 0s - loss: 0.1239 - mean_absolute_error: 0.1239 - mean_squared_error: 0.0347

Epoch 00026: val_loss did not improve from 0.14154

10471/10471 [=====] - 1s 64us/sample - loss: 0.1243 - mean_absolute_error: 0.1242 - mean_squared_error: 0.0350 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0462

Epoch 27/500

10368/10471 [=====.>.] - ETA: 0s - loss: 0.1239 - mean_absolute_error: 0.1239 - mean_squared_error: 0.0353

Epoch 00027: val_loss did not improve from 0.14154

10471/10471 [=====] - 1s 64us/sample - loss: 0.1238 - mean_absolute_error: 0.1238 - mean_squared_error: 0.0353 - val_loss: 0.1438 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0437

Epoch 28/500

10336/10471 [=====.>.] - ETA: 0s - loss: 0.1235 - mean_absolute_error: 0.1235 - mean_squared_error: 0.0348

Epoch 00028: val_loss did not improve from 0.14154

10471/10471 [=====] - 1s 64us/sample - loss: 0.1236 - mean_absolute_error: 0.1237 - mean_squared_error: 0.0348 - val_loss: 0.1451 - val_mean_absolute_error: 0.1451 - val_mean_squared_error: 0.0434

Epoch 29/500

10144/10471 [=====.>.] - ETA: 0s - loss: 0.1220 - mean_absolute_error: 0.1220 - mean_squared_error: 0.0345

Epoch 00029: val_loss did not improve from 0.14154

10471/10471 [=====] - 1s 65us/sample - loss: 0.1221 - mean_absolute_error: 0.1219 - mean_squared_error: 0.0345 - val_loss: 0.1445 - val_mean_absolute_error: 0.1445 - val_mean_squared_error: 0.0437

Epoch 30/500

10272/10471 [=====.>.] - ETA: 0s - loss: 0.1221 - mean_absolute_error: 0.1221 - mean_squared_error: 0.0343

Epoch 00030: val_loss did not improve from 0.14154

10471/10471 [=====] - 1s 64us/sample - loss: 0.1223 - mean_absolute_error: 0.1221 - mean_squared_error: 0.0343 - val_loss: 0.1445 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0438

Epoch 31/500

10240/10471 [=====.>.] - ETA: 0s - loss: 0.1196 - mean_absolute_error: 0.1196 - mean_squared_error: 0.0335

Epoch 00031: val_loss did not improve from 0.14154

10471/10471 [=====] - 1s 64us/sample - loss: 0.1198 - mean_absolute_error: 0.1198 - mean_squared_error: 0.0336 - val_loss: 0.1489 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0464

Epoch 32/500

10400/10471 [=====.>.] - ETA: 0s - loss: 0.1200 - mean_absolute_error: 0.1200 - mean_squared_error: 0.0335

Epoch 00032: val_loss did not improve from 0.14154

10471/10471 [=====] - 1s 63us/sample - loss: 0.1200 - mean_absolute_error: 0.1199 - mean_squared_error: 0.0334 - val_loss: 0.1442 - val_mean_absolute_error: 0.1442 - val_mean_squared_error: 0.0437

Epoch 33/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1173 - mean_absolute_error: 0.1173 - mean_squared_error: 0.0322
Epoch 00033: val_loss improved from 0.14154 to 0.14130, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 65us/sample - loss: 0.1175 - mean_absolute_error: 0.1175 - mean_squared_error: 0.0322 - val_loss: 0.1413 - val_mean_absolute_error: 0.1413 - val_mean_squared_error: 0.0408
Epoch 34/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1181 - mean_absolute_error: 0.1181 - mean_squared_error: 0.0325
Epoch 00034: val_loss did not improve from 0.14130
10471/10471 [=====] - 1s 65us/sample - loss: 0.1182 - mean_absolute_error: 0.1182 - mean_squared_error: 0.0325 - val_loss: 0.1449 - val_mean_absolute_error: 0.1449 - val_mean_squared_error: 0.0433
Epoch 35/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1173 - mean_absolute_error: 0.1173 - mean_squared_error: 0.0318
Epoch 00035: val_loss did not improve from 0.14130
10471/10471 [=====] - 1s 65us/sample - loss: 0.1171 - mean_absolute_error: 0.1170 - mean_squared_error: 0.0317 - val_loss: 0.1436 - val_mean_absolute_error: 0.1436 - val_mean_squared_error: 0.0433
Epoch 36/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1166 - mean_absolute_error: 0.1166 - mean_squared_error: 0.0317
Epoch 00036: val_loss did not improve from 0.14130
10471/10471 [=====] - 1s 63us/sample - loss: 0.1166 - mean_absolute_error: 0.1165 - mean_squared_error: 0.0316 - val_loss: 0.1424 - val_mean_absolute_error: 0.1424 - val_mean_squared_error: 0.0425
Epoch 37/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1150 - mean_absolute_error: 0.1150 - mean_squared_error: 0.0313
Epoch 00037: val_loss did not improve from 0.14130
10471/10471 [=====] - 1s 64us/sample - loss: 0.1152 - mean_absolute_error: 0.1153 - mean_squared_error: 0.0313 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0440
Epoch 38/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1139 - mean_absolute_error: 0.1139 - mean_squared_error: 0.0304
Epoch 00038: val_loss did not improve from 0.14130
10471/10471 [=====] - 1s 68us/sample - loss: 0.1137 - mean_absolute_error: 0.1135 - mean_squared_error: 0.0304 - val_loss: 0.1434 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0433
Epoch 39/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1136 - mean_absolute_error: 0.1136 - mean_squared_error: 0.0305
Epoch 00039: val_loss improved from 0.14130 to 0.14064, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 71us/sample - loss: 0.1136 - mean_absolute_error: 0.1138 - mean_squared_error: 0.0306 - val_loss: 0.1406 - val_mean_absolute_error: 0.1407 - val_mean_squared_error: 0.0418
Epoch 40/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1137 - mean_absolute_error: 0.1137 - mean_squared_error: 0.0303
Epoch 00040: val_loss did not improve from 0.14064
10471/10471 [=====] - 1s 65us/sample - loss: 0.1135 - mean_absolute_error: 0.1133 - mean_squared_error: 0.0301 - val_loss: 0.1455 - val_mean_absolute_error: 0.1455 - val_mean_squared_error: 0.0425
Epoch 41/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1129 - mean_absolute_error: 0.1129 - mean_squared_error: 0.0297

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Epoch 00041: val_loss did not improve from 0.14064
10471/10471 [=====] - 1s 65us/sample - loss: 0.1127 - mean_absolute_error: 0.1126 - mean_squared_error: 0.0296 - val_loss: 0.1467 - val_mean_absolute_error: 0.1466 - val_mean_squared_error: 0.0444
Epoch 42/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1111 - mean_absolute_error: 0.1111 - mean_squared_error: 0.0295
Epoch 00042: val_loss did not improve from 0.14064
10471/10471 [=====] - 1s 64us/sample - loss: 0.1110 - mean_absolute_error: 0.1109 - mean_squared_error: 0.0294 - val_loss: 0.1453 - val_mean_absolute_error: 0.1453 - val_mean_squared_error: 0.0429
Epoch 43/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1107 - mean_absolute_error: 0.1107 - mean_squared_error: 0.0288
Epoch 00043: val_loss did not improve from 0.14064
10471/10471 [=====] - 1s 64us/sample - loss: 0.1106 - mean_absolute_error: 0.1105 - mean_squared_error: 0.0288 - val_loss: 0.1455 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0429
Epoch 44/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1098 - mean_absolute_error: 0.1098 - mean_squared_error: 0.0288
Epoch 00044: val_loss did not improve from 0.14064
10471/10471 [=====] - 1s 64us/sample - loss: 0.1099 - mean_absolute_error: 0.1098 - mean_squared_error: 0.0288 - val_loss: 0.1483 - val_mean_absolute_error: 0.1483 - val_mean_squared_error: 0.0442
Epoch 45/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1094 - mean_absolute_error: 0.1094 - mean_squared_error: 0.0283
Epoch 00045: val_loss did not improve from 0.14064
10471/10471 [=====] - 1s 65us/sample - loss: 0.1096 - mean_absolute_error: 0.1097 - mean_squared_error: 0.0285 - val_loss: 0.1494 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0447
Epoch 46/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1081 - mean_absolute_error: 0.1081 - mean_squared_error: 0.0281
Epoch 00046: val_loss did not improve from 0.14064
10471/10471 [=====] - 1s 64us/sample - loss: 0.1082 - mean_absolute_error: 0.1084 - mean_squared_error: 0.0282 - val_loss: 0.1439 - val_mean_absolute_error: 0.1440 - val_mean_squared_error: 0.0427
Epoch 47/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1076 - mean_absolute_error: 0.1076 - mean_squared_error: 0.0277
Epoch 00047: val_loss improved from 0.14064 to 0.14011, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 66us/sample - loss: 0.1074 - mean_absolute_error: 0.1072 - mean_squared_error: 0.0275 - val_loss: 0.1401 - val_mean_absolute_error: 0.1401 - val_mean_squared_error: 0.0418
Epoch 48/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1073 - mean_absolute_error: 0.1073 - mean_squared_error: 0.0277
Epoch 00048: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 65us/sample - loss: 0.1073 - mean_absolute_error: 0.1072 - mean_squared_error: 0.0276 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0429
Epoch 49/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1065 - mean_absolute_error: 0.1065 - mean_squared_error: 0.0275
Epoch 00049: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.1062 - mean_absolute_error: 0.1062 - mean_squared_error: 0.0272 - val_loss: 0.1432 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0433
```

Epoch 50/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1061 - mean_absolute_error: 0.1061 - mean_squared_error: 0.0269
Epoch 00050: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.1061 - mean_absolute_error: 0.1062 - mean_squared_error: 0.0270 - val_loss: 0.1467 - val_mean_absolute_error: 0.1467 - val_mean_squared_error: 0.0454
Epoch 51/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1056 - mean_absolute_error: 0.1056 - mean_squared_error: 0.0266
Epoch 00051: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.1059 - mean_absolute_error: 0.1061 - mean_squared_error: 0.0269 - val_loss: 0.1469 - val_mean_absolute_error: 0.1469 - val_mean_squared_error: 0.0449
Epoch 52/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1034 - mean_absolute_error: 0.1034 - mean_squared_error: 0.0259
Epoch 00052: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.1036 - mean_absolute_error: 0.1036 - mean_squared_error: 0.0259 - val_loss: 0.1509 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0450
Epoch 53/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1032 - mean_absolute_error: 0.1032 - mean_squared_error: 0.0255
Epoch 00053: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 63us/sample - loss: 0.1034 - mean_absolute_error: 0.1033 - mean_squared_error: 0.0255 - val_loss: 0.1447 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0422
Epoch 54/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1040 - mean_absolute_error: 0.1040 - mean_squared_error: 0.0259
Epoch 00054: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.1041 - mean_absolute_error: 0.1040 - mean_squared_error: 0.0259 - val_loss: 0.1562 - val_mean_absolute_error: 0.1562 - val_mean_squared_error: 0.0475
Epoch 55/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1026 - mean_absolute_error: 0.1026 - mean_squared_error: 0.0251
Epoch 00055: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 63us/sample - loss: 0.1026 - mean_absolute_error: 0.1027 - mean_squared_error: 0.0251 - val_loss: 0.1482 - val_mean_absolute_error: 0.1482 - val_mean_squared_error: 0.0457
Epoch 56/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1015 - mean_absolute_error: 0.1015 - mean_squared_error: 0.0244
Epoch 00056: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 63us/sample - loss: 0.1014 - mean_absolute_error: 0.1013 - mean_squared_error: 0.0244 - val_loss: 0.1443 - val_mean_absolute_error: 0.1443 - val_mean_squared_error: 0.0428
Epoch 57/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1018 - mean_absolute_error: 0.1018 - mean_squared_error: 0.0246
Epoch 00057: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.1019 - mean_absolute_error: 0.1018 - mean_squared_error: 0.0247 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0454
Epoch 58/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1015 - mean_absolute_error: 0.1015 - mean_squared_error: 0.0245
Epoch 00058: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 63us/sample - loss: 0.1016 - mean_absolute_error:

lute_error: 0.1017 - mean_squared_error: 0.0245 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0439
Epoch 59/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1002 - mean_absolute_error: 0.1002 - mean_squared_error: 0.0242
Epoch 00059: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 65us/sample - loss: 0.1001 - mean_absolute_error: 0.1000 - mean_squared_error: 0.0241 - val_loss: 0.1456 - val_mean_absolute_error: 0.1456 - val_mean_squared_error: 0.0438
Epoch 60/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1013 - mean_absolute_error: 0.1013 - mean_squared_error: 0.0243
Epoch 00060: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 65us/sample - loss: 0.1011 - mean_absolute_error: 0.1012 - mean_squared_error: 0.0243 - val_loss: 0.1448 - val_mean_absolute_error: 0.1448 - val_mean_squared_error: 0.0443
Epoch 61/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.0994 - mean_absolute_error: 0.0994 - mean_squared_error: 0.0236
Epoch 00061: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.0996 - mean_absolute_error: 0.0999 - mean_squared_error: 0.0239 - val_loss: 0.1499 - val_mean_absolute_error: 0.1498 - val_mean_squared_error: 0.0460
Epoch 62/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.0982 - mean_absolute_error: 0.0982 - mean_squared_error: 0.0231
Epoch 00062: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.0983 - mean_absolute_error: 0.0984 - mean_squared_error: 0.0231 - val_loss: 0.1459 - val_mean_absolute_error: 0.1459 - val_mean_squared_error: 0.0439
Epoch 63/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.0984 - mean_absolute_error: 0.0984 - mean_squared_error: 0.0231
Epoch 00063: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.0983 - mean_absolute_error: 0.0984 - mean_squared_error: 0.0231 - val_loss: 0.1474 - val_mean_absolute_error: 0.1474 - val_mean_squared_error: 0.0445
Epoch 64/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.0986 - mean_absolute_error: 0.0986 - mean_squared_error: 0.0230
Epoch 00064: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 63us/sample - loss: 0.0985 - mean_absolute_error: 0.0984 - mean_squared_error: 0.0229 - val_loss: 0.1490 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0456
Epoch 65/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.0975 - mean_absolute_error: 0.0975 - mean_squared_error: 0.0228
Epoch 00065: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 63us/sample - loss: 0.0974 - mean_absolute_error: 0.0974 - mean_squared_error: 0.0227 - val_loss: 0.1528 - val_mean_absolute_error: 0.1528 - val_mean_squared_error: 0.0472
Epoch 66/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.0959 - mean_absolute_error: 0.0959 - mean_squared_error: 0.0218
Epoch 00066: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.0959 - mean_absolute_error: 0.0958 - mean_squared_error: 0.0218 - val_loss: 0.1548 - val_mean_absolute_error: 0.1548 - val_mean_squared_error: 0.0465
Epoch 67/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.0955 - mean_absolute_error: 0.0955 - mean_squared_error: 0.0221

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Epoch 00067: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.0954 - mean_absolute_error: 0.0956 - mean_squared_error: 0.0222 - val_loss: 0.1502 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0457
Epoch 68/500
9664/10471 [=====>...] - ETA: 0s - loss: 0.0968 - mean_absolute_error: 0.0968 - mean_squared_error: 0.0224
Epoch 00068: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 68us/sample - loss: 0.0967 - mean_absolute_error: 0.0965 - mean_squared_error: 0.0222 - val_loss: 0.1499 - val_mean_absolute_error: 0.1499 - val_mean_squared_error: 0.0452
Epoch 69/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.0958 - mean_absolute_error: 0.0958 - mean_squared_error: 0.0218
Epoch 00069: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.0961 - mean_absolute_error: 0.0961 - mean_squared_error: 0.0220 - val_loss: 0.1492 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0446
Epoch 70/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.0952 - mean_absolute_error: 0.0952 - mean_squared_error: 0.0214
Epoch 00070: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.0953 - mean_absolute_error: 0.0953 - mean_squared_error: 0.0214 - val_loss: 0.1541 - val_mean_absolute_error: 0.1541 - val_mean_squared_error: 0.0473
Epoch 71/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.0937 - mean_absolute_error: 0.0937 - mean_squared_error: 0.0211
Epoch 00071: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.0935 - mean_absolute_error: 0.0936 - mean_squared_error: 0.0209 - val_loss: 0.1523 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0475
Epoch 72/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.0939 - mean_absolute_error: 0.0939 - mean_squared_error: 0.0211Restoring model weights from the end of the best epoch.

Epoch 00072: val_loss did not improve from 0.14011
10471/10471 [=====] - 1s 64us/sample - loss: 0.0941 - mean_absolute_error: 0.0944 - mean_squared_error: 0.0214 - val_loss: 0.1569 - val_mean_absolute_error: 0.1568 - val_mean_squared_error: 0.0492
Epoch 00072: early stopping
MAE: 0.14010559
RMSE: 0.20440271
Adding initial Dense layers with 128
Adding Dense layer with 128
Adding last layer with 128
Outputting predictive model - Tabular
Model: "model_103"

```

Layer (type)	Output Shape	Param #

input_104 (InputLayer)	[(None, 61)]	0
dense_780 (Dense)	(None, 128)	7936
dense_781 (Dense)	(None, 128)	16512
dense_782 (Dense)	(None, 128)	16512
dense_783 (Dense)	(None, 128)	16512
dense_784 (Dense)	(None, 128)	16512
dense_785 (Dense)	(None, 128)	16512
dense_786 (Dense)	(None, 128)	16512
dense_787 (Dense)	(None, 128)	16512
dense_788 (Dense)	(None, 128)	16512
dense_789 (Dense)	(None, 128)	16512
dense_790 (Dense)	(None, 128)	16512
dense_791 (Dense)	(None, 128)	16512
dropout_27 (Dropout)	(None, 128)	0
dense_792 (Dense)	(None, 1)	129
<hr/>		

Total params: 189,697

Trainable params: 189,697

Non-trainable params: 0

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10432/10471 [=====>.] - ETA: 0s - loss: 1.6345 - mean_absolute_error: 1.6345 - mean_squared_error: 5.2602

Epoch 00001: val_loss improved from inf to 0.65716, saving model to best_basic_model.hdf5

10471/10471 [=====] - 2s 151us/sample - loss: 1.6328 - mean_absolute_error: 1.6313 - mean_squared_error: 5.2388 - val_loss: 0.6572 - val_mean_absolute_error: 0.6574 - val_mean_squared_error: 0.5421

Epoch 2/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.8955 - mean_absolute_error: 0.8955 - mean_squared_error: 1.2561

Epoch 00002: val_loss improved from 0.65716 to 0.30556, saving model to best_basic_model.hdf5

10471/10471 [=====] - 1s 92us/sample - loss: 0.8955 - mean_absolute_error: 0.8955 - mean_squared_error: 1.2551 - val_loss: 0.3056 - val_mean_absolute_error: 0.3055 - val_mean_squared_error: 0.1460

Epoch 3/500

10048/10471 [=====>..] - ETA: 0s - loss: 0.7691 - mean_absolute_error: 0.7691 - mean_squared_error: 0.9329

Epoch 00003: val_loss did not improve from 0.30556

10471/10471 [=====] - 1s 87us/sample - loss: 0.7655 - mean_absolute_error: 0.7653 - mean_squared_error: 0.9245 - val_loss: 0.3255 - val_mean_absolute_error: 0.3255 - val_mean_squared_error: 0.1512

Epoch 4/500

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10400/10471 [=====>.] - ETA: 0s - loss: 0.6528 - mean_absolute_error: 0.6528 - mean_squared_error: 0.6744
Epoch 00004: val_loss did not improve from 0.30556
10471/10471 [=====] - 1s 89us/sample - loss: 0.6524 - mean_absolute_error: 0.6523 - mean_squared_error: 0.6732 - val_loss: 0.3083 - val_mean_absolute_error: 0.3083 - val_mean_squared_error: 0.1418
Epoch 5/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.5729 - mean_absolute_error: 0.5729 - mean_squared_error: 0.5167
Epoch 00005: val_loss improved from 0.30556 to 0.30373, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 91us/sample - loss: 0.5706 - mean_absolute_error: 0.5701 - mean_squared_error: 0.5114 - val_loss: 0.3037 - val_mean_absolute_error: 0.3037 - val_mean_squared_error: 0.1409
Epoch 6/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.4623 - mean_absolute_error: 0.4623 - mean_squared_error: 0.3423
Epoch 00006: val_loss improved from 0.30373 to 0.22764, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 94us/sample - loss: 0.4622 - mean_absolute_error: 0.4621 - mean_squared_error: 0.3418 - val_loss: 0.2276 - val_mean_absolute_error: 0.2276 - val_mean_squared_error: 0.0843
Epoch 7/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.3766 - mean_absolute_error: 0.3766 - mean_squared_error: 0.2246
Epoch 00007: val_loss improved from 0.22764 to 0.19236, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 91us/sample - loss: 0.3740 - mean_absolute_error: 0.3740 - mean_squared_error: 0.2217 - val_loss: 0.1924 - val_mean_absolute_error: 0.1923 - val_mean_squared_error: 0.0670
Epoch 8/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3005 - mean_absolute_error: 0.3005 - mean_squared_error: 0.1459
Epoch 00008: val_loss improved from 0.19236 to 0.16592, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 92us/sample - loss: 0.3005 - mean_absolute_error: 0.3005 - mean_squared_error: 0.1458 - val_loss: 0.1659 - val_mean_absolute_error: 0.1659 - val_mean_squared_error: 0.0529
Epoch 9/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.2432 - mean_absolute_error: 0.2432 - mean_squared_error: 0.0982
Epoch 00009: val_loss did not improve from 0.16592
10471/10471 [=====] - 1s 87us/sample - loss: 0.2437 - mean_absolute_error: 0.2439 - mean_squared_error: 0.0987 - val_loss: 0.1665 - val_mean_absolute_error: 0.1665 - val_mean_squared_error: 0.0541
Epoch 10/500
9888/10471 [=====>..] - ETA: 0s - loss: 0.1957 - mean_absolute_error: 0.1957 - mean_squared_error: 0.0668
Epoch 00010: val_loss did not improve from 0.16592
10471/10471 [=====] - 1s 88us/sample - loss: 0.1955 - mean_absolute_error: 0.1953 - mean_squared_error: 0.0664 - val_loss: 0.1689 - val_mean_absolute_error: 0.1689 - val_mean_squared_error: 0.0568
Epoch 11/500
9920/10471 [=====>..] - ETA: 0s - loss: 0.1717 - mean_absolute_error: 0.1717 - mean_squared_error: 0.0545
Epoch 00011: val_loss improved from 0.16592 to 0.15643, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 91us/sample - loss: 0.1705 - mean_absolute_error: 0.1704 - mean_squared_error: 0.0537 - val_loss: 0.1564 - val_mean_absolute_error: 0.1564 - val_mean_squared_error: 0.0496
Epoch 12/500
```

```
10272/10471 [=====>.] - ETA: 0s - loss: 0.1551 - mean_absolute_error: 0.1551 - mean_squared_error: 0.0473
Epoch 00012: val_loss did not improve from 0.15643
10471/10471 [=====] - 1s 89us/sample - loss: 0.1552 - mean_absolute_error: 0.1552 - mean_squared_error: 0.0473 - val_loss: 0.1687 - val_mean_absolute_error: 0.1687 - val_mean_squared_error: 0.0514
Epoch 13/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1483 - mean_absolute_error: 0.1483 - mean_squared_error: 0.0444
Epoch 00013: val_loss did not improve from 0.15643
10471/10471 [=====] - 1s 89us/sample - loss: 0.1483 - mean_absolute_error: 0.1484 - mean_squared_error: 0.0446 - val_loss: 0.1762 - val_mean_absolute_error: 0.1762 - val_mean_squared_error: 0.0559
Epoch 14/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1448 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0427
Epoch 00014: val_loss improved from 0.15643 to 0.14784, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 92us/sample - loss: 0.1446 - mean_absolute_error: 0.1447 - mean_squared_error: 0.0427 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0456
Epoch 15/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0410
Epoch 00015: val_loss improved from 0.14784 to 0.14437, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 94us/sample - loss: 0.1393 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0409 - val_loss: 0.1444 - val_mean_absolute_error: 0.1443 - val_mean_squared_error: 0.0445
Epoch 16/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0398
Epoch 00016: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 88us/sample - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0398 - val_loss: 0.1444 - val_mean_absolute_error: 0.1444 - val_mean_squared_error: 0.0438
Epoch 17/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1347 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0392
Epoch 00017: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 89us/sample - loss: 0.1347 - mean_absolute_error: 0.1345 - mean_squared_error: 0.0392 - val_loss: 0.1532 - val_mean_absolute_error: 0.1532 - val_mean_squared_error: 0.0461
Epoch 18/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1327 - mean_absolute_error: 0.1327 - mean_squared_error: 0.0382
Epoch 00018: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 92us/sample - loss: 0.1325 - mean_absolute_error: 0.1326 - mean_squared_error: 0.0382 - val_loss: 0.1558 - val_mean_absolute_error: 0.1558 - val_mean_squared_error: 0.0477
Epoch 19/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1308 - mean_absolute_error: 0.1308 - mean_squared_error: 0.0368
Epoch 00019: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 87us/sample - loss: 0.1305 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0377 - val_loss: 0.1499 - val_mean_absolute_error: 0.1499 - val_mean_squared_error: 0.0463
Epoch 20/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1281 - mean_absolute_error: 0.1281 - mean_squared_error: 0.0363
Epoch 00020: val_loss did not improve from 0.14437
```

```
10471/10471 [=====] - 1s 91us/sample - loss: 0.1281 - mean_absolute_error: 0.1281 - mean_squared_error: 0.0363 - val_loss: 0.1445 - val_mean_absolute_error: 0.1445 - val_mean_squared_error: 0.0433
Epoch 21/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1253 - mean_absolute_error: 0.1253 - mean_squared_error: 0.0352
Epoch 00021: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 97us/sample - loss: 0.1255 - mean_absolute_error: 0.1255 - mean_squared_error: 0.0352 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0437
Epoch 22/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1246 - mean_absolute_error: 0.1246 - mean_squared_error: 0.0346
Epoch 00022: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 101us/sample - loss: 0.1249 - mean_absolute_error: 0.1248 - mean_squared_error: 0.0348 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0442
Epoch 23/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1234 - mean_absolute_error: 0.1234 - mean_squared_error: 0.0343
Epoch 00023: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 97us/sample - loss: 0.1233 - mean_absolute_error: 0.1232 - mean_squared_error: 0.0342 - val_loss: 0.1466 - val_mean_absolute_error: 0.1466 - val_mean_squared_error: 0.0442
Epoch 24/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1212 - mean_absolute_error: 0.1212 - mean_squared_error: 0.0337
Epoch 00024: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 96us/sample - loss: 0.1210 - mean_absolute_error: 0.1210 - mean_squared_error: 0.0334 - val_loss: 0.1449 - val_mean_absolute_error: 0.1449 - val_mean_squared_error: 0.0435
Epoch 25/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1213 - mean_absolute_error: 0.1213 - mean_squared_error: 0.0332
Epoch 00025: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 94us/sample - loss: 0.1213 - mean_absolute_error: 0.1213 - mean_squared_error: 0.0332 - val_loss: 0.1512 - val_mean_absolute_error: 0.1512 - val_mean_squared_error: 0.0461
Epoch 26/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1187 - mean_absolute_error: 0.1187 - mean_squared_error: 0.0323
Epoch 00026: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 96us/sample - loss: 0.1186 - mean_absolute_error: 0.1185 - mean_squared_error: 0.0321 - val_loss: 0.1462 - val_mean_absolute_error: 0.1462 - val_mean_squared_error: 0.0440
Epoch 27/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1161 - mean_absolute_error: 0.1161 - mean_squared_error: 0.0311
Epoch 00027: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 96us/sample - loss: 0.1159 - mean_absolute_error: 0.1160 - mean_squared_error: 0.0310 - val_loss: 0.1476 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0444
Epoch 28/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1146 - mean_absolute_error: 0.1146 - mean_squared_error: 0.0305
Epoch 00028: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 95us/sample - loss: 0.1149 - mean_absolute_error: 0.1149 - mean_squared_error: 0.0306 - val_loss: 0.1514 - val_mean_absolute_error: 0.1514 - val_mean_squared_error: 0.0469
Epoch 29/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1173 - mean_absolute_error:
```

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ror: 0.1173 - mean_squared_error: 0.0312
Epoch 00029: val_loss did not improve from 0.14437
10471/10471 [=====] - 1s 97us/sample - loss: 0.1171 - mean_absolute_error: 0.1172 - mean_squared_error: 0.0310 - val_loss: 0.1526 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0459
Epoch 30/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1131 - mean_absolute_error: 0.1131 - mean_squared_error: 0.0297
Epoch 00030: val_loss improved from 0.14437 to 0.14315, saving model to best_basic_mode1.hdf5
10471/10471 [=====] - 1s 99us/sample - loss: 0.1132 - mean_absolute_error: 0.1132 - mean_squared_error: 0.0298 - val_loss: 0.1432 - val_mean_absolute_error: 0.1431 - val_mean_squared_error: 0.0440
Epoch 31/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1134 - mean_absolute_error: 0.1134 - mean_squared_error: 0.0296
Epoch 00031: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 96us/sample - loss: 0.1133 - mean_absolute_error: 0.1133 - mean_squared_error: 0.0295 - val_loss: 0.1610 - val_mean_absolute_error: 0.1609 - val_mean_squared_error: 0.0508
Epoch 32/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1113 - mean_absolute_error: 0.1113 - mean_squared_error: 0.0285
Epoch 00032: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 97us/sample - loss: 0.1115 - mean_absolute_error: 0.1115 - mean_squared_error: 0.0286 - val_loss: 0.1512 - val_mean_absolute_error: 0.1512 - val_mean_squared_error: 0.0460
Epoch 33/500
10368/10471 [=====.>.] - ETA: 0s - loss: 0.1097 - mean_absolute_error: 0.1097 - mean_squared_error: 0.0279
Epoch 00033: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 94us/sample - loss: 0.1095 - mean_absolute_error: 0.1095 - mean_squared_error: 0.0278 - val_loss: 0.1509 - val_mean_absolute_error: 0.1509 - val_mean_squared_error: 0.0458
Epoch 34/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1088 - mean_absolute_error: 0.1088 - mean_squared_error: 0.0274
Epoch 00034: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 95us/sample - loss: 0.1095 - mean_absolute_error: 0.1097 - mean_squared_error: 0.0280 - val_loss: 0.1518 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0464
Epoch 35/500
10400/10471 [=====.>.] - ETA: 0s - loss: 0.1082 - mean_absolute_error: 0.1082 - mean_squared_error: 0.0275
Epoch 00035: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 95us/sample - loss: 0.1083 - mean_absolute_error: 0.1083 - mean_squared_error: 0.0275 - val_loss: 0.1481 - val_mean_absolute_error: 0.1481 - val_mean_squared_error: 0.0456
Epoch 36/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1087 - mean_absolute_error: 0.1087 - mean_squared_error: 0.0273
Epoch 00036: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 97us/sample - loss: 0.1089 - mean_absolute_error: 0.1090 - mean_squared_error: 0.0275 - val_loss: 0.1501 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0456
Epoch 37/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1058 - mean_absolute_error: 0.1058 - mean_squared_error: 0.0264
Epoch 00037: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 95us/sample - loss: 0.1058 - mean_absolute_error: 0.1058 - mean_squared_error: 0.0263 - val_loss: 0.1517 - val_mean_absolute_error: 0.1517 - val_mean_squared_error: 0.0456
```

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rror: 0.1516 - val_mean_squared_error: 0.0470
Epoch 38/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1080 - mean_absolute_error: 0.1080 - mean_squared_error: 0.0271
Epoch 00038: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 98us/sample - loss: 0.1079 - mean_absolute_error: 0.1078 - mean_squared_error: 0.0270 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0443
Epoch 39/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1046 - mean_absolute_error: 0.1046 - mean_squared_error: 0.0258
Epoch 00039: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 97us/sample - loss: 0.1046 - mean_absolute_error: 0.1046 - mean_squared_error: 0.0257 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0458
Epoch 40/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1045 - mean_absolute_error: 0.1045 - mean_squared_error: 0.0252
Epoch 00040: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 97us/sample - loss: 0.1044 - mean_absolute_error: 0.1044 - mean_squared_error: 0.0251 - val_loss: 0.1448 - val_mean_absolute_error: 0.1447 - val_mean_squared_error: 0.0443
Epoch 41/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1034 - mean_absolute_error: 0.1034 - mean_squared_error: 0.0249
Epoch 00041: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 96us/sample - loss: 0.1034 - mean_absolute_error: 0.1035 - mean_squared_error: 0.0250 - val_loss: 0.1525 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0478
Epoch 42/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1032 - mean_absolute_error: 0.1032 - mean_squared_error: 0.0248
Epoch 00042: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 95us/sample - loss: 0.1032 - mean_absolute_error: 0.1032 - mean_squared_error: 0.0248 - val_loss: 0.1572 - val_mean_absolute_error: 0.1571 - val_mean_squared_error: 0.0490
Epoch 43/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1017 - mean_absolute_error: 0.1017 - mean_squared_error: 0.0242
Epoch 00043: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 96us/sample - loss: 0.1019 - mean_absolute_error: 0.1021 - mean_squared_error: 0.0246 - val_loss: 0.1476 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0469
Epoch 44/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1004 - mean_absolute_error: 0.1004 - mean_squared_error: 0.0238
Epoch 00044: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 97us/sample - loss: 0.1004 - mean_absolute_error: 0.1004 - mean_squared_error: 0.0237 - val_loss: 0.1501 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0472
Epoch 45/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1017 - mean_absolute_error: 0.1017 - mean_squared_error: 0.0239
Epoch 00045: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 96us/sample - loss: 0.1015 - mean_absolute_error: 0.1016 - mean_squared_error: 0.0237 - val_loss: 0.1493 - val_mean_absolute_error: 0.1493 - val_mean_squared_error: 0.0461
Epoch 46/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.0975 - mean_absolute_error: 0.0975 - mean_squared_error: 0.0227
Epoch 00046: val_loss did not improve from 0.14315
```

```
10471/10471 [=====] - 1s 95us/sample - loss: 0.0975 - mean_absolute_error: 0.0975 - mean_squared_error: 0.0226 - val_loss: 0.1539 - val_mean_absolute_error: 0.1538 - val_mean_squared_error: 0.0480
Epoch 47/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.0987 - mean_absolute_error: 0.0987 - mean_squared_error: 0.0228
Epoch 00047: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 98us/sample - loss: 0.0983 - mean_absolute_error: 0.0983 - mean_squared_error: 0.0226 - val_loss: 0.1527 - val_mean_absolute_error: 0.1527 - val_mean_squared_error: 0.0483
Epoch 48/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.0986 - mean_absolute_error: 0.0986 - mean_squared_error: 0.0226
Epoch 00048: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 94us/sample - loss: 0.0986 - mean_absolute_error: 0.0985 - mean_squared_error: 0.0226 - val_loss: 0.1554 - val_mean_absolute_error: 0.1554 - val_mean_squared_error: 0.0491
Epoch 49/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.0957 - mean_absolute_error: 0.0957 - mean_squared_error: 0.0217
Epoch 00049: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 90us/sample - loss: 0.0957 - mean_absolute_error: 0.0956 - mean_squared_error: 0.0217 - val_loss: 0.1544 - val_mean_absolute_error: 0.1543 - val_mean_squared_error: 0.0482
Epoch 50/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.0961 - mean_absolute_error: 0.0961 - mean_squared_error: 0.0217
Epoch 00050: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 94us/sample - loss: 0.0960 - mean_absolute_error: 0.0958 - mean_squared_error: 0.0216 - val_loss: 0.1500 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0463
Epoch 51/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.0964 - mean_absolute_error: 0.0964 - mean_squared_error: 0.0218
Epoch 00051: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 98us/sample - loss: 0.0961 - mean_absolute_error: 0.0961 - mean_squared_error: 0.0215 - val_loss: 0.1526 - val_mean_absolute_error: 0.1525 - val_mean_squared_error: 0.0482
Epoch 52/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.0922 - mean_absolute_error: 0.0922 - mean_squared_error: 0.0202
Epoch 00052: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 98us/sample - loss: 0.0926 - mean_absolute_error: 0.0926 - mean_squared_error: 0.0206 - val_loss: 0.1575 - val_mean_absolute_error: 0.1574 - val_mean_squared_error: 0.0507
Epoch 53/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.0939 - mean_absolute_error: 0.0939 - mean_squared_error: 0.0206
Epoch 00053: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 98us/sample - loss: 0.0939 - mean_absolute_error: 0.0940 - mean_squared_error: 0.0209 - val_loss: 0.1615 - val_mean_absolute_error: 0.1614 - val_mean_squared_error: 0.0513
Epoch 54/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.0926 - mean_absolute_error: 0.0926 - mean_squared_error: 0.0202
Epoch 00054: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 95us/sample - loss: 0.0929 - mean_absolute_error: 0.0930 - mean_squared_error: 0.0204 - val_loss: 0.1547 - val_mean_absolute_error: 0.1547 - val_mean_squared_error: 0.0476
Epoch 55/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.0911 - mean_absolute_error:
```

```
ror: 0.0911 - mean_squared_error: 0.0201Restoring model weights from the end of the best epoch.
```

```
Epoch 00055: val_loss did not improve from 0.14315
10471/10471 [=====] - 1s 95us/sample - loss: 0.0912 - mean_absolute_error: 0.0913 - mean_squared_error: 0.0201 - val_loss: 0.1523 - val_mean_absolute_error: 0.1522 - val_mean_squared_error: 0.0473
Epoch 00055: early stopping
MAE: 0.14310598
RMSE: 0.20973568
```

In [172...]

```
# make data frame from our models dictionary
target = pd.DataFrame(neural_networks).reset_index(drop=True)

# sort data frame by mae and reset index
target.sort_values('mae', ascending=True).head(30)
```

Out[172...]

	model	r2	mae	rmse
3	Neural Net Baseline 4	None	0.137028	0.202084
28	Neural Net Baseline 5Batchnorm	None	0.137731	0.202571
23	Neural Net Baseline 24	None	0.137872	0.203800
5	Neural Net Baseline 6	None	0.138789	0.203796
2	Neural Net Baseline 3	None	0.139234	0.203894
41	Neural Net Baseline 5Dropout	None	0.139377	0.205209
43	Neural Net Baseline 7Dropout	None	0.139412	0.205922
0	Neural Net Baseline 1	None	0.139421	0.204523
42	Neural Net Baseline 6Dropout	None	0.139905	0.204371
35	Neural Net Baseline 12Batchnorm	None	0.140057	0.202847
48	Neural Net Baseline 12Dropout	None	0.140106	0.204403
22	Neural Net Baseline 23	None	0.140351	0.202624
39	Neural Net Baseline 3Dropout	None	0.140494	0.202183
36	Neural Net Baseline 13Batchnorm	None	0.140557	0.202349
7	Neural Net Baseline 8	None	0.140576	0.207187
44	Neural Net Baseline 8Dropout	None	0.140584	0.202564
20	Neural Net Baseline 21	None	0.140644	0.206346
4	Neural Net Baseline 5	None	0.140769	0.204007
34	Neural Net Baseline 11Batchnorm	None	0.140852	0.203204
46	Neural Net Baseline 10Dropout	None	0.141473	0.204853
11	Neural Net Baseline 12	None	0.141929	0.208810
19	Neural Net Baseline 20	None	0.141950	0.207592
24	Neural Net Baseline 1Batchnorm	None	0.142134	0.205585

	model	r2	mae	rmse
18	Neural Net Baseline 19	None	0.142392	0.210638
6	Neural Net Baseline 7	None	0.142414	0.208745
33	Neural Net Baseline 10Batchnorm	None	0.142555	0.208224
27	Neural Net Baseline 4Batchnorm	None	0.142589	0.203310
45	Neural Net Baseline 9Dropout	None	0.142741	0.210851
49	Neural Net Baseline 13Dropout	None	0.143106	0.209736
32	Neural Net Baseline 9Batchnorm	None	0.143337	0.207804

In [174...]

```
# Making our model from out best selection
tabular_model, num_inputs = mlp_branch(X_train_tabular.shape[1], [64, 32, 16, 8, 4], mu

# running our neural network model on the train/val data
results, best_tabular_model = run_nn(tabular_model, X_train_tabular, y_train, X_val_tab
```

```
Adding initial Dense layers with 32
ERROR! Session/line number was not unique in database. History logging moved to new session 3461
Adding Dense layer with 32
Adding Dense layer with 32
Adding Dense layer with 32
Adding last layer with 32
Outputting predictive model - Tabular
Model: "model_105"
```

Layer (type)	Output Shape	Param #
input_107 (InputLayer)	[(None, 61)]	0
batch_normalization_213 (BatchNormalization)	(None, 61)	244
dense_804 (Dense)	(None, 32)	1984
batch_normalization_214 (BatchNormalization)	(None, 32)	128
dense_805 (Dense)	(None, 32)	1056
batch_normalization_215 (BatchNormalization)	(None, 32)	128
dense_806 (Dense)	(None, 32)	1056
batch_normalization_216 (BatchNormalization)	(None, 32)	128
dense_807 (Dense)	(None, 32)	1056
batch_normalization_217 (BatchNormalization)	(None, 32)	128
dense_808 (Dense)	(None, 32)	1056
dense_809 (Dense)	(None, 1)	33

Total params: 6,997
Trainable params: 6,619

Non-trainable params: 378

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500

10368/10471 [=====>.] - ETA: 0s - loss: 2.3615 - mean_absolute_error: 2.3615 - mean_squared_error: 19.7094

Epoch 00001: val_loss improved from inf to 0.54308, saving model to best_tabular_model.hdf5

10471/10471 [=====] - 3s 241us/sample - loss: 2.3438 - mean_absolute_error: 2.3395 - mean_squared_error: 19.4757 - val_loss: 0.5431 - val_mean_absolute_error: 0.5431 - val_mean_squared_error: 0.4673

Epoch 2/500

10048/10471 [=====>..] - ETA: 0s - loss: 0.4549 - mean_absolute_error: 0.4549 - mean_squared_error: 0.3309

Epoch 00002: val_loss improved from 0.54308 to 0.36783, saving model to best_tabular_model.hdf5

10471/10471 [=====] - 1s 111us/sample - loss: 0.4519 - mean_absolute_error: 0.4514 - mean_squared_error: 0.3265 - val_loss: 0.3678 - val_mean_absolute_error: 0.3680 - val_mean_squared_error: 0.2328

Epoch 3/500

10176/10471 [=====>.] - ETA: 0s - loss: 0.3485 - mean_absolute_error: 0.3485 - mean_squared_error: 0.1998

Epoch 00003: val_loss improved from 0.36783 to 0.36486, saving model to best_tabular_model.hdf5

10471/10471 [=====] - 1s 115us/sample - loss: 0.3485 - mean_absolute_error: 0.3492 - mean_squared_error: 0.2006 - val_loss: 0.3649 - val_mean_absolute_error: 0.3651 - val_mean_squared_error: 0.2141

Epoch 4/500

10208/10471 [=====>.] - ETA: 0s - loss: 0.3289 - mean_absolute_error: 0.3289 - mean_squared_error: 0.1727

Epoch 00004: val_loss did not improve from 0.36486

10471/10471 [=====] - 1s 107us/sample - loss: 0.3295 - mean_absolute_error: 0.3292 - mean_squared_error: 0.1729 - val_loss: 0.5772 - val_mean_absolute_error: 0.5771 - val_mean_squared_error: 0.4259

Epoch 5/500

10304/10471 [=====>.] - ETA: 0s - loss: 0.3072 - mean_absolute_error: 0.3072 - mean_squared_error: 0.1515

Epoch 00005: val_loss improved from 0.36486 to 0.35241, saving model to best_tabular_model.hdf5

10471/10471 [=====] - 1s 109us/sample - loss: 0.3071 - mean_absolute_error: 0.3072 - mean_squared_error: 0.1511 - val_loss: 0.3524 - val_mean_absolute_error: 0.3526 - val_mean_squared_error: 0.1787

Epoch 6/500

10368/10471 [=====>.] - ETA: 0s - loss: 0.2902 - mean_absolute_error: 0.2902 - mean_squared_error: 0.1374

Epoch 00006: val_loss improved from 0.35241 to 0.21816, saving model to best_tabular_model.hdf5

10471/10471 [=====] - 1s 112us/sample - loss: 0.2901 - mean_absolute_error: 0.2901 - mean_squared_error: 0.1374 - val_loss: 0.2182 - val_mean_absolute_error: 0.2182 - val_mean_squared_error: 0.0859

Epoch 7/500

10048/10471 [=====>..] - ETA: 0s - loss: 0.2762 - mean_absolute_error: 0.2762 - mean_squared_error: 0.1242

Epoch 00007: val_loss did not improve from 0.21816

10471/10471 [=====] - 1s 107us/sample - loss: 0.2739 - mean_absolute_error: 0.2738 - mean_squared_error: 0.1226 - val_loss: 0.2355 - val_mean_absolute_error: 0.2354 - val_mean_squared_error: 0.0936

Epoch 8/500

10240/10471 [=====>.] - ETA: 0s - loss: 0.2614 - mean_absolute_error:

```
ror: 0.2614 - mean_squared_error: 0.1123
Epoch 00008: val_loss improved from 0.21816 to 0.21772, saving model to best_tabular_mod
el.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.2596 - mean_ab
olute_error: 0.2593 - mean_squared_error: 0.1110 - val_loss: 0.2177 - val_mean_absolute_
error: 0.2177 - val_mean_squared_error: 0.0826
Epoch 9/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.2587 - mean_absolute_er
ror: 0.2587 - mean_squared_error: 0.1114
Epoch 00009: val_loss did not improve from 0.21772
10471/10471 [=====] - 1s 107us/sample - loss: 0.2567 - mean_ab
olute_error: 0.2569 - mean_squared_error: 0.1102 - val_loss: 0.3425 - val_mean_absolute_
error: 0.3427 - val_mean_squared_error: 0.1545
Epoch 10/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2293 - mean_absolute_er
ror: 0.2293 - mean_squared_error: 0.0882
Epoch 00010: val_loss improved from 0.21772 to 0.17589, saving model to best_tabular_mod
el.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.2295 - mean_ab
olute_error: 0.2301 - mean_squared_error: 0.0889 - val_loss: 0.1759 - val_mean_absolute_
error: 0.1760 - val_mean_squared_error: 0.0553
Epoch 11/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.2268 - mean_absolute_er
ror: 0.2268 - mean_squared_error: 0.0873
Epoch 00011: val_loss did not improve from 0.17589
10471/10471 [=====] - 1s 107us/sample - loss: 0.2259 - mean_ab
olute_error: 0.2260 - mean_squared_error: 0.0866 - val_loss: 0.1941 - val_mean_absolute_
error: 0.1942 - val_mean_squared_error: 0.0636
Epoch 12/500
10176/10471 [=====>..] - ETA: 0s - loss: 0.2322 - mean_absolute_er
ror: 0.2322 - mean_squared_error: 0.0904
Epoch 00012: val_loss did not improve from 0.17589
10471/10471 [=====] - 1s 106us/sample - loss: 0.2330 - mean_ab
olute_error: 0.2330 - mean_squared_error: 0.0909 - val_loss: 0.2220 - val_mean_absolute_
error: 0.2219 - val_mean_squared_error: 0.0845
Epoch 13/500
10464/10471 [=====>..] - ETA: 0s - loss: 0.2096 - mean_absolute_er
ror: 0.2096 - mean_squared_error: 0.0754
Epoch 00013: val_loss did not improve from 0.17589
10471/10471 [=====] - 1s 109us/sample - loss: 0.2096 - mean_ab
olute_error: 0.2094 - mean_squared_error: 0.0753 - val_loss: 0.1808 - val_mean_absolute_
error: 0.1808 - val_mean_squared_error: 0.0590
Epoch 14/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.2154 - mean_absolute_er
ror: 0.2154 - mean_squared_error: 0.0794
Epoch 00014: val_loss did not improve from 0.17589
10471/10471 [=====] - 1s 107us/sample - loss: 0.2143 - mean_ab
olute_error: 0.2141 - mean_squared_error: 0.0786 - val_loss: 0.1839 - val_mean_absolute_
error: 0.1839 - val_mean_squared_error: 0.0591
Epoch 15/500
10432/10471 [=====>..] - ETA: 0s - loss: 0.2083 - mean_absolute_er
ror: 0.2083 - mean_squared_error: 0.0751
Epoch 00015: val_loss did not improve from 0.17589
10471/10471 [=====] - 1s 110us/sample - loss: 0.2084 - mean_ab
olute_error: 0.2081 - mean_squared_error: 0.0751 - val_loss: 0.4260 - val_mean_absolute_
error: 0.4263 - val_mean_squared_error: 0.2223
Epoch 16/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.2086 - mean_absolute_er
ror: 0.2086 - mean_squared_error: 0.0759
Epoch 00016: val_loss did not improve from 0.17589
10471/10471 [=====] - 1s 106us/sample - loss: 0.2092 - mean_ab
```

```
olute_error: 0.2092 - mean_squared_error: 0.0761 - val_loss: 0.2108 - val_mean_absolute_error: 0.2109 - val_mean_squared_error: 0.0705
Epoch 17/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1973 - mean_absolute_error: 0.1973 - mean_squared_error: 0.0674
Epoch 00017: val_loss improved from 0.17589 to 0.16577, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 113us/sample - loss: 0.1977 - mean_absolute_error: 0.1981 - mean_squared_error: 0.0678 - val_loss: 0.1658 - val_mean_absolute_error: 0.1658 - val_mean_squared_error: 0.0500
Epoch 18/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.2092 - mean_absolute_error: 0.2092 - mean_squared_error: 0.0757
Epoch 00018: val_loss did not improve from 0.16577
10471/10471 [=====] - 1s 111us/sample - loss: 0.2097 - mean_absolute_error: 0.2098 - mean_squared_error: 0.0760 - val_loss: 0.3892 - val_mean_absolute_error: 0.3894 - val_mean_squared_error: 0.1827
Epoch 19/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.2100 - mean_absolute_error: 0.2100 - mean_squared_error: 0.0758
Epoch 00019: val_loss did not improve from 0.16577
10471/10471 [=====] - 1s 111us/sample - loss: 0.2098 - mean_absolute_error: 0.2100 - mean_squared_error: 0.0760 - val_loss: 0.1958 - val_mean_absolute_error: 0.1958 - val_mean_squared_error: 0.0627
Epoch 20/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1970 - mean_absolute_error: 0.1970 - mean_squared_error: 0.0687
Epoch 00020: val_loss did not improve from 0.16577
10471/10471 [=====] - 1s 107us/sample - loss: 0.1964 - mean_absolute_error: 0.1965 - mean_squared_error: 0.0682 - val_loss: 0.1895 - val_mean_absolute_error: 0.1896 - val_mean_squared_error: 0.0608
Epoch 21/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1949 - mean_absolute_error: 0.1949 - mean_squared_error: 0.0675
Epoch 00021: val_loss did not improve from 0.16577
10471/10471 [=====] - 1s 105us/sample - loss: 0.1946 - mean_absolute_error: 0.1948 - mean_squared_error: 0.0675 - val_loss: 0.1935 - val_mean_absolute_error: 0.1936 - val_mean_squared_error: 0.0621
Epoch 22/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1914 - mean_absolute_error: 0.1914 - mean_squared_error: 0.0652 ETA: 0s - loss: 0.1949 - mean_absolute_error: 0.1949 - mean_squared_error: 0.0675
Epoch 00022: val_loss did not improve from 0.16577
10471/10471 [=====] - 1s 106us/sample - loss: 0.1906 - mean_absolute_error: 0.1906 - mean_squared_error: 0.0648 - val_loss: 0.1828 - val_mean_absolute_error: 0.1829 - val_mean_squared_error: 0.0568
Epoch 23/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1845 - mean_absolute_error: 0.1845 - mean_squared_error: 0.0612
Epoch 00023: val_loss improved from 0.16577 to 0.15644, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.1845 - mean_absolute_error: 0.1849 - mean_squared_error: 0.0614 - val_loss: 0.1564 - val_mean_absolute_error: 0.1565 - val_mean_squared_error: 0.0482
Epoch 24/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1835 - mean_absolute_error: 0.1835 - mean_squared_error: 0.0607
Epoch 00024: val_loss did not improve from 0.15644
10471/10471 [=====] - 1s 113us/sample - loss: 0.1826 - mean_absolute_error: 0.1827 - mean_squared_error: 0.0602 - val_loss: 0.2082 - val_mean_absolute_error: 0.2080 - val_mean_squared_error: 0.0744
```

Epoch 25/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1927 - mean_absolute_error: 0.1927 - mean_squared_error: 0.0660
Epoch 00025: val_loss did not improve from 0.15644
10471/10471 [=====] - 1s 110us/sample - loss: 0.1928 - mean_absolute_error: 0.1928 - mean_squared_error: 0.0661 - val_loss: 0.2153 - val_mean_absolute_error: 0.2154 - val_mean_squared_error: 0.0711
Epoch 26/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1875 - mean_absolute_error: 0.1875 - mean_squared_error: 0.0628
Epoch 00026: val_loss did not improve from 0.15644
10471/10471 [=====] - 1s 109us/sample - loss: 0.1875 - mean_absolute_error: 0.1876 - mean_squared_error: 0.0629 - val_loss: 0.2802 - val_mean_absolute_error: 0.2804 - val_mean_squared_error: 0.1091
Epoch 27/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1845 - mean_absolute_error: 0.1845 - mean_squared_error: 0.0611
Epoch 00027: val_loss improved from 0.15644 to 0.15283, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 112us/sample - loss: 0.1845 - mean_absolute_error: 0.1847 - mean_squared_error: 0.0614 - val_loss: 0.1528 - val_mean_absolute_error: 0.1528 - val_mean_squared_error: 0.0476
Epoch 28/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1920 - mean_absolute_error: 0.1920 - mean_squared_error: 0.0655
Epoch 00028: val_loss did not improve from 0.15283
10471/10471 [=====] - 1s 107us/sample - loss: 0.1934 - mean_absolute_error: 0.1933 - mean_squared_error: 0.0661 - val_loss: 0.3617 - val_mean_absolute_error: 0.3619 - val_mean_squared_error: 0.1599
Epoch 29/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1898 - mean_absolute_error: 0.1898 - mean_squared_error: 0.0648
Epoch 00029: val_loss did not improve from 0.15283
10471/10471 [=====] - 1s 109us/sample - loss: 0.1897 - mean_absolute_error: 0.1896 - mean_squared_error: 0.0646 - val_loss: 0.2167 - val_mean_absolute_error: 0.2168 - val_mean_squared_error: 0.0736
Epoch 30/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1831 - mean_absolute_error: 0.1831 - mean_squared_error: 0.0608
Epoch 00030: val_loss improved from 0.15283 to 0.14999, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.1827 - mean_absolute_error: 0.1828 - mean_squared_error: 0.0606 - val_loss: 0.1500 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0452
Epoch 31/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1944 - mean_absolute_error: 0.1944 - mean_squared_error: 0.0670
Epoch 00031: val_loss did not improve from 0.14999
10471/10471 [=====] - 1s 107us/sample - loss: 0.1932 - mean_absolute_error: 0.1931 - mean_squared_error: 0.0664 - val_loss: 0.1814 - val_mean_absolute_error: 0.1815 - val_mean_squared_error: 0.0570
Epoch 32/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1888 - mean_absolute_error: 0.1888 - mean_squared_error: 0.0637
Epoch 00032: val_loss did not improve from 0.14999
10471/10471 [=====] - 1s 105us/sample - loss: 0.1888 - mean_absolute_error: 0.1891 - mean_squared_error: 0.0640 - val_loss: 0.1653 - val_mean_absolute_error: 0.1652 - val_mean_squared_error: 0.0533
Epoch 33/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1782 - mean_absolute_error: 0.1782 - mean_squared_error: 0.0585

```
Epoch 00033: val_loss did not improve from 0.14999
10471/10471 [=====] - 1s 108us/sample - loss: 0.1780 - mean_absolute_error: 0.1780 - mean_squared_error: 0.0584 - val_loss: 0.1797 - val_mean_absolute_error: 0.1796 - val_mean_squared_error: 0.0613
Epoch 34/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1787 - mean_absolute_error: 0.1787 - mean_squared_error: 0.0581
Epoch 00034: val_loss did not improve from 0.14999
10471/10471 [=====] - 1s 106us/sample - loss: 0.1788 - mean_absolute_error: 0.1789 - mean_squared_error: 0.0582 - val_loss: 0.2680 - val_mean_absolute_error: 0.2679 - val_mean_squared_error: 0.1079
Epoch 35/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1815 - mean_absolute_error: 0.1815 - mean_squared_error: 0.0604
Epoch 00035: val_loss did not improve from 0.14999
10471/10471 [=====] - 1s 107us/sample - loss: 0.1833 - mean_absolute_error: 0.1835 - mean_squared_error: 0.0612 - val_loss: 0.1664 - val_mean_absolute_error: 0.1664 - val_mean_squared_error: 0.0539
Epoch 36/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1924 - mean_absolute_error: 0.1924 - mean_squared_error: 0.0661
Epoch 00036: val_loss improved from 0.14999 to 0.14887, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 109us/sample - loss: 0.1931 - mean_absolute_error: 0.1930 - mean_squared_error: 0.0663 - val_loss: 0.1489 - val_mean_absolute_error: 0.1489 - val_mean_squared_error: 0.0444
Epoch 37/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1800 - mean_absolute_error: 0.1800 - mean_squared_error: 0.0598
Epoch 00037: val_loss did not improve from 0.14887
10471/10471 [=====] - 1s 107us/sample - loss: 0.1799 - mean_absolute_error: 0.1800 - mean_squared_error: 0.0598 - val_loss: 0.2030 - val_mean_absolute_error: 0.2031 - val_mean_squared_error: 0.0645
Epoch 38/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1879 - mean_absolute_error: 0.1879 - mean_squared_error: 0.0643
Epoch 00038: val_loss did not improve from 0.14887
10471/10471 [=====] - 1s 107us/sample - loss: 0.1885 - mean_absolute_error: 0.1890 - mean_squared_error: 0.0648 - val_loss: 0.2507 - val_mean_absolute_error: 0.2505 - val_mean_squared_error: 0.0963
Epoch 39/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1735 - mean_absolute_error: 0.1735 - mean_squared_error: 0.0557
Epoch 00039: val_loss did not improve from 0.14887
10471/10471 [=====] - 1s 108us/sample - loss: 0.1733 - mean_absolute_error: 0.1737 - mean_squared_error: 0.0558 - val_loss: 0.1587 - val_mean_absolute_error: 0.1588 - val_mean_squared_error: 0.0476
Epoch 40/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1799 - mean_absolute_error: 0.1799 - mean_squared_error: 0.0591
Epoch 00040: val_loss did not improve from 0.14887
10471/10471 [=====] - 1s 113us/sample - loss: 0.1799 - mean_absolute_error: 0.1799 - mean_squared_error: 0.0591 - val_loss: 0.1617 - val_mean_absolute_error: 0.1617 - val_mean_squared_error: 0.0521
Epoch 41/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1836 - mean_absolute_error: 0.1836 - mean_squared_error: 0.0619
Epoch 00041: val_loss did not improve from 0.14887
10471/10471 [=====] - 1s 108us/sample - loss: 0.1827 - mean_absolute_error: 0.1828 - mean_squared_error: 0.0613 - val_loss: 0.1570 - val_mean_absolute_error: 0.1571 - val_mean_squared_error: 0.0499
```

Epoch 42/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1737 - mean_absolute_error: 0.1737 - mean_squared_error: 0.0563
Epoch 00042: val_loss did not improve from 0.14887
10471/10471 [=====] - 1s 106us/sample - loss: 0.1736 - mean_absolute_error: 0.1735 - mean_squared_error: 0.0561 - val_loss: 0.1573 - val_mean_absolute_error: 0.1575 - val_mean_squared_error: 0.0472
Epoch 43/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1750 - mean_absolute_error: 0.1750 - mean_squared_error: 0.0571
Epoch 00043: val_loss improved from 0.14887 to 0.14624, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 111us/sample - loss: 0.1741 - mean_absolute_error: 0.1740 - mean_squared_error: 0.0567 - val_loss: 0.1462 - val_mean_absolute_error: 0.1463 - val_mean_squared_error: 0.0434
Epoch 44/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1676 - mean_absolute_error: 0.1676 - mean_squared_error: 0.0529
Epoch 00044: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 107us/sample - loss: 0.1676 - mean_absolute_error: 0.1678 - mean_squared_error: 0.0530 - val_loss: 0.1535 - val_mean_absolute_error: 0.1535 - val_mean_squared_error: 0.0459
Epoch 45/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1818 - mean_absolute_error: 0.1818 - mean_squared_error: 0.0601
Epoch 00045: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 109us/sample - loss: 0.1818 - mean_absolute_error: 0.1818 - mean_squared_error: 0.0601 - val_loss: 0.1521 - val_mean_absolute_error: 0.1521 - val_mean_squared_error: 0.0465
Epoch 46/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1849 - mean_absolute_error: 0.1849 - mean_squared_error: 0.0619
Epoch 00046: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 108us/sample - loss: 0.1848 - mean_absolute_error: 0.1851 - mean_squared_error: 0.0619 - val_loss: 0.1574 - val_mean_absolute_error: 0.1575 - val_mean_squared_error: 0.0488
Epoch 47/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1750 - mean_absolute_error: 0.1750 - mean_squared_error: 0.0570
Epoch 00047: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 108us/sample - loss: 0.1768 - mean_absolute_error: 0.1768 - mean_squared_error: 0.0580 - val_loss: 0.1932 - val_mean_absolute_error: 0.1933 - val_mean_squared_error: 0.0599
Epoch 48/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1749 - mean_absolute_error: 0.1749 - mean_squared_error: 0.0565
Epoch 00048: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 105us/sample - loss: 0.1749 - mean_absolute_error: 0.1750 - mean_squared_error: 0.0565 - val_loss: 0.1768 - val_mean_absolute_error: 0.1768 - val_mean_squared_error: 0.0589
Epoch 49/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1727 - mean_absolute_error: 0.1727 - mean_squared_error: 0.0551
Epoch 00049: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 106us/sample - loss: 0.1726 - mean_absolute_error: 0.1729 - mean_squared_error: 0.0555 - val_loss: 0.1568 - val_mean_absolute_error: 0.1568 - val_mean_squared_error: 0.0489
Epoch 50/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1739 - mean_absolute_error: 0.1739 - mean_squared_error: 0.0563
Epoch 00050: val_loss did not improve from 0.14624

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10471/10471 [=====] - 1s 106us/sample - loss: 0.1736 - mean_absolute_error: 0.1737 - mean_squared_error: 0.0562 - val_loss: 0.1529 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0466
Epoch 51/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1760 - mean_absolute_error: 0.1760 - mean_squared_error: 0.0574
Epoch 00051: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 109us/sample - loss: 0.1758 - mean_absolute_error: 0.1766 - mean_squared_error: 0.0577 - val_loss: 0.2024 - val_mean_absolute_error: 0.2023 - val_mean_squared_error: 0.0714
Epoch 52/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1725 - mean_absolute_error: 0.1725 - mean_squared_error: 0.0548
Epoch 00052: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 106us/sample - loss: 0.1723 - mean_absolute_error: 0.1724 - mean_squared_error: 0.0548 - val_loss: 0.1518 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0466
Epoch 53/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1811 - mean_absolute_error: 0.1811 - mean_squared_error: 0.0593
Epoch 00053: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 106us/sample - loss: 0.1808 - mean_absolute_error: 0.1809 - mean_squared_error: 0.0591 - val_loss: 0.1588 - val_mean_absolute_error: 0.1588 - val_mean_squared_error: 0.0504
Epoch 54/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1691 - mean_absolute_error: 0.1691 - mean_squared_error: 0.0534
Epoch 00054: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 108us/sample - loss: 0.1697 - mean_absolute_error: 0.1701 - mean_squared_error: 0.0539 - val_loss: 0.1849 - val_mean_absolute_error: 0.1848 - val_mean_squared_error: 0.0621
Epoch 55/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1641 - mean_absolute_error: 0.1641 - mean_squared_error: 0.0512
Epoch 00055: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 107us/sample - loss: 0.1637 - mean_absolute_error: 0.1637 - mean_squared_error: 0.0509 - val_loss: 0.1596 - val_mean_absolute_error: 0.1597 - val_mean_squared_error: 0.0485
Epoch 56/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1700 - mean_absolute_error: 0.1700 - mean_squared_error: 0.0542
Epoch 00056: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 107us/sample - loss: 0.1700 - mean_absolute_error: 0.1698 - mean_squared_error: 0.0541 - val_loss: 0.1930 - val_mean_absolute_error: 0.1931 - val_mean_squared_error: 0.0608
Epoch 57/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1753 - mean_absolute_error: 0.1753 - mean_squared_error: 0.0565
Epoch 00057: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 104us/sample - loss: 0.1752 - mean_absolute_error: 0.1753 - mean_squared_error: 0.0565 - val_loss: 0.1528 - val_mean_absolute_error: 0.1529 - val_mean_squared_error: 0.0455
Epoch 58/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1716 - mean_absolute_error: 0.1716 - mean_squared_error: 0.0550
Epoch 00058: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 107us/sample - loss: 0.1709 - mean_absolute_error: 0.1709 - mean_squared_error: 0.0547 - val_loss: 0.1572 - val_mean_absolute_error: 0.1572 - val_mean_squared_error: 0.0496
Epoch 59/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1690 - mean_absolute_error:
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ror: 0.1690 - mean_squared_error: 0.0536
Epoch 00059: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 111us/sample - loss: 0.1691 - mean_absolute_error: 0.1692 - mean_squared_error: 0.0537 - val_loss: 0.1556 - val_mean_absolute_error: 0.1557 - val_mean_squared_error: 0.0465
Epoch 60/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1700 - mean_absolute_error: 0.1700 - mean_squared_error: 0.0539
Epoch 00060: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 111us/sample - loss: 0.1695 - mean_absolute_error: 0.1694 - mean_squared_error: 0.0536 - val_loss: 0.1981 - val_mean_absolute_error: 0.1982 - val_mean_squared_error: 0.0626
Epoch 61/500
10304/10471 [=====.>.] - ETA: 0s - loss: 0.1680 - mean_absolute_error: 0.1680 - mean_squared_error: 0.0534
Epoch 00061: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 110us/sample - loss: 0.1677 - mean_absolute_error: 0.1676 - mean_squared_error: 0.0533 - val_loss: 0.1470 - val_mean_absolute_error: 0.1471 - val_mean_squared_error: 0.0440
Epoch 62/500
10016/10471 [=====.>..] - ETA: 0s - loss: 0.1688 - mean_absolute_error: 0.1688 - mean_squared_error: 0.0541
Epoch 00062: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 108us/sample - loss: 0.1684 - mean_absolute_error: 0.1684 - mean_squared_error: 0.0535 - val_loss: 0.1504 - val_mean_absolute_error: 0.1504 - val_mean_squared_error: 0.0472
Epoch 63/500
10080/10471 [=====.>..] - ETA: 0s - loss: 0.1821 - mean_absolute_error: 0.1821 - mean_squared_error: 0.0605
Epoch 00063: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 112us/sample - loss: 0.1812 - mean_absolute_error: 0.1814 - mean_squared_error: 0.0601 - val_loss: 0.1476 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0459
Epoch 64/500
10240/10471 [=====.>.] - ETA: 0s - loss: 0.1645 - mean_absolute_error: 0.1645 - mean_squared_error: 0.0512
Epoch 00064: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 111us/sample - loss: 0.1649 - mean_absolute_error: 0.1655 - mean_squared_error: 0.0519 - val_loss: 0.1532 - val_mean_absolute_error: 0.1533 - val_mean_squared_error: 0.0455
Epoch 65/500
10336/10471 [=====.>.] - ETA: 0s - loss: 0.1679 - mean_absolute_error: 0.1679 - mean_squared_error: 0.0533
Epoch 00065: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 111us/sample - loss: 0.1680 - mean_absolute_error: 0.1681 - mean_squared_error: 0.0537 - val_loss: 0.1679 - val_mean_absolute_error: 0.1680 - val_mean_squared_error: 0.0499
Epoch 66/500
10208/10471 [=====.>.] - ETA: 0s - loss: 0.1711 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0545
Epoch 00066: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 113us/sample - loss: 0.1708 - mean_absolute_error: 0.1711 - mean_squared_error: 0.0546 - val_loss: 0.2514 - val_mean_absolute_error: 0.2516 - val_mean_squared_error: 0.0868
Epoch 67/500
10144/10471 [=====.>.] - ETA: 0s - loss: 0.1620 - mean_absolute_error: 0.1620 - mean_squared_error: 0.0497
Epoch 00067: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 107us/sample - loss: 0.1626 - mean_absolute_error: 0.1627 - mean_squared_error: 0.0501 - val_loss: 0.1561 - val_mean_absolute_error: 0.1561 - val_mean_squared_error: 0.0500
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Epoch 68/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1634 - mean_absolute_error: 0.1634 - mean_squared_error: 0.0516
Epoch 00068: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 107us/sample - loss: 0.1638 - mean_absolute_error: 0.1638 - mean_squared_error: 0.0519 - val_loss: 0.1570 - val_mean_absolute_error: 0.1571 - val_mean_squared_error: 0.0468
Epoch 69/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1721 - mean_absolute_error: 0.1721 - mean_squared_error: 0.0552
Epoch 00069: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 107us/sample - loss: 0.1714 - mean_absolute_error: 0.1716 - mean_squared_error: 0.0548 - val_loss: 0.1573 - val_mean_absolute_error: 0.1573 - val_mean_squared_error: 0.0501
Epoch 70/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1651 - mean_absolute_error: 0.1651 - mean_squared_error: 0.0519
Epoch 00070: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 110us/sample - loss: 0.1648 - mean_absolute_error: 0.1647 - mean_squared_error: 0.0517 - val_loss: 0.1771 - val_mean_absolute_error: 0.1773 - val_mean_squared_error: 0.0529
Epoch 71/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1620 - mean_absolute_error: 0.1620 - mean_squared_error: 0.0504
Epoch 00071: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 111us/sample - loss: 0.1615 - mean_absolute_error: 0.1615 - mean_squared_error: 0.0502 - val_loss: 0.2082 - val_mean_absolute_error: 0.2083 - val_mean_squared_error: 0.0664
Epoch 72/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1679 - mean_absolute_error: 0.1679 - mean_squared_error: 0.0526
Epoch 00072: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 109us/sample - loss: 0.1679 - mean_absolute_error: 0.1680 - mean_squared_error: 0.0527 - val_loss: 0.1675 - val_mean_absolute_error: 0.1674 - val_mean_squared_error: 0.0543
Epoch 73/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1737 - mean_absolute_error: 0.1737 - mean_squared_error: 0.0566
Epoch 00073: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 108us/sample - loss: 0.1734 - mean_absolute_error: 0.1736 - mean_squared_error: 0.0564 - val_loss: 0.1508 - val_mean_absolute_error: 0.1508 - val_mean_squared_error: 0.0468
Epoch 74/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1680 - mean_absolute_error: 0.1680 - mean_squared_error: 0.0535
Epoch 00074: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 107us/sample - loss: 0.1685 - mean_absolute_error: 0.1686 - mean_squared_error: 0.0536 - val_loss: 0.1594 - val_mean_absolute_error: 0.1594 - val_mean_squared_error: 0.0501
Epoch 75/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1683 - mean_absolute_error: 0.1683 - mean_squared_error: 0.0536
Epoch 00075: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 108us/sample - loss: 0.1678 - mean_absolute_error: 0.1679 - mean_squared_error: 0.0532 - val_loss: 0.1747 - val_mean_absolute_error: 0.1748 - val_mean_squared_error: 0.0529
Epoch 76/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1654 - mean_absolute_error: 0.1654 - mean_squared_error: 0.0518
Epoch 00076: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 105us/sample - loss: 0.1651 - mean_absolute_error:

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olute_error: 0.1656 - mean_squared_error: 0.0527 - val_loss: 0.1691 - val_mean_absolute_
error: 0.1690 - val_mean_squared_error: 0.0551
Epoch 77/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1604 - mean_absolute_er
ror: 0.1604 - mean_squared_error: 0.0502
Epoch 00077: val_loss did not improve from 0.14624
10471/10471 [=====] - 1s 110us/sample - loss: 0.1603 - mean_abs
olute_error: 0.1603 - mean_squared_error: 0.0500 - val_loss: 0.1522 - val_mean_absolute_
error: 0.1522 - val_mean_squared_error: 0.0451
Epoch 78/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1645 - mean_absolute_er
ror: 0.1645 - mean_squared_error: 0.0513
Epoch 00078: val_loss improved from 0.14624 to 0.14579, saving model to best_tabular_mod
el.hdf5
10471/10471 [=====] - 1s 112us/sample - loss: 0.1645 - mean_abs
olute_error: 0.1644 - mean_squared_error: 0.0513 - val_loss: 0.1458 - val_mean_absolute_
error: 0.1458 - val_mean_squared_error: 0.0432
Epoch 79/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1647 - mean_absolute_er
ror: 0.1647 - mean_squared_error: 0.0516
Epoch 00079: val_loss did not improve from 0.14579
10471/10471 [=====] - 1s 106us/sample - loss: 0.1650 - mean_abs
olute_error: 0.1654 - mean_squared_error: 0.0520 - val_loss: 0.2669 - val_mean_absolute_
error: 0.2671 - val_mean_squared_error: 0.0956
Epoch 80/500
9984/10471 [=====>..] - ETA: 0s - loss: 0.1632 - mean_absolute_er
ror: 0.1632 - mean_squared_error: 0.0513
Epoch 00080: val_loss improved from 0.14579 to 0.14490, saving model to best_tabular_mod
el.hdf5
10471/10471 [=====] - 1s 112us/sample - loss: 0.1621 - mean_abs
olute_error: 0.1619 - mean_squared_error: 0.0506 - val_loss: 0.1449 - val_mean_absolute_
error: 0.1449 - val_mean_squared_error: 0.0421
Epoch 81/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1632 - mean_absolute_er
ror: 0.1632 - mean_squared_error: 0.0505
Epoch 00081: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 112us/sample - loss: 0.1632 - mean_abs
olute_error: 0.1633 - mean_squared_error: 0.0505 - val_loss: 0.1783 - val_mean_absolute_
error: 0.1782 - val_mean_squared_error: 0.0612
Epoch 82/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1640 - mean_absolute_er
ror: 0.1640 - mean_squared_error: 0.0511
Epoch 00082: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 110us/sample - loss: 0.1638 - mean_abs
olute_error: 0.1638 - mean_squared_error: 0.0508 - val_loss: 0.1515 - val_mean_absolute_
error: 0.1514 - val_mean_squared_error: 0.0464
Epoch 83/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1617 - mean_absolute_er
ror: 0.1617 - mean_squared_error: 0.0499
Epoch 00083: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 110us/sample - loss: 0.1618 - mean_abs
olute_error: 0.1617 - mean_squared_error: 0.0499 - val_loss: 0.1485 - val_mean_absolute_
error: 0.1485 - val_mean_squared_error: 0.0447
Epoch 84/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1603 - mean_absolute_er
ror: 0.1603 - mean_squared_error: 0.0504
Epoch 00084: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 110us/sample - loss: 0.1599 - mean_abs
olute_error: 0.1599 - mean_squared_error: 0.0500 - val_loss: 0.1813 - val_mean_absolute_
error: 0.1813 - val_mean_squared_error: 0.0569
Epoch 85/500
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10400/10471 [=====>.] - ETA: 0s - loss: 0.1594 - mean_absolute_error: 0.1594 - mean_squared_error: 0.0496
Epoch 00085: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 110us/sample - loss: 0.1594 - mean_absolute_error: 0.1595 - mean_squared_error: 0.0496 - val_loss: 0.1450 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0429
Epoch 86/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1538 - mean_absolute_error: 0.1538 - mean_squared_error: 0.0474
Epoch 00086: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 109us/sample - loss: 0.1537 - mean_absolute_error: 0.1536 - mean_squared_error: 0.0473 - val_loss: 0.1592 - val_mean_absolute_error: 0.1591 - val_mean_squared_error: 0.0519
Epoch 87/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1590 - mean_absolute_error: 0.1590 - mean_squared_error: 0.0498
Epoch 00087: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 105us/sample - loss: 0.1590 - mean_absolute_error: 0.1592 - mean_squared_error: 0.0500 - val_loss: 0.1943 - val_mean_absolute_error: 0.1944 - val_mean_squared_error: 0.0614
Epoch 88/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1627 - mean_absolute_error: 0.1627 - mean_squared_error: 0.0512
Epoch 00088: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 106us/sample - loss: 0.1624 - mean_absolute_error: 0.1626 - mean_squared_error: 0.0511 - val_loss: 0.1766 - val_mean_absolute_error: 0.1765 - val_mean_squared_error: 0.0592
Epoch 89/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1632 - mean_absolute_error: 0.1632 - mean_squared_error: 0.0508
Epoch 00089: val_loss did not improve from 0.14490
10471/10471 [=====] - 1s 106us/sample - loss: 0.1633 - mean_absolute_error: 0.1636 - mean_squared_error: 0.0510 - val_loss: 0.2121 - val_mean_absolute_error: 0.2122 - val_mean_squared_error: 0.0666
Epoch 90/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1576 - mean_absolute_error: 0.1576 - mean_squared_error: 0.0485
Epoch 00090: val_loss improved from 0.14490 to 0.14174, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 108us/sample - loss: 0.1576 - mean_absolute_error: 0.1578 - mean_squared_error: 0.0485 - val_loss: 0.1417 - val_mean_absolute_error: 0.1418 - val_mean_squared_error: 0.0417
Epoch 91/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1555 - mean_absolute_error: 0.1555 - mean_squared_error: 0.0470
Epoch 00091: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 108us/sample - loss: 0.1568 - mean_absolute_error: 0.1572 - mean_squared_error: 0.0480 - val_loss: 0.1622 - val_mean_absolute_error: 0.1622 - val_mean_squared_error: 0.0520
Epoch 92/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1579 - mean_absolute_error: 0.1579 - mean_squared_error: 0.0488
Epoch 00092: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 105us/sample - loss: 0.1589 - mean_absolute_error: 0.1590 - mean_squared_error: 0.0493 - val_loss: 0.1778 - val_mean_absolute_error: 0.1779 - val_mean_squared_error: 0.0529
Epoch 93/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1529 - mean_absolute_error: 0.1529 - mean_squared_error: 0.0464
Epoch 00093: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1529 - mean_absolute_error: 0.1529 - mean_squared_error: 0.0464

olute_error: 0.1528 - mean_squared_error: 0.0465 - val_loss: 0.1684 - val_mean_absolute_error: 0.1685 - val_mean_squared_error: 0.0507
Epoch 94/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1558 - mean_absolute_error: 0.1558 - mean_squared_error: 0.0476
Epoch 00094: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1573 - mean_absolute_error: 0.1573 - mean_squared_error: 0.0485 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0448
Epoch 95/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1558 - mean_absolute_error: 0.1558 - mean_squared_error: 0.0474
Epoch 00095: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 105us/sample - loss: 0.1556 - mean_absolute_error: 0.1557 - mean_squared_error: 0.0473 - val_loss: 0.1518 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0478
Epoch 96/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1577 - mean_absolute_error: 0.1577 - mean_squared_error: 0.0487
Epoch 00096: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1583 - mean_absolute_error: 0.1584 - mean_squared_error: 0.0488 - val_loss: 0.1446 - val_mean_absolute_error: 0.1446 - val_mean_squared_error: 0.0428
Epoch 97/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1561 - mean_absolute_error: 0.1561 - mean_squared_error: 0.0480
Epoch 00097: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1567 - mean_absolute_error: 0.1567 - mean_squared_error: 0.0481 - val_loss: 0.1711 - val_mean_absolute_error: 0.1711 - val_mean_squared_error: 0.0561
Epoch 98/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1600 - mean_absolute_error: 0.1600 - mean_squared_error: 0.0494
Epoch 00098: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1603 - mean_absolute_error: 0.1609 - mean_squared_error: 0.0502 - val_loss: 0.1713 - val_mean_absolute_error: 0.1713 - val_mean_squared_error: 0.0564
Epoch 99/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1542 - mean_absolute_error: 0.1542 - mean_squared_error: 0.0473
Epoch 00099: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1540 - mean_absolute_error: 0.1543 - mean_squared_error: 0.0472 - val_loss: 0.1493 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0435
Epoch 100/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1599 - mean_absolute_error: 0.1599 - mean_squared_error: 0.0500
Epoch 00100: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1597 - mean_absolute_error: 0.1600 - mean_squared_error: 0.0503 - val_loss: 0.1753 - val_mean_absolute_error: 0.1753 - val_mean_squared_error: 0.0584
Epoch 101/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1568 - mean_absolute_error: 0.1568 - mean_squared_error: 0.0481
Epoch 00101: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1573 - mean_absolute_error: 0.1573 - mean_squared_error: 0.0486 - val_loss: 0.2566 - val_mean_absolute_error: 0.2568 - val_mean_squared_error: 0.0905
Epoch 102/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1534 - mean_absolute_error: 0.1534 - mean_squared_error: 0.0471

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Epoch 00102: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1535 - mean_absolute_error: 0.1536 - mean_squared_error: 0.0472 - val_loss: 0.1511 - val_mean_absolute_error: 0.1512 - val_mean_squared_error: 0.0442
Epoch 103/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1529 - mean_absolute_error: 0.1529 - mean_squared_error: 0.0476
Epoch 00103: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 105us/sample - loss: 0.1528 - mean_absolute_error: 0.1528 - mean_squared_error: 0.0475 - val_loss: 0.1554 - val_mean_absolute_error: 0.1555 - val_mean_squared_error: 0.0461
Epoch 104/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1517 - mean_absolute_error: 0.1517 - mean_squared_error: 0.0462
Epoch 00104: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 104us/sample - loss: 0.1519 - mean_absolute_error: 0.1525 - mean_squared_error: 0.0472 - val_loss: 0.1461 - val_mean_absolute_error: 0.1461 - val_mean_squared_error: 0.0442
Epoch 105/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1499 - mean_absolute_error: 0.1499 - mean_squared_error: 0.0455
Epoch 00105: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1507 - mean_absolute_error: 0.1506 - mean_squared_error: 0.0456 - val_loss: 0.1502 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0468
Epoch 106/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1589 - mean_absolute_error: 0.1589 - mean_squared_error: 0.0491
Epoch 00106: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1591 - mean_absolute_error: 0.1595 - mean_squared_error: 0.0494 - val_loss: 0.1974 - val_mean_absolute_error: 0.1973 - val_mean_squared_error: 0.0686
Epoch 107/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1506 - mean_absolute_error: 0.1506 - mean_squared_error: 0.0457
Epoch 00107: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 105us/sample - loss: 0.1507 - mean_absolute_error: 0.1510 - mean_squared_error: 0.0464 - val_loss: 0.1506 - val_mean_absolute_error: 0.1506 - val_mean_squared_error: 0.0468
Epoch 108/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1560 - mean_absolute_error: 0.1560 - mean_squared_error: 0.0480
Epoch 00108: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 107us/sample - loss: 0.1560 - mean_absolute_error: 0.1558 - mean_squared_error: 0.0477 - val_loss: 0.1559 - val_mean_absolute_error: 0.1559 - val_mean_squared_error: 0.0501
Epoch 109/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1532 - mean_absolute_error: 0.1532 - mean_squared_error: 0.0472
Epoch 00109: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 105us/sample - loss: 0.1533 - mean_absolute_error: 0.1537 - mean_squared_error: 0.0474 - val_loss: 0.1542 - val_mean_absolute_error: 0.1542 - val_mean_squared_error: 0.0489
Epoch 110/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1488 - mean_absolute_error: 0.1488 - mean_squared_error: 0.0451
Epoch 00110: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 109us/sample - loss: 0.1487 - mean_absolute_error: 0.1489 - mean_squared_error: 0.0450 - val_loss: 0.1552 - val_mean_absolute_error: 0.1553 - val_mean_squared_error: 0.0466
Epoch 111/500
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10080/10471 [=====>..] - ETA: 0s - loss: 0.1491 - mean_absolute_error: 0.1491 - mean_squared_error: 0.0456
Epoch 00111: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 109us/sample - loss: 0.1492 - mean_absolute_error: 0.1493 - mean_squared_error: 0.0458 - val_loss: 0.1494 - val_mean_absolute_error: 0.1495 - val_mean_squared_error: 0.0440
Epoch 112/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1503 - mean_absolute_error: 0.1503 - mean_squared_error: 0.0453
Epoch 00112: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 107us/sample - loss: 0.1501 - mean_absolute_error: 0.1499 - mean_squared_error: 0.0450 - val_loss: 0.1543 - val_mean_absolute_error: 0.1544 - val_mean_squared_error: 0.0455
Epoch 113/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1533 - mean_absolute_error: 0.1533 - mean_squared_error: 0.0465
Epoch 00113: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 111us/sample - loss: 0.1534 - mean_absolute_error: 0.1537 - mean_squared_error: 0.0467 - val_loss: 0.1777 - val_mean_absolute_error: 0.1778 - val_mean_squared_error: 0.0543
Epoch 114/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1498 - mean_absolute_error: 0.1498 - mean_squared_error: 0.0452
Epoch 00114: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 107us/sample - loss: 0.1496 - mean_absolute_error: 0.1498 - mean_squared_error: 0.0452 - val_loss: 0.1876 - val_mean_absolute_error: 0.1877 - val_mean_squared_error: 0.0574
Epoch 115/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1482 - mean_absolute_error: 0.1482 - mean_squared_error: 0.0451
Epoch 00115: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 106us/sample - loss: 0.1483 - mean_absolute_error: 0.1486 - mean_squared_error: 0.0454 - val_loss: 0.1619 - val_mean_absolute_error: 0.1620 - val_mean_squared_error: 0.0493
Epoch 116/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1486 - mean_absolute_error: 0.1486 - mean_squared_error: 0.0451
Epoch 00116: val_loss did not improve from 0.14174
10471/10471 [=====] - 1s 109us/sample - loss: 0.1485 - mean_absolute_error: 0.1487 - mean_squared_error: 0.0450 - val_loss: 0.1526 - val_mean_absolute_error: 0.1527 - val_mean_squared_error: 0.0455
Epoch 117/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1485 - mean_absolute_error: 0.1485 - mean_squared_error: 0.0451
Epoch 00117: val_loss improved from 0.14174 to 0.13992, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 112us/sample - loss: 0.1484 - mean_absolute_error: 0.1485 - mean_squared_error: 0.0453 - val_loss: 0.1399 - val_mean_absolute_error: 0.1399 - val_mean_squared_error: 0.0426
Epoch 118/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1522 - mean_absolute_error: 0.1522 - mean_squared_error: 0.0465
Epoch 00118: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 110us/sample - loss: 0.1520 - mean_absolute_error: 0.1521 - mean_squared_error: 0.0465 - val_loss: 0.1452 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0451
Epoch 119/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1483 - mean_absolute_error: 0.1483 - mean_squared_error: 0.0445
Epoch 00119: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 106us/sample - loss: 0.1487 - mean_absolute_error:
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olute_error: 0.1488 - mean_squared_error: 0.0448 - val_loss: 0.1416 - val_mean_absolute_
error: 0.1417 - val_mean_squared_error: 0.0427
Epoch 120/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1476 - mean_absolute_er
ror: 0.1476 - mean_squared_error: 0.0444
Epoch 00120: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 108us/sample - loss: 0.1480 - mean_abs
olute_error: 0.1482 - mean_squared_error: 0.0447 - val_loss: 0.1531 - val_mean_absolute_
error: 0.1532 - val_mean_squared_error: 0.0450
Epoch 121/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1466 - mean_absolute_er
ror: 0.1466 - mean_squared_error: 0.0436
Epoch 00121: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 106us/sample - loss: 0.1478 - mean_abs
olute_error: 0.1477 - mean_squared_error: 0.0442 - val_loss: 0.1825 - val_mean_absolute_
error: 0.1824 - val_mean_squared_error: 0.0619
Epoch 122/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1467 - mean_absolute_er
ror: 0.1467 - mean_squared_error: 0.0444
Epoch 00122: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 109us/sample - loss: 0.1468 - mean_abs
olute_error: 0.1468 - mean_squared_error: 0.0444 - val_loss: 0.1429 - val_mean_absolute_
error: 0.1429 - val_mean_squared_error: 0.0436
Epoch 123/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1470 - mean_absolute_er
ror: 0.1470 - mean_squared_error: 0.0441
Epoch 00123: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 105us/sample - loss: 0.1468 - mean_abs
olute_error: 0.1469 - mean_squared_error: 0.0440 - val_loss: 0.1724 - val_mean_absolute_
error: 0.1724 - val_mean_squared_error: 0.0531
Epoch 124/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1479 - mean_absolute_er
ror: 0.1479 - mean_squared_error: 0.0446
Epoch 00124: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 111us/sample - loss: 0.1479 - mean_abs
olute_error: 0.1479 - mean_squared_error: 0.0446 - val_loss: 0.1413 - val_mean_absolute_
error: 0.1413 - val_mean_squared_error: 0.0422
Epoch 125/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1466 - mean_absolute_er
ror: 0.1466 - mean_squared_error: 0.0441
Epoch 00125: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 108us/sample - loss: 0.1469 - mean_abs
olute_error: 0.1466 - mean_squared_error: 0.0444 - val_loss: 0.1631 - val_mean_absolute_
error: 0.1631 - val_mean_squared_error: 0.0485
Epoch 126/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1471 - mean_absolute_er
ror: 0.1471 - mean_squared_error: 0.0442
Epoch 00126: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 107us/sample - loss: 0.1467 - mean_abs
olute_error: 0.1466 - mean_squared_error: 0.0439 - val_loss: 0.1594 - val_mean_absolute_
error: 0.1595 - val_mean_squared_error: 0.0466
Epoch 127/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1504 - mean_absolute_er
ror: 0.1504 - mean_squared_error: 0.0453
Epoch 00127: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 108us/sample - loss: 0.1509 - mean_abs
olute_error: 0.1508 - mean_squared_error: 0.0457 - val_loss: 0.1729 - val_mean_absolute_
error: 0.1729 - val_mean_squared_error: 0.0516
Epoch 128/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.1457 - mean_absolute_er
ror: 0.1457 - mean_squared_error: 0.0434
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Epoch 00128: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 109us/sample - loss: 0.1456 - mean_absolute_error: 0.1459 - mean_squared_error: 0.0438 - val_loss: 0.1458 - val_mean_absolute_error: 0.1458 - val_mean_squared_error: 0.0459
Epoch 129/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1491 - mean_absolute_error: 0.1491 - mean_squared_error: 0.0454
Epoch 00129: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 109us/sample - loss: 0.1489 - mean_absolute_error: 0.1490 - mean_squared_error: 0.0455 - val_loss: 0.1426 - val_mean_absolute_error: 0.1426 - val_mean_squared_error: 0.0425
Epoch 130/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1456 - mean_absolute_error: 0.1456 - mean_squared_error: 0.0444
Epoch 00130: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 108us/sample - loss: 0.1456 - mean_absolute_error: 0.1459 - mean_squared_error: 0.0445 - val_loss: 0.1416 - val_mean_absolute_error: 0.1416 - val_mean_squared_error: 0.0433
Epoch 131/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1458 - mean_absolute_error: 0.1458 - mean_squared_error: 0.0441
Epoch 00131: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 109us/sample - loss: 0.1459 - mean_absolute_error: 0.1463 - mean_squared_error: 0.0444 - val_loss: 0.1450 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0437
Epoch 132/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1461 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0442
Epoch 00132: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 107us/sample - loss: 0.1458 - mean_absolute_error: 0.1461 - mean_squared_error: 0.0442 - val_loss: 0.1437 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0431
Epoch 133/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1434 - mean_absolute_error: 0.1434 - mean_squared_error: 0.0430
Epoch 00133: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 107us/sample - loss: 0.1434 - mean_absolute_error: 0.1434 - mean_squared_error: 0.0427 - val_loss: 0.1445 - val_mean_absolute_error: 0.1445 - val_mean_squared_error: 0.0450
Epoch 134/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1450 - mean_absolute_error: 0.1450 - mean_squared_error: 0.0436
Epoch 00134: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 104us/sample - loss: 0.1449 - mean_absolute_error: 0.1448 - mean_squared_error: 0.0435 - val_loss: 0.1436 - val_mean_absolute_error: 0.1437 - val_mean_squared_error: 0.0445
Epoch 135/500
10208/10471 [=====>..] - ETA: 0s - loss: 0.1436 - mean_absolute_error: 0.1436 - mean_squared_error: 0.0429
Epoch 00135: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 106us/sample - loss: 0.1437 - mean_absolute_error: 0.1439 - mean_squared_error: 0.0430 - val_loss: 0.1470 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0444
Epoch 136/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1440 - mean_absolute_error: 0.1440 - mean_squared_error: 0.0431
Epoch 00136: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 107us/sample - loss: 0.1436 - mean_absolute_error: 0.1434 - mean_squared_error: 0.0428 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0468
Epoch 137/500
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10240/10471 [=====>.] - ETA: 0s - loss: 0.1439 - mean_absolute_error: 0.1439 - mean_squared_error: 0.0427
Epoch 00137: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 107us/sample - loss: 0.1438 - mean_absolute_error: 0.1438 - mean_squared_error: 0.0427 - val_loss: 0.1536 - val_mean_absolute_error: 0.1536 - val_mean_squared_error: 0.0458
Epoch 138/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1419 - mean_absolute_error: 0.1419 - mean_squared_error: 0.0426
Epoch 00138: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 106us/sample - loss: 0.1419 - mean_absolute_error: 0.1422 - mean_squared_error: 0.0426 - val_loss: 0.1435 - val_mean_absolute_error: 0.1435 - val_mean_squared_error: 0.0443
Epoch 139/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1454 - mean_absolute_error: 0.1454 - mean_squared_error: 0.0440
Epoch 00139: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 106us/sample - loss: 0.1450 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0437 - val_loss: 0.1422 - val_mean_absolute_error: 0.1422 - val_mean_squared_error: 0.0439
Epoch 140/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1453 - mean_absolute_error: 0.1453 - mean_squared_error: 0.0436
Epoch 00140: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 106us/sample - loss: 0.1454 - mean_absolute_error: 0.1453 - mean_squared_error: 0.0435 - val_loss: 0.1450 - val_mean_absolute_error: 0.1450 - val_mean_squared_error: 0.0435
Epoch 141/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1436 - mean_absolute_error: 0.1436 - mean_squared_error: 0.0425
Epoch 00141: val_loss did not improve from 0.13992
10471/10471 [=====] - 1s 106us/sample - loss: 0.1434 - mean_absolute_error: 0.1437 - mean_squared_error: 0.0427 - val_loss: 0.1424 - val_mean_absolute_error: 0.1424 - val_mean_squared_error: 0.0430
Epoch 142/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1410 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0425
Epoch 00142: val_loss improved from 0.13992 to 0.13891, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 108us/sample - loss: 0.1408 - mean_absolute_error: 0.1410 - mean_squared_error: 0.0423 - val_loss: 0.1389 - val_mean_absolute_error: 0.1389 - val_mean_squared_error: 0.0418
Epoch 143/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1430 - mean_absolute_error: 0.1430 - mean_squared_error: 0.0428
Epoch 00143: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 106us/sample - loss: 0.1429 - mean_absolute_error: 0.1431 - mean_squared_error: 0.0429 - val_loss: 0.1389 - val_mean_absolute_error: 0.1390 - val_mean_squared_error: 0.0416
Epoch 144/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1423 - mean_absolute_error: 0.1423 - mean_squared_error: 0.0423
Epoch 00144: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 106us/sample - loss: 0.1417 - mean_absolute_error: 0.1417 - mean_squared_error: 0.0420 - val_loss: 0.1546 - val_mean_absolute_error: 0.1546 - val_mean_squared_error: 0.0492
Epoch 145/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1481 - mean_absolute_error: 0.1481 - mean_squared_error: 0.0445
Epoch 00145: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 112us/sample - loss: 0.1480 - mean_absolute_error: 0.1480 - mean_squared_error: 0.0445
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olute_error: 0.1481 - mean_squared_error: 0.0445 - val_loss: 0.1443 - val_mean_absolute_
error: 0.1443 - val_mean_squared_error: 0.0440
Epoch 146/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1389 - mean_absolute_er
ror: 0.1389 - mean_squared_error: 0.0412
Epoch 00146: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 108us/sample - loss: 0.1389 - mean_abs
olute_error: 0.1390 - mean_squared_error: 0.0412 - val_loss: 0.1684 - val_mean_absolute_
error: 0.1684 - val_mean_squared_error: 0.0508
Epoch 147/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1400 - mean_absolute_er
ror: 0.1400 - mean_squared_error: 0.0409
Epoch 00147: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 112us/sample - loss: 0.1405 - mean_abs
olute_error: 0.1409 - mean_squared_error: 0.0415 - val_loss: 0.1447 - val_mean_absolute_
error: 0.1448 - val_mean_squared_error: 0.0431
Epoch 148/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1405 - mean_absolute_er
ror: 0.1405 - mean_squared_error: 0.0415
Epoch 00148: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 108us/sample - loss: 0.1407 - mean_abs
olute_error: 0.1414 - mean_squared_error: 0.0420 - val_loss: 0.1482 - val_mean_absolute_
error: 0.1482 - val_mean_squared_error: 0.0470
Epoch 149/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1420 - mean_absolute_er
ror: 0.1420 - mean_squared_error: 0.0423
Epoch 00149: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 105us/sample - loss: 0.1422 - mean_abs
olute_error: 0.1424 - mean_squared_error: 0.0425 - val_loss: 0.1398 - val_mean_absolute_
error: 0.1399 - val_mean_squared_error: 0.0420
Epoch 150/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1435 - mean_absolute_er
ror: 0.1435 - mean_squared_error: 0.0434
Epoch 00150: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 107us/sample - loss: 0.1435 - mean_abs
olute_error: 0.1437 - mean_squared_error: 0.0436 - val_loss: 0.1562 - val_mean_absolute_
error: 0.1563 - val_mean_squared_error: 0.0475
Epoch 151/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1410 - mean_absolute_er
ror: 0.1410 - mean_squared_error: 0.0421
Epoch 00151: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 110us/sample - loss: 0.1410 - mean_abs
olute_error: 0.1412 - mean_squared_error: 0.0422 - val_loss: 0.1414 - val_mean_absolute_
error: 0.1415 - val_mean_squared_error: 0.0420
Epoch 152/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1396 - mean_absolute_er
ror: 0.1396 - mean_squared_error: 0.0413
Epoch 00152: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 107us/sample - loss: 0.1397 - mean_abs
olute_error: 0.1397 - mean_squared_error: 0.0413 - val_loss: 0.1689 - val_mean_absolute_
error: 0.1690 - val_mean_squared_error: 0.0521
Epoch 153/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1416 - mean_absolute_er
ror: 0.1416 - mean_squared_error: 0.0424
Epoch 00153: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 107us/sample - loss: 0.1417 - mean_abs
olute_error: 0.1419 - mean_squared_error: 0.0425 - val_loss: 0.1482 - val_mean_absolute_
error: 0.1482 - val_mean_squared_error: 0.0459
Epoch 154/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1406 - mean_absolute_er
ror: 0.1406 - mean_squared_error: 0.0418
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Epoch 00154: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 105us/sample - loss: 0.1408 - mean_absolute_error: 0.1407 - mean_squared_error: 0.0418 - val_loss: 0.1428 - val_mean_absolute_error: 0.1428 - val_mean_squared_error: 0.0441
Epoch 155/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1420 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0424
Epoch 00155: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 107us/sample - loss: 0.1423 - mean_absolute_error: 0.1425 - mean_squared_error: 0.0427 - val_loss: 0.1432 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0447
Epoch 156/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1375 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0405
Epoch 00156: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 105us/sample - loss: 0.1376 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0405 - val_loss: 0.1429 - val_mean_absolute_error: 0.1430 - val_mean_squared_error: 0.0446
Epoch 157/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1379 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0403
Epoch 00157: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 103us/sample - loss: 0.1384 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0410 - val_loss: 0.1424 - val_mean_absolute_error: 0.1425 - val_mean_squared_error: 0.0438
Epoch 158/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1406 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0418
Epoch 00158: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 104us/sample - loss: 0.1409 - mean_absolute_error: 0.1414 - mean_squared_error: 0.0425 - val_loss: 0.1425 - val_mean_absolute_error: 0.1425 - val_mean_squared_error: 0.0440
Epoch 159/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1384 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0408
Epoch 00159: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 109us/sample - loss: 0.1383 - mean_absolute_error: 0.1383 - mean_squared_error: 0.0408 - val_loss: 0.1526 - val_mean_absolute_error: 0.1526 - val_mean_squared_error: 0.0471
Epoch 160/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1390 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0416
Epoch 00160: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 108us/sample - loss: 0.1385 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0413 - val_loss: 0.1404 - val_mean_absolute_error: 0.1404 - val_mean_squared_error: 0.0429
Epoch 161/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1420 - mean_absolute_error: 0.1420 - mean_squared_error: 0.0425
Epoch 00161: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 108us/sample - loss: 0.1421 - mean_absolute_error: 0.1425 - mean_squared_error: 0.0428 - val_loss: 0.1455 - val_mean_absolute_error: 0.1455 - val_mean_squared_error: 0.0453
Epoch 162/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1400 - mean_absolute_error: 0.1400 - mean_squared_error: 0.0413
Epoch 00162: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 109us/sample - loss: 0.1407 - mean_absolute_error: 0.1406 - mean_squared_error: 0.0418 - val_loss: 0.1411 - val_mean_absolute_error: 0.1411 - val_mean_squared_error: 0.0419
Epoch 163/500
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10464/10471 [=====>.] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0418
Epoch 00163: val_loss did not improve from 0.13891
10471/10471 [=====] - 1s 110us/sample - loss: 0.1394 - mean_absolute_error: 0.1396 - mean_squared_error: 0.0418 - val_loss: 0.1418 - val_mean_absolute_error: 0.1418 - val_mean_squared_error: 0.0428
Epoch 164/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1414 - mean_absolute_error: 0.1414 - mean_squared_error: 0.0418
Epoch 00164: val_loss improved from 0.13891 to 0.13866, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 108us/sample - loss: 0.1415 - mean_absolute_error: 0.1415 - mean_squared_error: 0.0419 - val_loss: 0.1387 - val_mean_absolute_error: 0.1387 - val_mean_squared_error: 0.0414
Epoch 165/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1376 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0407
Epoch 00165: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 109us/sample - loss: 0.1378 - mean_absolute_error: 0.1383 - mean_squared_error: 0.0412 - val_loss: 0.1459 - val_mean_absolute_error: 0.1459 - val_mean_squared_error: 0.0447
Epoch 166/500
10400/10471 [=====>..] - ETA: 0s - loss: 0.1394 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0413
Epoch 00166: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 110us/sample - loss: 0.1392 - mean_absolute_error: 0.1392 - mean_squared_error: 0.0412 - val_loss: 0.1418 - val_mean_absolute_error: 0.1418 - val_mean_squared_error: 0.0436
Epoch 167/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1393 - mean_absolute_error: 0.1393 - mean_squared_error: 0.0419
Epoch 00167: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 107us/sample - loss: 0.1392 - mean_absolute_error: 0.1394 - mean_squared_error: 0.0416 - val_loss: 0.1410 - val_mean_absolute_error: 0.1410 - val_mean_squared_error: 0.0430
Epoch 168/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1376 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0405
Epoch 00168: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 109us/sample - loss: 0.1376 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0405 - val_loss: 0.1453 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0439
Epoch 169/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1360 - mean_absolute_error: 0.1360 - mean_squared_error: 0.0402
Epoch 00169: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 112us/sample - loss: 0.1362 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0403 - val_loss: 0.1416 - val_mean_absolute_error: 0.1416 - val_mean_squared_error: 0.0435
Epoch 170/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1391 - mean_absolute_error: 0.1391 - mean_squared_error: 0.0411
Epoch 00170: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 111us/sample - loss: 0.1392 - mean_absolute_error: 0.1398 - mean_squared_error: 0.0416 - val_loss: 0.1418 - val_mean_absolute_error: 0.1418 - val_mean_squared_error: 0.0442
Epoch 171/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1412 - mean_absolute_error: 0.1412 - mean_squared_error: 0.0424
Epoch 00171: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 108us/sample - loss: 0.1414 - mean_absolute_error: 0.1414 - mean_squared_error: 0.0424
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olute_error: 0.1416 - mean_squared_error: 0.0426 - val_loss: 0.1549 - val_mean_absolute_error: 0.1549 - val_mean_squared_error: 0.0500
Epoch 172/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0409
Epoch 00172: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 108us/sample - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0411 - val_loss: 0.1431 - val_mean_absolute_error: 0.1431 - val_mean_squared_error: 0.0445
Epoch 173/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1387 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0413
Epoch 00173: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 108us/sample - loss: 0.1383 - mean_absolute_error: 0.1385 - mean_squared_error: 0.0410 - val_loss: 0.1407 - val_mean_absolute_error: 0.1407 - val_mean_squared_error: 0.0424
Epoch 174/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0409
Epoch 00174: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 106us/sample - loss: 0.1381 - mean_absolute_error: 0.1382 - mean_squared_error: 0.0410 - val_loss: 0.1561 - val_mean_absolute_error: 0.1562 - val_mean_squared_error: 0.0487
Epoch 175/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1357 - mean_absolute_error: 0.1357 - mean_squared_error: 0.0401
Epoch 00175: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 105us/sample - loss: 0.1358 - mean_absolute_error: 0.1360 - mean_squared_error: 0.0402 - val_loss: 0.1476 - val_mean_absolute_error: 0.1476 - val_mean_squared_error: 0.0439
Epoch 176/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1378 - mean_absolute_error: 0.1378 - mean_squared_error: 0.0407
Epoch 00176: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 105us/sample - loss: 0.1379 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0407 - val_loss: 0.1411 - val_mean_absolute_error: 0.1410 - val_mean_squared_error: 0.0433
Epoch 177/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1371 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0408
Epoch 00177: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 107us/sample - loss: 0.1373 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0408 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0457
Epoch 178/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1369 - mean_absolute_error: 0.1369 - mean_squared_error: 0.0399
Epoch 00178: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 109us/sample - loss: 0.1369 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0399 - val_loss: 0.1433 - val_mean_absolute_error: 0.1433 - val_mean_squared_error: 0.0434
Epoch 179/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1380 - mean_absolute_error: 0.1380 - mean_squared_error: 0.0409
Epoch 00179: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 106us/sample - loss: 0.1376 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0406 - val_loss: 0.1413 - val_mean_absolute_error: 0.1414 - val_mean_squared_error: 0.0425
Epoch 180/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0401

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Epoch 00180: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 108us/sample - loss: 0.1369 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0401 - val_loss: 0.1534 - val_mean_absolute_error: 0.1534 - val_mean_squared_error: 0.0461
Epoch 181/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1365 - mean_absolute_error: 0.1365 - mean_squared_error: 0.0398
Epoch 00181: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 106us/sample - loss: 0.1367 - mean_absolute_error: 0.1368 - mean_squared_error: 0.0400 - val_loss: 0.1411 - val_mean_absolute_error: 0.1411 - val_mean_squared_error: 0.0434
Epoch 182/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1372 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0402
Epoch 00182: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 105us/sample - loss: 0.1372 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0404 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0451
Epoch 183/500
10336/10471 [=====>.] - ETA: 0s - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0402
Epoch 00183: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 105us/sample - loss: 0.1371 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0400 - val_loss: 0.1418 - val_mean_absolute_error: 0.1418 - val_mean_squared_error: 0.0439
Epoch 184/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1377 - mean_absolute_error: 0.1377 - mean_squared_error: 0.0405
Epoch 00184: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 108us/sample - loss: 0.1375 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0403 - val_loss: 0.1455 - val_mean_absolute_error: 0.1455 - val_mean_squared_error: 0.0458
Epoch 185/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0408
Epoch 00185: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 108us/sample - loss: 0.1375 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0407 - val_loss: 0.1533 - val_mean_absolute_error: 0.1533 - val_mean_squared_error: 0.0463
Epoch 186/500
10304/10471 [=====>..] - ETA: 0s - loss: 0.1350 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0395
Epoch 00186: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 106us/sample - loss: 0.1358 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0400 - val_loss: 0.1454 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0430
Epoch 187/500
10240/10471 [=====>..] - ETA: 0s - loss: 0.1381 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0405
Epoch 00187: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 106us/sample - loss: 0.1382 - mean_absolute_error: 0.1387 - mean_squared_error: 0.0410 - val_loss: 0.1496 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0447
Epoch 188/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1361 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0403
Epoch 00188: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 108us/sample - loss: 0.1362 - mean_absolute_error: 0.1365 - mean_squared_error: 0.0404 - val_loss: 0.1523 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0479
Epoch 189/500
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10176/10471 [=====>.] - ETA: 0s - loss: 0.1376 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0406
Epoch 00189: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 107us/sample - loss: 0.1379 - mean_absolute_error: 0.1379 - mean_squared_error: 0.0406 - val_loss: 0.1409 - val_mean_absolute_error: 0.1409 - val_mean_squared_error: 0.0435
Epoch 190/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1371 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0406
Epoch 00190: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 108us/sample - loss: 0.1371 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0407 - val_loss: 0.1407 - val_mean_absolute_error: 0.1407 - val_mean_squared_error: 0.0433
Epoch 191/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0402
Epoch 00191: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 107us/sample - loss: 0.1363 - mean_absolute_error: 0.1365 - mean_squared_error: 0.0400 - val_loss: 0.1454 - val_mean_absolute_error: 0.1454 - val_mean_squared_error: 0.0456
Epoch 192/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0410
Epoch 00192: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 105us/sample - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0409 - val_loss: 0.1399 - val_mean_absolute_error: 0.1400 - val_mean_squared_error: 0.0423
Epoch 193/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0406
Epoch 00193: val_loss did not improve from 0.13866
10471/10471 [=====] - 1s 106us/sample - loss: 0.1371 - mean_absolute_error: 0.1372 - mean_squared_error: 0.0407 - val_loss: 0.1388 - val_mean_absolute_error: 0.1387 - val_mean_squared_error: 0.0427
Epoch 194/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1375 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0408
Epoch 00194: val_loss improved from 0.13866 to 0.13789, saving model to best_tabular_model.hdf5
10471/10471 [=====] - 1s 110us/sample - loss: 0.1375 - mean_absolute_error: 0.1376 - mean_squared_error: 0.0407 - val_loss: 0.1379 - val_mean_absolute_error: 0.1379 - val_mean_squared_error: 0.0410
Epoch 195/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1378 - mean_absolute_error: 0.1378 - mean_squared_error: 0.0406
Epoch 00195: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 107us/sample - loss: 0.1379 - mean_absolute_error: 0.1378 - mean_squared_error: 0.0406 - val_loss: 0.1484 - val_mean_absolute_error: 0.1484 - val_mean_squared_error: 0.0453
Epoch 196/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1339 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0393
Epoch 00196: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1350 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0399 - val_loss: 0.1491 - val_mean_absolute_error: 0.1492 - val_mean_squared_error: 0.0450
Epoch 197/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1361 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0400
Epoch 00197: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 111us/sample - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0401
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olute_error: 0.1362 - mean_squared_error: 0.0403 - val_loss: 0.1424 - val_mean_absolute_error: 0.1424 - val_mean_squared_error: 0.0432
Epoch 198/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1358 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0401
Epoch 00198: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1360 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0403 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0438
Epoch 199/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1355 - mean_absolute_error: 0.1355 - mean_squared_error: 0.0398
Epoch 00199: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1360 - mean_absolute_error: 0.1360 - mean_squared_error: 0.0403 - val_loss: 0.1617 - val_mean_absolute_error: 0.1617 - val_mean_squared_error: 0.0489
Epoch 200/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1366 - mean_absolute_error: 0.1366 - mean_squared_error: 0.0409
Epoch 00200: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 108us/sample - loss: 0.1367 - mean_absolute_error: 0.1371 - mean_squared_error: 0.0410 - val_loss: 0.1440 - val_mean_absolute_error: 0.1439 - val_mean_squared_error: 0.0450
Epoch 201/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1381 - mean_absolute_error: 0.1381 - mean_squared_error: 0.0404
Epoch 00201: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 110us/sample - loss: 0.1381 - mean_absolute_error: 0.1384 - mean_squared_error: 0.0406 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0456
Epoch 202/500
10400/10471 [=====>.] - ETA: 0s - loss: 0.1361 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0401
Epoch 00202: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 105us/sample - loss: 0.1362 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0401 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0463
Epoch 203/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1341 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0394
Epoch 00203: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 108us/sample - loss: 0.1343 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0397 - val_loss: 0.1531 - val_mean_absolute_error: 0.1531 - val_mean_squared_error: 0.0448
Epoch 204/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1375 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0407
Epoch 00204: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 105us/sample - loss: 0.1376 - mean_absolute_error: 0.1378 - mean_squared_error: 0.0407 - val_loss: 0.1402 - val_mean_absolute_error: 0.1402 - val_mean_squared_error: 0.0422
Epoch 205/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1359 - mean_absolute_error: 0.1359 - mean_squared_error: 0.0397
Epoch 00205: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 107us/sample - loss: 0.1359 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0399 - val_loss: 0.1676 - val_mean_absolute_error: 0.1675 - val_mean_squared_error: 0.0567
Epoch 206/500
9952/10471 [=====>..] - ETA: 0s - loss: 0.1374 - mean_absolute_error: 0.1374 - mean_squared_error: 0.0408

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Epoch 00206: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1374 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0407 - val_loss: 0.1418 - val_mean_absolute_error: 0.1419 - val_mean_squared_error: 0.0424
Epoch 207/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1339 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0392
Epoch 00207: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1340 - mean_absolute_error: 0.1342 - mean_squared_error: 0.0391 - val_loss: 0.1394 - val_mean_absolute_error: 0.1394 - val_mean_squared_error: 0.0422
Epoch 208/500
10208/10471 [=====>.] - ETA: 0s - loss: 0.1333 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0391
Epoch 00208: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1336 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0394 - val_loss: 0.1490 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0455
Epoch 209/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1370 - mean_absolute_error: 0.1370 - mean_squared_error: 0.0402
Epoch 00209: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 108us/sample - loss: 0.1372 - mean_absolute_error: 0.1375 - mean_squared_error: 0.0408 - val_loss: 0.1432 - val_mean_absolute_error: 0.1432 - val_mean_squared_error: 0.0431
Epoch 210/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1352 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0391
Epoch 00210: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 112us/sample - loss: 0.1355 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0397 - val_loss: 0.1484 - val_mean_absolute_error: 0.1484 - val_mean_squared_error: 0.0446
Epoch 211/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1356 - mean_absolute_error: 0.1356 - mean_squared_error: 0.0395
Epoch 00211: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1357 - mean_absolute_error: 0.1357 - mean_squared_error: 0.0395 - val_loss: 0.1499 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0460
Epoch 212/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1352 - mean_absolute_error: 0.1352 - mean_squared_error: 0.0399
Epoch 00212: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 110us/sample - loss: 0.1354 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0401 - val_loss: 0.1435 - val_mean_absolute_error: 0.1435 - val_mean_squared_error: 0.0452
Epoch 213/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1354 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0399
Epoch 00213: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 108us/sample - loss: 0.1356 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0401 - val_loss: 0.1434 - val_mean_absolute_error: 0.1434 - val_mean_squared_error: 0.0433
Epoch 214/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1373 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0407
Epoch 00214: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 107us/sample - loss: 0.1370 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0405 - val_loss: 0.1495 - val_mean_absolute_error: 0.1495 - val_mean_squared_error: 0.0456
Epoch 215/500
```

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10176/10471 [=====>.] - ETA: 0s - loss: 0.1347 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0400
Epoch 00215: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0398 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0459
Epoch 216/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0401
Epoch 00216: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 108us/sample - loss: 0.1349 - mean_absolute_error: 0.1348 - mean_squared_error: 0.0398 - val_loss: 0.1457 - val_mean_absolute_error: 0.1457 - val_mean_squared_error: 0.0440
Epoch 217/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1366 - mean_absolute_error: 0.1366 - mean_squared_error: 0.0406
Epoch 00217: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 108us/sample - loss: 0.1362 - mean_absolute_error: 0.1361 - mean_squared_error: 0.0403 - val_loss: 0.1409 - val_mean_absolute_error: 0.1409 - val_mean_squared_error: 0.0434
Epoch 218/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0397
Epoch 00218: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 105us/sample - loss: 0.1344 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0396 - val_loss: 0.1471 - val_mean_absolute_error: 0.1471 - val_mean_squared_error: 0.0459
Epoch 219/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1333 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0390
Epoch 00219: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1339 - mean_absolute_error: 0.1344 - mean_squared_error: 0.0398 - val_loss: 0.1438 - val_mean_absolute_error: 0.1438 - val_mean_squared_error: 0.0436
Epoch 220/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1368 - mean_absolute_error: 0.1368 - mean_squared_error: 0.0399
Epoch 00220: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1367 - mean_absolute_error: 0.1373 - mean_squared_error: 0.0405 - val_loss: 0.1421 - val_mean_absolute_error: 0.1421 - val_mean_squared_error: 0.0430
Epoch 221/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1390 - mean_absolute_error: 0.1390 - mean_squared_error: 0.0408
Epoch 00221: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1391 - mean_absolute_error: 0.1395 - mean_squared_error: 0.0410 - val_loss: 0.1426 - val_mean_absolute_error: 0.1426 - val_mean_squared_error: 0.0429
Epoch 222/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1347 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0396
Epoch 00222: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1348 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0396 - val_loss: 0.1459 - val_mean_absolute_error: 0.1459 - val_mean_squared_error: 0.0459
Epoch 223/500
10144/10471 [=====>.] - ETA: 0s - loss: 0.1358 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0397
Epoch 00223: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1362 - mean_absolute_error: 0.1362 - mean_squared_error: 0.0399 - val_loss: 0.1421 - val_mean_absolute_error:
```

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error: 0.1422 - val_mean_squared_error: 0.0434
Epoch 224/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1351 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0398
Epoch 00224: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1351 - mean_absolute_error: 0.1351 - mean_squared_error: 0.0398 - val_loss: 0.1418 - val_mean_absolute_error: 0.1418 - val_mean_squared_error: 0.0429
Epoch 225/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1348 - mean_absolute_error: 0.1348 - mean_squared_error: 0.0399
Epoch 00225: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 112us/sample - loss: 0.1353 - mean_absolute_error: 0.1354 - mean_squared_error: 0.0402 - val_loss: 0.1459 - val_mean_absolute_error: 0.1459 - val_mean_squared_error: 0.0465
Epoch 226/500
10240/10471 [=====>.] - ETA: 0s - loss: 0.1328 - mean_absolute_error: 0.1328 - mean_squared_error: 0.0388
Epoch 00226: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 111us/sample - loss: 0.1326 - mean_absolute_error: 0.1327 - mean_squared_error: 0.0387 - val_loss: 0.1517 - val_mean_absolute_error: 0.1518 - val_mean_squared_error: 0.0469
Epoch 227/500
10016/10471 [=====>..] - ETA: 0s - loss: 0.1341 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0392
Epoch 00227: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1340 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0392 - val_loss: 0.1420 - val_mean_absolute_error: 0.1421 - val_mean_squared_error: 0.0435
Epoch 228/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0392
Epoch 00228: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1346 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0393 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0457
Epoch 229/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1347 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0393
Epoch 00229: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1348 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0395 - val_loss: 0.1400 - val_mean_absolute_error: 0.1400 - val_mean_squared_error: 0.0432
Epoch 230/500
10432/10471 [=====>.] - ETA: 0s - loss: 0.1339 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0397
Epoch 00230: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1339 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0396 - val_loss: 0.1397 - val_mean_absolute_error: 0.1397 - val_mean_squared_error: 0.0428
Epoch 231/500
10080/10471 [=====>..] - ETA: 0s - loss: 0.1343 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0394
Epoch 00231: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 108us/sample - loss: 0.1345 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0398 - val_loss: 0.1480 - val_mean_absolute_error: 0.1480 - val_mean_squared_error: 0.0460
Epoch 232/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1336 - mean_absolute_error: 0.1336 - mean_squared_error: 0.0392
Epoch 00232: val_loss did not improve from 0.13789
```

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10471/10471 [=====] - 1s 110us/sample - loss: 0.1338 - mean_absolute_error: 0.1339 - mean_squared_error: 0.0392 - val_loss: 0.1401 - val_mean_absolute_error: 0.1402 - val_mean_squared_error: 0.0434
Epoch 233/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1333 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0387
Epoch 00233: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 108us/sample - loss: 0.1333 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0387 - val_loss: 0.1434 - val_mean_absolute_error: 0.1434 - val_mean_squared_error: 0.0442
Epoch 234/500
10048/10471 [=====>..] - ETA: 0s - loss: 0.1344 - mean_absolute_error: 0.1344 - mean_squared_error: 0.0393
Epoch 00234: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1346 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0397 - val_loss: 0.1454 - val_mean_absolute_error: 0.1455 - val_mean_squared_error: 0.0452
Epoch 235/500
10112/10471 [=====>..] - ETA: 0s - loss: 0.1341 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0393
Epoch 00235: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 108us/sample - loss: 0.1347 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0403 - val_loss: 0.1471 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0459
Epoch 236/500
10304/10471 [=====>.] - ETA: 0s - loss: 0.1333 - mean_absolute_error: 0.1333 - mean_squared_error: 0.0394
Epoch 00236: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 105us/sample - loss: 0.1336 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0400 - val_loss: 0.1392 - val_mean_absolute_error: 0.1393 - val_mean_squared_error: 0.0431
Epoch 237/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0391
Epoch 00237: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 110us/sample - loss: 0.1348 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0393 - val_loss: 0.1452 - val_mean_absolute_error: 0.1452 - val_mean_squared_error: 0.0448
Epoch 238/500
10176/10471 [=====>.] - ETA: 0s - loss: 0.1349 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0395
Epoch 00238: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 108us/sample - loss: 0.1346 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0393 - val_loss: 0.1421 - val_mean_absolute_error: 0.1421 - val_mean_squared_error: 0.0442
Epoch 239/500
10272/10471 [=====>.] - ETA: 0s - loss: 0.1353 - mean_absolute_error: 0.1353 - mean_squared_error: 0.0396
Epoch 00239: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1350 - mean_absolute_error: 0.1349 - mean_squared_error: 0.0393 - val_loss: 0.1429 - val_mean_absolute_error: 0.1429 - val_mean_squared_error: 0.0444
Epoch 240/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0392
Epoch 00240: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 105us/sample - loss: 0.1346 - mean_absolute_error: 0.1346 - mean_squared_error: 0.0391 - val_loss: 0.1429 - val_mean_absolute_error: 0.1430 - val_mean_squared_error: 0.0447
Epoch 241/500
10368/10471 [=====>.] - ETA: 0s - loss: 0.1335 - mean_absolute_error:
```

```

ror: 0.1335 - mean_squared_error: 0.0393
Epoch 00241: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 105us/sample - loss: 0.1337 - mean_absolute_error: 0.1341 - mean_squared_error: 0.0397 - val_loss: 0.1460 - val_mean_absolute_error: 0.1460 - val_mean_squared_error: 0.0451
Epoch 242/500
10176/10471 [=====.>.] - ETA: 0s - loss: 0.1318 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0386
Epoch 00242: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1318 - mean_absolute_error: 0.1318 - mean_squared_error: 0.0386 - val_loss: 0.1420 - val_mean_absolute_error: 0.1420 - val_mean_squared_error: 0.0433
Epoch 243/500
10432/10471 [=====.>.] - ETA: 0s - loss: 0.1340 - mean_absolute_error: 0.1340 - mean_squared_error: 0.0394
Epoch 00243: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 109us/sample - loss: 0.1341 - mean_absolute_error: 0.1343 - mean_squared_error: 0.0394 - val_loss: 0.1492 - val_mean_absolute_error: 0.1492 - val_mean_squared_error: 0.0467
Epoch 244/500
10272/10471 [=====.>.] - ETA: 0s - loss: 0.1347 - mean_absolute_error: 0.1347 - mean_squared_error: 0.0398Restoring model weights from the end of the best epoch.

Epoch 00244: val_loss did not improve from 0.13789
10471/10471 [=====] - 1s 106us/sample - loss: 0.1347 - mean_absolute_error: 0.1350 - mean_squared_error: 0.0399 - val_loss: 0.1445 - val_mean_absolute_error: 0.1445 - val_mean_squared_error: 0.0456
Epoch 00244: early stopping

```

NLP Model

In [133...]

```

nlp_model, num_inputs = nlp_branch(num_tokens, embedding_matrix, max_words)

results, best_nlp_model = run_nn(nlp_model, tokenized_train, y_train, tokenized_val, y_

```

Outputting predictive model - NLP
Model: "model_37"

Layer (type)	Output Shape	Param #
<hr/>		
input_38 (InputLayer)	[(None, None)]	0
embedding (Embedding)	(None, None, 300)	4559100
bidirectional (Bidirectional)	(None, None, 300)	541200
bidirectional_1 (Bidirection)	(None, 300)	541200
dense_268 (Dense)	(None, 128)	38528
dense_269 (Dense)	(None, 1)	129
<hr/>		
Total params: 5,680,157		
Trainable params: 1,121,057		
Non-trainable params: 4,559,100		

None

[INFO] training model...

Train on 10471 samples, validate on 1309 samples

Epoch 1/500
10464/10471 [=====>.] - ETA: 0s - loss: 1.4414 - mean_absolute_error: 1.4414 - mean_squared_error: 11.5981
Epoch 00001: val_loss improved from inf to 0.38956, saving model to best_nlp_model.hdf5
10471/10471 [=====] - 31s 3ms/sample - loss: 1.4407 - mean_absolute_error: 1.4382 - mean_squared_error: 11.5632 - val_loss: 0.3896 - val_mean_absolute_error: 0.3895 - val_mean_squared_error: 0.2289
Epoch 2/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3970 - mean_absolute_error: 0.3970 - mean_squared_error: 0.2531
Epoch 00002: val_loss improved from 0.38956 to 0.32638, saving model to best_nlp_model.hdf5
10471/10471 [=====] - 26s 2ms/sample - loss: 0.3969 - mean_absolute_error: 0.3965 - mean_squared_error: 0.2526 - val_loss: 0.3264 - val_mean_absolute_error: 0.3265 - val_mean_squared_error: 0.1831
Epoch 3/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3872 - mean_absolute_error: 0.3872 - mean_squared_error: 0.2411
Epoch 00003: val_loss did not improve from 0.32638
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3873 - mean_absolute_error: 0.3876 - mean_squared_error: 0.2414 - val_loss: 0.3773 - val_mean_absolute_error: 0.3775 - val_mean_squared_error: 0.2339
Epoch 4/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3775 - mean_absolute_error: 0.3775 - mean_squared_error: 0.2309
Epoch 00004: val_loss did not improve from 0.32638
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3775 - mean_absolute_error: 0.3776 - mean_squared_error: 0.2309 - val_loss: 0.4189 - val_mean_absolute_error: 0.4187 - val_mean_squared_error: 0.2587
Epoch 5/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3892 - mean_absolute_error: 0.3892 - mean_squared_error: 0.2402
Epoch 00005: val_loss improved from 0.32638 to 0.32527, saving model to best_nlp_model.hdf5
10471/10471 [=====] - 26s 2ms/sample - loss: 0.3891 - mean_absolute_error: 0.3887 - mean_squared_error: 0.2397 - val_loss: 0.3253 - val_mean_absolute_error: 0.3252 - val_mean_squared_error: 0.1715
Epoch 6/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3443 - mean_absolute_error: 0.3443 - mean_squared_error: 0.1942
Epoch 00006: val_loss did not improve from 0.32527
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3443 - mean_absolute_error: 0.3443 - mean_squared_error: 0.1941 - val_loss: 0.4903 - val_mean_absolute_error: 0.4901 - val_mean_squared_error: 0.3352
Epoch 7/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3669 - mean_absolute_error: 0.3669 - mean_squared_error: 0.2155
Epoch 00007: val_loss did not improve from 0.32527
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3670 - mean_absolute_error: 0.3674 - mean_squared_error: 0.2157 - val_loss: 0.3632 - val_mean_absolute_error: 0.3634 - val_mean_squared_error: 0.2148
Epoch 8/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3530 - mean_absolute_error: 0.3530 - mean_squared_error: 0.2041
Epoch 00008: val_loss improved from 0.32527 to 0.32106, saving model to best_nlp_model.hdf5
10471/10471 [=====] - 26s 2ms/sample - loss: 0.3529 - mean_absolute_error: 0.3527 - mean_squared_error: 0.2038 - val_loss: 0.3211 - val_mean_absolute_error: 0.3209 - val_mean_squared_error: 0.1656
Epoch 9/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3275 - mean_absolute_error:

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ror: 0.3275 - mean_squared_error: 0.1795
Epoch 00009: val_loss did not improve from 0.32106
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3276 - mean_absolute_error: 0.3278 - mean_squared_error: 0.1798 - val_loss: 0.4736 - val_mean_absolute_error: 0.4739 - val_mean_squared_error: 0.3252
Epoch 10/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3455 - mean_absolute_error: 0.3455 - mean_squared_error: 0.1947
Epoch 00010: val_loss did not improve from 0.32106
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3456 - mean_absolute_error: 0.3461 - mean_squared_error: 0.1953 - val_loss: 0.4739 - val_mean_absolute_error: 0.4737 - val_mean_squared_error: 0.3165
Epoch 11/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3301 - mean_absolute_error: 0.3301 - mean_squared_error: 0.1788
Epoch 00011: val_loss improved from 0.32106 to 0.29524, saving model to best_nlp_model.hdf5
10471/10471 [=====] - 26s 2ms/sample - loss: 0.3301 - mean_absolute_error: 0.3302 - mean_squared_error: 0.1791 - val_loss: 0.2952 - val_mean_absolute_error: 0.2953 - val_mean_squared_error: 0.1454
Epoch 12/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3084 - mean_absolute_error: 0.3084 - mean_squared_error: 0.1595
Epoch 00012: val_loss did not improve from 0.29524
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3086 - mean_absolute_error: 0.3090 - mean_squared_error: 0.1602 - val_loss: 0.3489 - val_mean_absolute_error: 0.3487 - val_mean_squared_error: 0.1890
Epoch 13/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3218 - mean_absolute_error: 0.3218 - mean_squared_error: 0.1707
Epoch 00013: val_loss did not improve from 0.29524
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3219 - mean_absolute_error: 0.3222 - mean_squared_error: 0.1713 - val_loss: 0.3386 - val_mean_absolute_error: 0.3385 - val_mean_squared_error: 0.1802
Epoch 14/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3042 - mean_absolute_error: 0.3042 - mean_squared_error: 0.1562
Epoch 00014: val_loss did not improve from 0.29524
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3042 - mean_absolute_error: 0.3042 - mean_squared_error: 0.1562 - val_loss: 0.6064 - val_mean_absolute_error: 0.6068 - val_mean_squared_error: 0.4852
Epoch 15/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3428 - mean_absolute_error: 0.3428 - mean_squared_error: 0.1892
Epoch 00015: val_loss did not improve from 0.29524
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3428 - mean_absolute_error: 0.3428 - mean_squared_error: 0.1891 - val_loss: 0.3648 - val_mean_absolute_error: 0.3646 - val_mean_squared_error: 0.2037
Epoch 16/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3117 - mean_absolute_error: 0.3117 - mean_squared_error: 0.1607
Epoch 00016: val_loss did not improve from 0.29524
10471/10471 [=====] - 23s 2ms/sample - loss: 0.3117 - mean_absolute_error: 0.3115 - mean_squared_error: 0.1604 - val_loss: 0.3012 - val_mean_absolute_error: 0.3011 - val_mean_squared_error: 0.1500
Epoch 17/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3027 - mean_absolute_error: 0.3027 - mean_squared_error: 0.1545
Epoch 00017: val_loss improved from 0.29524 to 0.28955, saving model to best_nlp_model.hdf5
10471/10471 [=====] - 26s 2ms/sample - loss: 0.3027 - mean_absolute_error:
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lute_error: 0.3027 - mean_squared_error: 0.1546 - val_loss: 0.2895 - val_mean_absolute_error: 0.2896 - val_mean_squared_error: 0.1434

Epoch 18/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.2980 - mean_absolute_error: 0.2980 - mean_squared_error: 0.1507

Epoch 00018: val_loss did not improve from 0.28955

10471/10471 [=====] - 23s 2ms/sample - loss: 0.2980 - mean_absolute_error: 0.2978 - mean_squared_error: 0.1506 - val_loss: 0.2977 - val_mean_absolute_error: 0.2977 - val_mean_squared_error: 0.1486

Epoch 19/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.3007 - mean_absolute_error: 0.3007 - mean_squared_error: 0.1509

Epoch 00019: val_loss did not improve from 0.28955

10471/10471 [=====] - 23s 2ms/sample - loss: 0.3007 - mean_absolute_error: 0.3007 - mean_squared_error: 0.1508 - val_loss: 0.2976 - val_mean_absolute_error: 0.2976 - val_mean_squared_error: 0.1472

Epoch 20/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.2977 - mean_absolute_error: 0.2977 - mean_squared_error: 0.1490

Epoch 00020: val_loss did not improve from 0.28955

10471/10471 [=====] - 23s 2ms/sample - loss: 0.2977 - mean_absolute_error: 0.2978 - mean_squared_error: 0.1490 - val_loss: 0.3641 - val_mean_absolute_error: 0.3639 - val_mean_squared_error: 0.2040

Epoch 21/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.2943 - mean_absolute_error: 0.2943 - mean_squared_error: 0.1448

Epoch 00021: val_loss did not improve from 0.28955

10471/10471 [=====] - 23s 2ms/sample - loss: 0.2942 - mean_absolute_error: 0.2938 - mean_squared_error: 0.1445 - val_loss: 0.3299 - val_mean_absolute_error: 0.3301 - val_mean_squared_error: 0.1816

Epoch 22/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.2854 - mean_absolute_error: 0.2854 - mean_squared_error: 0.1379

Epoch 00022: val_loss did not improve from 0.28955

10471/10471 [=====] - 23s 2ms/sample - loss: 0.2854 - mean_absolute_error: 0.2853 - mean_squared_error: 0.1379 - val_loss: 0.4040 - val_mean_absolute_error: 0.4043 - val_mean_squared_error: 0.2472

Epoch 23/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.2740 - mean_absolute_error: 0.2740 - mean_squared_error: 0.1286

Epoch 00023: val_loss did not improve from 0.28955

10471/10471 [=====] - 23s 2ms/sample - loss: 0.2739 - mean_absolute_error: 0.2739 - mean_squared_error: 0.1287 - val_loss: 0.3358 - val_mean_absolute_error: 0.3357 - val_mean_squared_error: 0.1786

Epoch 24/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.2748 - mean_absolute_error: 0.2748 - mean_squared_error: 0.1301

Epoch 00024: val_loss did not improve from 0.28955

10471/10471 [=====] - 23s 2ms/sample - loss: 0.2750 - mean_absolute_error: 0.2757 - mean_squared_error: 0.1314 - val_loss: 0.3999 - val_mean_absolute_error: 0.4002 - val_mean_squared_error: 0.2454

Epoch 25/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.2800 - mean_absolute_error: 0.2800 - mean_squared_error: 0.1329

Epoch 00025: val_loss did not improve from 0.28955

10471/10471 [=====] - 23s 2ms/sample - loss: 0.2800 - mean_absolute_error: 0.2803 - mean_squared_error: 0.1332 - val_loss: 0.3533 - val_mean_absolute_error: 0.3535 - val_mean_squared_error: 0.2019

Epoch 26/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.2774 - mean_absolute_error: 0.2774 - mean_squared_error: 0.1318

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Epoch 00026: val_loss did not improve from 0.28955
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2773 - mean_absolute_error: 0.2770 - mean_squared_error: 0.1315 - val_loss: 0.3547 - val_mean_absolute_error: 0.3545 - val_mean_squared_error: 0.1946
Epoch 27/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2760 - mean_absolute_error: 0.2760 - mean_squared_error: 0.1318
Epoch 00027: val_loss improved from 0.28955 to 0.28622, saving model to best_nlp_model.hdf5
10471/10471 [=====] - 26s 2ms/sample - loss: 0.2760 - mean_absolute_error: 0.2761 - mean_squared_error: 0.1318 - val_loss: 0.2862 - val_mean_absolute_error: 0.2862 - val_mean_squared_error: 0.1389
Epoch 28/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2713 - mean_absolute_error: 0.2713 - mean_squared_error: 0.1280
Epoch 00028: val_loss did not improve from 0.28622
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2715 - mean_absolute_error: 0.2720 - mean_squared_error: 0.1290 - val_loss: 0.3043 - val_mean_absolute_error: 0.3045 - val_mean_squared_error: 0.1552
Epoch 29/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2767 - mean_absolute_error: 0.2767 - mean_squared_error: 0.1314
Epoch 00029: val_loss did not improve from 0.28622
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2767 - mean_absolute_error: 0.2766 - mean_squared_error: 0.1313 - val_loss: 0.2982 - val_mean_absolute_error: 0.2984 - val_mean_squared_error: 0.1506
Epoch 30/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2659 - mean_absolute_error: 0.2659 - mean_squared_error: 0.1227
Epoch 00030: val_loss did not improve from 0.28622
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2659 - mean_absolute_error: 0.2656 - mean_squared_error: 0.1224 - val_loss: 0.3742 - val_mean_absolute_error: 0.3745 - val_mean_squared_error: 0.2214
Epoch 31/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2726 - mean_absolute_error: 0.2726 - mean_squared_error: 0.1286
Epoch 00031: val_loss did not improve from 0.28622
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2726 - mean_absolute_error: 0.2725 - mean_squared_error: 0.1286 - val_loss: 0.3388 - val_mean_absolute_error: 0.3390 - val_mean_squared_error: 0.1858
Epoch 32/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2607 - mean_absolute_error: 0.2607 - mean_squared_error: 0.1189
Epoch 00032: val_loss did not improve from 0.28622
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2608 - mean_absolute_error: 0.2609 - mean_squared_error: 0.1191 - val_loss: 0.2888 - val_mean_absolute_error: 0.2890 - val_mean_squared_error: 0.1433
Epoch 33/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2624 - mean_absolute_error: 0.2624 - mean_squared_error: 0.1199
Epoch 00033: val_loss improved from 0.28622 to 0.27872, saving model to best_nlp_model.hdf5
10471/10471 [=====] - 26s 2ms/sample - loss: 0.2625 - mean_absolute_error: 0.2625 - mean_squared_error: 0.1199 - val_loss: 0.2787 - val_mean_absolute_error: 0.2788 - val_mean_squared_error: 0.1347
Epoch 34/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2618 - mean_absolute_error: 0.2618 - mean_squared_error: 0.1201
Epoch 00034: val_loss did not improve from 0.27872
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2618 - mean_absolute_error: 0.2618 - mean_squared_error: 0.1200 - val_loss: 0.3004 - val_mean_absolute_error: 0.3004 - val_mean_squared_error: 0.1552
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rror: 0.3006 - val_mean_squared_error: 0.1542
Epoch 35/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2610 - mean_absolute_error: 0.2610 - mean_squared_error: 0.1186
Epoch 00035: val_loss did not improve from 0.27872
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2610 - mean_absolute_error: 0.2611 - mean_squared_error: 0.1186 - val_loss: 0.2866 - val_mean_absolute_error: 0.2867 - val_mean_squared_error: 0.1406
Epoch 36/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2516 - mean_absolute_error: 0.2516 - mean_squared_error: 0.1124
Epoch 00036: val_loss did not improve from 0.27872
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2515 - mean_absolute_error: 0.2511 - mean_squared_error: 0.1121 - val_loss: 0.2822 - val_mean_absolute_error: 0.2823 - val_mean_squared_error: 0.1388
Epoch 37/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2559 - mean_absolute_error: 0.2559 - mean_squared_error: 0.1156
Epoch 00037: val_loss improved from 0.27872 to 0.27715, saving model to best_nlp_model.hdf5
10471/10471 [=====] - 26s 3ms/sample - loss: 0.2560 - mean_absolute_error: 0.2564 - mean_squared_error: 0.1164 - val_loss: 0.2771 - val_mean_absolute_error: 0.2772 - val_mean_squared_error: 0.1336
Epoch 38/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2533 - mean_absolute_error: 0.2533 - mean_squared_error: 0.1139
Epoch 00038: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2534 - mean_absolute_error: 0.2539 - mean_squared_error: 0.1147 - val_loss: 0.3720 - val_mean_absolute_error: 0.3718 - val_mean_squared_error: 0.2105
Epoch 39/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2529 - mean_absolute_error: 0.2529 - mean_squared_error: 0.1138
Epoch 00039: val_loss did not improve from 0.27715
10471/10471 [=====] - 24s 2ms/sample - loss: 0.2531 - mean_absolute_error: 0.2536 - mean_squared_error: 0.1149 - val_loss: 0.2822 - val_mean_absolute_error: 0.2822 - val_mean_squared_error: 0.1386
Epoch 40/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2462 - mean_absolute_error: 0.2462 - mean_squared_error: 0.1096
Epoch 00040: val_loss did not improve from 0.27715
10471/10471 [=====] - 25s 2ms/sample - loss: 0.2462 - mean_absolute_error: 0.2460 - mean_squared_error: 0.1094 - val_loss: 0.2962 - val_mean_absolute_error: 0.2962 - val_mean_squared_error: 0.1496
Epoch 41/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2512 - mean_absolute_error: 0.2512 - mean_squared_error: 0.1125
Epoch 00041: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2512 - mean_absolute_error: 0.2510 - mean_squared_error: 0.1124 - val_loss: 0.3016 - val_mean_absolute_error: 0.3017 - val_mean_squared_error: 0.1575
Epoch 42/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2407 - mean_absolute_error: 0.2407 - mean_squared_error: 0.1051
Epoch 00042: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2407 - mean_absolute_error: 0.2408 - mean_squared_error: 0.1052 - val_loss: 0.3074 - val_mean_absolute_error: 0.3074 - val_mean_squared_error: 0.1544
Epoch 43/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2409 - mean_absolute_error: 0.2409 - mean_squared_error: 0.1051

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Epoch 00043: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2408 - mean_absolute_error: 0.2405 - mean_squared_error: 0.1049 - val_loss: 0.2917 - val_mean_absolute_error: 0.2918 - val_mean_squared_error: 0.1458
Epoch 44/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.2391 - mean_absolute_error: 0.2391 - mean_squared_error: 0.1041
Epoch 00044: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2391 - mean_absolute_error: 0.2390 - mean_squared_error: 0.1040 - val_loss: 0.3089 - val_mean_absolute_error: 0.3088 - val_mean_squared_error: 0.1572
Epoch 45/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.2518 - mean_absolute_error: 0.2518 - mean_squared_error: 0.1115
Epoch 00045: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2518 - mean_absolute_error: 0.2516 - mean_squared_error: 0.1113 - val_loss: 0.3093 - val_mean_absolute_error: 0.3095 - val_mean_squared_error: 0.1622
Epoch 46/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.2414 - mean_absolute_error: 0.2414 - mean_squared_error: 0.1048
Epoch 00046: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2413 - mean_absolute_error: 0.2413 - mean_squared_error: 0.1047 - val_loss: 0.2825 - val_mean_absolute_error: 0.2826 - val_mean_squared_error: 0.1379
Epoch 47/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.2309 - mean_absolute_error: 0.2309 - mean_squared_error: 0.0990
Epoch 00047: val_loss did not improve from 0.27715
10471/10471 [=====] - 24s 2ms/sample - loss: 0.2309 - mean_absolute_error: 0.2312 - mean_squared_error: 0.0994 - val_loss: 0.3029 - val_mean_absolute_error: 0.3030 - val_mean_squared_error: 0.1577
Epoch 48/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.2332 - mean_absolute_error: 0.2332 - mean_squared_error: 0.1009
Epoch 00048: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2333 - mean_absolute_error: 0.2334 - mean_squared_error: 0.1010 - val_loss: 0.3333 - val_mean_absolute_error: 0.3335 - val_mean_squared_error: 0.1847
Epoch 49/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.2336 - mean_absolute_error: 0.2336 - mean_squared_error: 0.1000
Epoch 00049: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2335 - mean_absolute_error: 0.2334 - mean_squared_error: 0.0998 - val_loss: 0.3743 - val_mean_absolute_error: 0.3745 - val_mean_squared_error: 0.2201
Epoch 50/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.2289 - mean_absolute_error: 0.2289 - mean_squared_error: 0.0976
Epoch 00050: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2290 - mean_absolute_error: 0.2292 - mean_squared_error: 0.0978 - val_loss: 0.3331 - val_mean_absolute_error: 0.3331 - val_mean_squared_error: 0.1769
Epoch 51/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.2279 - mean_absolute_error: 0.2279 - mean_squared_error: 0.0968
Epoch 00051: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2279 - mean_absolute_error: 0.2279 - mean_squared_error: 0.0968 - val_loss: 0.2888 - val_mean_absolute_error: 0.2889 - val_mean_squared_error: 0.1431
Epoch 52/500
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10464/10471 [=====>.] - ETA: 0s - loss: 0.2271 - mean_absolute_error: 0.2271 - mean_squared_error: 0.0966
Epoch 00052: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2271 - mean_absolute_error: 0.2274 - mean_squared_error: 0.0968 - val_loss: 0.2842 - val_mean_absolute_error: 0.2843 - val_mean_squared_error: 0.1395
Epoch 53/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2225 - mean_absolute_error: 0.2225 - mean_squared_error: 0.0935
Epoch 00053: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2225 - mean_absolute_error: 0.2225 - mean_squared_error: 0.0935 - val_loss: 0.2919 - val_mean_absolute_error: 0.2919 - val_mean_squared_error: 0.1453
Epoch 54/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2257 - mean_absolute_error: 0.2257 - mean_squared_error: 0.0955
Epoch 00054: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2257 - mean_absolute_error: 0.2255 - mean_squared_error: 0.0953 - val_loss: 0.3257 - val_mean_absolute_error: 0.3257 - val_mean_squared_error: 0.1720
Epoch 55/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2256 - mean_absolute_error: 0.2256 - mean_squared_error: 0.0946
Epoch 00055: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2256 - mean_absolute_error: 0.2255 - mean_squared_error: 0.0946 - val_loss: 0.3092 - val_mean_absolute_error: 0.3093 - val_mean_squared_error: 0.1598
Epoch 56/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2264 - mean_absolute_error: 0.2264 - mean_squared_error: 0.0955
Epoch 00056: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2263 - mean_absolute_error: 0.2260 - mean_squared_error: 0.0952 - val_loss: 0.2946 - val_mean_absolute_error: 0.2946 - val_mean_squared_error: 0.1460
Epoch 57/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2194 - mean_absolute_error: 0.2194 - mean_squared_error: 0.0909
Epoch 00057: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2194 - mean_absolute_error: 0.2192 - mean_squared_error: 0.0907 - val_loss: 0.2927 - val_mean_absolute_error: 0.2927 - val_mean_squared_error: 0.1453
Epoch 58/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2166 - mean_absolute_error: 0.2166 - mean_squared_error: 0.0897
Epoch 00058: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2166 - mean_absolute_error: 0.2168 - mean_squared_error: 0.0900 - val_loss: 0.3097 - val_mean_absolute_error: 0.3099 - val_mean_squared_error: 0.1634
Epoch 59/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2141 - mean_absolute_error: 0.2141 - mean_squared_error: 0.0885
Epoch 00059: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2140 - mean_absolute_error: 0.2138 - mean_squared_error: 0.0884 - val_loss: 0.2993 - val_mean_absolute_error: 0.2994 - val_mean_squared_error: 0.1541
Epoch 60/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2230 - mean_absolute_error: 0.2230 - mean_squared_error: 0.0927
Epoch 00060: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2231 - mean_absolute_error: 0.2232 - mean_squared_error: 0.0929 - val_loss: 0.2899 - val_mean_absolute_error: 0.2899 - val_mean_squared_error: 0.1543
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rror: 0.2900 - val_mean_squared_error: 0.1447
Epoch 61/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2124 - mean_absolute_e
rror: 0.2124 - mean_squared_error: 0.0872
Epoch 00061: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2124 - mean_abso
lute_error: 0.2122 - mean_squared_error: 0.0870 - val_loss: 0.2938 - val_mean_absolute_e
rror: 0.2938 - val_mean_squared_error: 0.1474
Epoch 62/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2154 - mean_absolute_e
rror: 0.2154 - mean_squared_error: 0.0883Restoring model weights from the end of the best
epoch.

Epoch 00062: val_loss did not improve from 0.27715
10471/10471 [=====] - 23s 2ms/sample - loss: 0.2154 - mean_abso
lute_error: 0.2153 - mean_squared_error: 0.0882 - val_loss: 0.2922 - val_mean_absolute_e
rror: 0.2922 - val_mean_squared_error: 0.1447
Epoch 00062: early stopping

```

Inception Image Model

In [141...]

```

feature_model = InceptionV3(include_top=False, input_shape=(299, 299, 3), weights='imag
for layer in feature_model.layers:
    layer.trainable=False

feature_model.summary()

img_input = Input(shape=(299, 299, 3))

x = feature_model(img_input, training=False)
x = GlobalAveragePooling2D(name="avg_pool")(x)
x = BatchNormalization()(x)
output_cnn = Dense(64, activation='relu', kernel_initializer='he_normal')(x)

last_layer = Dense(1, activation='linear')(output_cnn)

best_inc_aug_model = Model(inputs=img_input, outputs=last_layer)

print(best_inc_aug_model.summary())

initial_learning_rate = 0.1
lr_schedule = ExponentialDecay(
    initial_learning_rate,
    decay_steps=100000,
    decay_rate=0.96,
    staircase=True)

best_inc_aug_model.compile(optimizer=Adam(learning_rate=lr_schedule, epsilon=1), loss="

stop = EarlyStopping(monitor="val_loss", patience=15, restore_best_weights=True, mode='
best = ModelCheckpoint(filepath='best_inception_model.hdf5', save_best_only=True, monit

results = best_inc_aug_model.fit(
    image_train_generator,
    epochs=500,
    validation_data=image_val_generator,
    callbacks=[stop, best],
    )

for layer in feature_model.layers:

```

```

layer.trainable=True

best_inc_aug_model.compile(optimizer=Adam(learning_rate=.00001), loss="mean_absolute_error"
stop = EarlyStopping(monitor="val_loss", patience=25, restore_best_weights=True, mode='min')
results = best_inc_aug_model.fit(
    image_train_generator,
    epochs=500,
    validation_data=image_val_generator,
    callbacks=[stop, best],
)

```

Model: "inception_v3"

Layer (type)	Output Shape	Param #	Connected to
input_39 (InputLayer)	[(None, 299, 299, 3) 0		
conv2d (Conv2D)	(None, 149, 149, 32) 864		input_39[0][0]
batch_normalization_58 (BatchNormalizer)	(None, 149, 149, 32) 96		conv2d[0][0]
activation (Activation)	(None, 149, 149, 32) 0		batch_normalization_58[0][0]
conv2d_1 (Conv2D)	(None, 147, 147, 32) 9216		activation[0][0]
batch_normalization_59 (BatchNormalizer)	(None, 147, 147, 32) 96		conv2d_1[0][0]
activation_1 (Activation)	(None, 147, 147, 32) 0		batch_normalization_59[0][0]
conv2d_2 (Conv2D)	(None, 147, 147, 64) 18432		activation_1[0][0]
batch_normalization_60 (BatchNormalizer)	(None, 147, 147, 64) 192		conv2d_2[0][0]
activation_2 (Activation)	(None, 147, 147, 64) 0		batch_normalization_60[0][0]
max_pooling2d (MaxPooling2D)	(None, 73, 73, 64) 0		activation_2[0][0]
conv2d_3 (Conv2D)	(None, 73, 73, 80) 5120		max_pooling2d[0][0]
batch_normalization_61 (BatchNormalizer)	(None, 73, 73, 80) 240		conv2d_3[0][0]
activation_3 (Activation)	(None, 73, 73, 80) 0		batch_normalization_61[0][0]

[0][0]

conv2d_4 (Conv2D)	(None, 71, 71, 192)	138240	activation_3[0][0]
batch_normalization_62 (BatchNo	(None, 71, 71, 192)	576	conv2d_4[0][0]
activation_4 (Activation)	(None, 71, 71, 192)	0	batch_normalization_62 [0][0]
max_pooling2d_1 (MaxPooling2D)	(None, 35, 35, 192)	0	activation_4[0][0]
conv2d_8 (Conv2D)	(None, 35, 35, 64)	12288	max_pooling2d_1[0][0]
batch_normalization_66 (BatchNo	(None, 35, 35, 64)	192	conv2d_8[0][0]
activation_8 (Activation)	(None, 35, 35, 64)	0	batch_normalization_66 [0][0]
conv2d_6 (Conv2D)	(None, 35, 35, 48)	9216	max_pooling2d_1[0][0]
conv2d_9 (Conv2D)	(None, 35, 35, 96)	55296	activation_8[0][0]
batch_normalization_64 (BatchNo	(None, 35, 35, 48)	144	conv2d_6[0][0]
batch_normalization_67 (BatchNo	(None, 35, 35, 96)	288	conv2d_9[0][0]
activation_6 (Activation)	(None, 35, 35, 48)	0	batch_normalization_64 [0][0]
activation_9 (Activation)	(None, 35, 35, 96)	0	batch_normalization_67 [0][0]
average_pooling2d (AveragePooli	(None, 35, 35, 192)	0	max_pooling2d_1[0][0]
conv2d_5 (Conv2D)	(None, 35, 35, 64)	12288	max_pooling2d_1[0][0]
conv2d_7 (Conv2D)	(None, 35, 35, 64)	76800	activation_6[0][0]
conv2d_10 (Conv2D)	(None, 35, 35, 96)	82944	activation_9[0][0]
conv2d_11 (Conv2D)	(None, 35, 35, 32)	6144	average_pooling2d[0][0]

batch_normalization_63 (BatchNo (None, 35, 35, 64)	192	conv2d_5[0][0]
batch_normalization_65 (BatchNo (None, 35, 35, 64)	192	conv2d_7[0][0]
batch_normalization_68 (BatchNo (None, 35, 35, 96)	288	conv2d_10[0][0]
batch_normalization_69 (BatchNo (None, 35, 35, 32)	96	conv2d_11[0][0]
activation_5 (Activation) (None, 35, 35, 64)	0	batch_normalization_63[0][0]
activation_7 (Activation) (None, 35, 35, 64)	0	batch_normalization_65[0][0]
activation_10 (Activation) (None, 35, 35, 96)	0	batch_normalization_68[0][0]
activation_11 (Activation) (None, 35, 35, 32)	0	batch_normalization_69[0][0]
mixed0 (Concatenate) (None, 35, 35, 256)	0	activation_5[0][0] activation_7[0][0] activation_10[0][0] activation_11[0][0]
conv2d_15 (Conv2D) (None, 35, 35, 64)	16384	mixed0[0][0]
batch_normalization_73 (BatchNo (None, 35, 35, 64)	192	conv2d_15[0][0]
activation_15 (Activation) (None, 35, 35, 64)	0	batch_normalization_73[0][0]
conv2d_13 (Conv2D) (None, 35, 35, 48)	12288	mixed0[0][0]
conv2d_16 (Conv2D) (None, 35, 35, 96)	55296	activation_15[0][0]
batch_normalization_71 (BatchNo (None, 35, 35, 48)	144	conv2d_13[0][0]
batch_normalization_74 (BatchNo (None, 35, 35, 96)	288	conv2d_16[0][0]
activation_13 (Activation) (None, 35, 35, 48)	0	batch_normalization_71[0][0]
activation_16 (Activation) (None, 35, 35, 96)	0	batch_normalization_74[0][0]

[0][0]

average_pooling2d_1 (AveragePooling2D)	(None, 35, 35, 256)	0	mixed0[0][0]
conv2d_12 (Conv2D)	(None, 35, 35, 64)	16384	mixed0[0][0]
conv2d_14 (Conv2D)	(None, 35, 35, 64)	76800	activation_13[0][0]
conv2d_17 (Conv2D)	(None, 35, 35, 96)	82944	activation_16[0][0]
conv2d_18 (Conv2D)	(None, 35, 35, 64)	16384	average_pooling2d_1[0]
batch_normalization_70 (BatchNormalization)	(None, 35, 35, 64)	192	conv2d_12[0][0]
batch_normalization_72 (BatchNormalization)	(None, 35, 35, 64)	192	conv2d_14[0][0]
batch_normalization_75 (BatchNormalization)	(None, 35, 35, 96)	288	conv2d_17[0][0]
batch_normalization_76 (BatchNormalization)	(None, 35, 35, 64)	192	conv2d_18[0][0]
activation_12 (Activation)	(None, 35, 35, 64)	0	batch_normalization_70[0][0]
activation_14 (Activation)	(None, 35, 35, 64)	0	batch_normalization_72[0][0]
activation_17 (Activation)	(None, 35, 35, 96)	0	batch_normalization_75[0][0]
activation_18 (Activation)	(None, 35, 35, 64)	0	batch_normalization_76[0][0]
mixed1 (Concatenate)	(None, 35, 35, 288)	0	activation_12[0][0] activation_14[0][0] activation_17[0][0] activation_18[0][0]
conv2d_22 (Conv2D)	(None, 35, 35, 64)	18432	mixed1[0][0]
batch_normalization_80 (BatchNormalization)	(None, 35, 35, 64)	192	conv2d_22[0][0]
activation_22 (Activation)	(None, 35, 35, 64)	0	batch_normalization_80[0][0]

conv2d_20 (Conv2D)	(None, 35, 35, 48)	13824	mixed1[0][0]
conv2d_23 (Conv2D)	(None, 35, 35, 96)	55296	activation_22[0][0]
batch_normalization_78 (BatchNo	(None, 35, 35, 48)	144	conv2d_20[0][0]
batch_normalization_81 (BatchNo	(None, 35, 35, 96)	288	conv2d_23[0][0]
activation_20 (Activation)	(None, 35, 35, 48)	0	batch_normalization_78 [0][0]
activation_23 (Activation)	(None, 35, 35, 96)	0	batch_normalization_81 [0][0]
average_pooling2d_2 (AveragePoo	(None, 35, 35, 288)	0	mixed1[0][0]
conv2d_19 (Conv2D)	(None, 35, 35, 64)	18432	mixed1[0][0]
conv2d_21 (Conv2D)	(None, 35, 35, 64)	76800	activation_20[0][0]
conv2d_24 (Conv2D)	(None, 35, 35, 96)	82944	activation_23[0][0]
conv2d_25 (Conv2D)	(None, 35, 35, 64)	18432	average_pooling2d_2[0] [0]
batch_normalization_77 (BatchNo	(None, 35, 35, 64)	192	conv2d_19[0][0]
batch_normalization_79 (BatchNo	(None, 35, 35, 64)	192	conv2d_21[0][0]
batch_normalization_82 (BatchNo	(None, 35, 35, 96)	288	conv2d_24[0][0]
batch_normalization_83 (BatchNo	(None, 35, 35, 64)	192	conv2d_25[0][0]
activation_19 (Activation)	(None, 35, 35, 64)	0	batch_normalization_77 [0][0]
activation_21 (Activation)	(None, 35, 35, 64)	0	batch_normalization_79 [0][0]
activation_24 (Activation)	(None, 35, 35, 96)	0	batch_normalization_82 [0][0]

activation_25 (Activation) [0][0]	(None, 35, 35, 64) 0	batch_normalization_83
mixed2 (Concatenate)	(None, 35, 35, 288) 0	activation_19[0][0] activation_21[0][0] activation_24[0][0] activation_25[0][0]
conv2d_27 (Conv2D)	(None, 35, 35, 64) 18432	mixed2[0][0]
batch_normalization_85 (BatchNo [0][0])	(None, 35, 35, 64) 192	conv2d_27[0][0]
activation_27 (Activation) [0][0]	(None, 35, 35, 64) 0	batch_normalization_85
conv2d_28 (Conv2D)	(None, 35, 35, 96) 55296	activation_27[0][0]
batch_normalization_86 (BatchNo [0][0])	(None, 35, 35, 96) 288	conv2d_28[0][0]
activation_28 (Activation) [0][0]	(None, 35, 35, 96) 0	batch_normalization_86
conv2d_26 (Conv2D)	(None, 17, 17, 384) 995328	mixed2[0][0]
conv2d_29 (Conv2D)	(None, 17, 17, 96) 82944	activation_28[0][0]
batch_normalization_84 (BatchNo [0][0])	(None, 17, 17, 384) 1152	conv2d_26[0][0]
batch_normalization_87 (BatchNo [0][0])	(None, 17, 17, 96) 288	conv2d_29[0][0]
activation_26 (Activation) [0][0]	(None, 17, 17, 384) 0	batch_normalization_84
activation_29 (Activation) [0][0]	(None, 17, 17, 96) 0	batch_normalization_87
max_pooling2d_2 (MaxPooling2D)	(None, 17, 17, 288) 0	mixed2[0][0]
mixed3 (Concatenate)	(None, 17, 17, 768) 0	activation_26[0][0] activation_29[0][0] max_pooling2d_2[0][0]
conv2d_34 (Conv2D)	(None, 17, 17, 128) 98304	mixed3[0][0]

batch_normalization_92 (BatchNo (None, 17, 17, 128) 384		conv2d_34[0][0]
activation_34 (Activation) (None, 17, 17, 128) 0		batch_normalization_92[0][0]
conv2d_35 (Conv2D) (None, 17, 17, 128) 114688		activation_34[0][0]
batch_normalization_93 (BatchNo (None, 17, 17, 128) 384		conv2d_35[0][0]
activation_35 (Activation) (None, 17, 17, 128) 0		batch_normalization_93[0][0]
conv2d_31 (Conv2D) (None, 17, 17, 128) 98304		mixed3[0][0]
conv2d_36 (Conv2D) (None, 17, 17, 128) 114688		activation_35[0][0]
batch_normalization_89 (BatchNo (None, 17, 17, 128) 384		conv2d_31[0][0]
batch_normalization_94 (BatchNo (None, 17, 17, 128) 384		conv2d_36[0][0]
activation_31 (Activation) (None, 17, 17, 128) 0		batch_normalization_89[0][0]
activation_36 (Activation) (None, 17, 17, 128) 0		batch_normalization_94[0][0]
conv2d_32 (Conv2D) (None, 17, 17, 128) 114688		activation_31[0][0]
conv2d_37 (Conv2D) (None, 17, 17, 128) 114688		activation_36[0][0]
batch_normalization_90 (BatchNo (None, 17, 17, 128) 384		conv2d_32[0][0]
batch_normalization_95 (BatchNo (None, 17, 17, 128) 384		conv2d_37[0][0]
activation_32 (Activation) (None, 17, 17, 128) 0		batch_normalization_90[0][0]
activation_37 (Activation) (None, 17, 17, 128) 0		batch_normalization_95[0][0]
average_pooling2d_3 (AveragePoo (None, 17, 17, 768) 0		mixed3[0][0]

conv2d_30 (Conv2D)	(None, 17, 17, 192)	147456	mixed3[0][0]
conv2d_33 (Conv2D)	(None, 17, 17, 192)	172032	activation_32[0][0]
conv2d_38 (Conv2D)	(None, 17, 17, 192)	172032	activation_37[0][0]
conv2d_39 (Conv2D)	(None, 17, 17, 192)	147456	average_pooling2d_3[0][0]
batch_normalization_88 (BatchNorm)	(None, 17, 17, 192)	576	conv2d_30[0][0]
batch_normalization_91 (BatchNorm)	(None, 17, 17, 192)	576	conv2d_33[0][0]
batch_normalization_96 (BatchNorm)	(None, 17, 17, 192)	576	conv2d_38[0][0]
batch_normalization_97 (BatchNorm)	(None, 17, 17, 192)	576	conv2d_39[0][0]
activation_30 (Activation)	(None, 17, 17, 192)	0	batch_normalization_88[0][0]
activation_33 (Activation)	(None, 17, 17, 192)	0	batch_normalization_91[0][0]
activation_38 (Activation)	(None, 17, 17, 192)	0	batch_normalization_96[0][0]
activation_39 (Activation)	(None, 17, 17, 192)	0	batch_normalization_97[0][0]
mixed4 (Concatenate)	(None, 17, 17, 768)	0	activation_30[0][0] activation_33[0][0] activation_38[0][0] activation_39[0][0]
conv2d_44 (Conv2D)	(None, 17, 17, 160)	122880	mixed4[0][0]
batch_normalization_102 (BatchNorm)	(None, 17, 17, 160)	480	conv2d_44[0][0]
activation_44 (Activation)	(None, 17, 17, 160)	0	batch_normalization_102[0][0]
conv2d_45 (Conv2D)	(None, 17, 17, 160)	179200	activation_44[0][0]
batch_normalization_103 (BatchNorm)	(None, 17, 17, 160)	480	conv2d_45[0][0]

activation_45 (Activation)	(None, 17, 17, 160) 0	batch_normalization_103 [0][0]
conv2d_41 (Conv2D)	(None, 17, 17, 160) 122880	mixed4[0][0]
conv2d_46 (Conv2D)	(None, 17, 17, 160) 179200	activation_45[0][0]
batch_normalization_99 (BatchNo)	(None, 17, 17, 160) 480	conv2d_41[0][0]
batch_normalization_104 (BatchN)	(None, 17, 17, 160) 480	conv2d_46[0][0]
activation_41 (Activation)	(None, 17, 17, 160) 0	batch_normalization_99 [0][0]
activation_46 (Activation)	(None, 17, 17, 160) 0	batch_normalization_104 [0][0]
conv2d_42 (Conv2D)	(None, 17, 17, 160) 179200	activation_41[0][0]
conv2d_47 (Conv2D)	(None, 17, 17, 160) 179200	activation_46[0][0]
batch_normalization_100 (BatchN)	(None, 17, 17, 160) 480	conv2d_42[0][0]
batch_normalization_105 (BatchN)	(None, 17, 17, 160) 480	conv2d_47[0][0]
activation_42 (Activation)	(None, 17, 17, 160) 0	batch_normalization_100 [0][0]
activation_47 (Activation)	(None, 17, 17, 160) 0	batch_normalization_105 [0][0]
average_pooling2d_4 (AveragePoo)	(None, 17, 17, 768) 0	mixed4[0][0]
conv2d_40 (Conv2D)	(None, 17, 17, 192) 147456	mixed4[0][0]
conv2d_43 (Conv2D)	(None, 17, 17, 192) 215040	activation_42[0][0]
conv2d_48 (Conv2D)	(None, 17, 17, 192) 215040	activation_47[0][0]
conv2d_49 (Conv2D)	(None, 17, 17, 192) 147456	average_pooling2d_4[0][0]

batch_normalization_98 (BatchNo (None, 17, 17, 192) 576		conv2d_40[0][0]
batch_normalization_101 (BatchN (None, 17, 17, 192) 576		conv2d_43[0][0]
batch_normalization_106 (BatchN (None, 17, 17, 192) 576		conv2d_48[0][0]
batch_normalization_107 (BatchN (None, 17, 17, 192) 576		conv2d_49[0][0]
activation_40 (Activation) (None, 17, 17, 192) 0	batch_normalization_98[0][0]	
activation_43 (Activation) (None, 17, 17, 192) 0	batch_normalization_101[0][0]	
activation_48 (Activation) (None, 17, 17, 192) 0	batch_normalization_106[0][0]	
activation_49 (Activation) (None, 17, 17, 192) 0	batch_normalization_107[0][0]	
mixed5 (Concatenate) (None, 17, 17, 768) 0	activation_40[0][0] activation_43[0][0] activation_48[0][0] activation_49[0][0]	
conv2d_54 (Conv2D) (None, 17, 17, 160) 122880	mixed5[0][0]	
batch_normalization_112 (BatchN (None, 17, 17, 160) 480	conv2d_54[0][0]	
activation_54 (Activation) (None, 17, 17, 160) 0	batch_normalization_112[0][0]	
conv2d_55 (Conv2D) (None, 17, 17, 160) 179200	activation_54[0][0]	
batch_normalization_113 (BatchN (None, 17, 17, 160) 480	conv2d_55[0][0]	
activation_55 (Activation) (None, 17, 17, 160) 0	batch_normalization_113[0][0]	
conv2d_51 (Conv2D) (None, 17, 17, 160) 122880	mixed5[0][0]	
conv2d_56 (Conv2D) (None, 17, 17, 160) 179200	activation_55[0][0]	

batch_normalization_109 (BatchN (None, 17, 17, 160) 480		conv2d_51[0][0]
batch_normalization_114 (BatchN (None, 17, 17, 160) 480		conv2d_56[0][0]
activation_51 (Activation) (None, 17, 17, 160) 0	[0][0]	batch_normalization_109
activation_56 (Activation) (None, 17, 17, 160) 0	[0][0]	batch_normalization_114
conv2d_52 (Conv2D) (None, 17, 17, 160) 179200		activation_51[0][0]
conv2d_57 (Conv2D) (None, 17, 17, 160) 179200		activation_56[0][0]
batch_normalization_110 (BatchN (None, 17, 17, 160) 480		conv2d_52[0][0]
batch_normalization_115 (BatchN (None, 17, 17, 160) 480		conv2d_57[0][0]
activation_52 (Activation) (None, 17, 17, 160) 0	[0][0]	batch_normalization_110
activation_57 (Activation) (None, 17, 17, 160) 0	[0][0]	batch_normalization_115
average_pooling2d_5 (AveragePoo (None, 17, 17, 768) 0		mixed5[0][0]
conv2d_50 (Conv2D) (None, 17, 17, 192) 147456		mixed5[0][0]
conv2d_53 (Conv2D) (None, 17, 17, 192) 215040		activation_52[0][0]
conv2d_58 (Conv2D) (None, 17, 17, 192) 215040		activation_57[0][0]
conv2d_59 (Conv2D) (None, 17, 17, 192) 147456	[0]	average_pooling2d_5[0]
batch_normalization_108 (BatchN (None, 17, 17, 192) 576		conv2d_50[0][0]
batch_normalization_111 (BatchN (None, 17, 17, 192) 576		conv2d_53[0][0]
batch_normalization_116 (BatchN (None, 17, 17, 192) 576		conv2d_58[0][0]
batch_normalization_117 (BatchN (None, 17, 17, 192) 576		conv2d_59[0][0]

activation_50 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_108
activation_53 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_111
activation_58 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_116
activation_59 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_117
mixed6 (Concatenate)	(None, 17, 17, 768) 0	activation_50[0][0] activation_53[0][0] activation_58[0][0] activation_59[0][0]
conv2d_64 (Conv2D)	(None, 17, 17, 192) 147456	mixed6[0][0]
batch_normalization_122 (BatchN)	(None, 17, 17, 192) 576	conv2d_64[0][0]
activation_64 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_122
conv2d_65 (Conv2D)	(None, 17, 17, 192) 258048	activation_64[0][0]
batch_normalization_123 (BatchN)	(None, 17, 17, 192) 576	conv2d_65[0][0]
activation_65 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_123
conv2d_61 (Conv2D)	(None, 17, 17, 192) 147456	mixed6[0][0]
conv2d_66 (Conv2D)	(None, 17, 17, 192) 258048	activation_65[0][0]
batch_normalization_119 (BatchN)	(None, 17, 17, 192) 576	conv2d_61[0][0]
batch_normalization_124 (BatchN)	(None, 17, 17, 192) 576	conv2d_66[0][0]
activation_61 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_119
activation_66 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_124

conv2d_62 (Conv2D)	(None, 17, 17, 192)	258048	activation_61[0][0]
conv2d_67 (Conv2D)	(None, 17, 17, 192)	258048	activation_66[0][0]
batch_normalization_120 (BatchN	(None, 17, 17, 192)	576	conv2d_62[0][0]
batch_normalization_125 (BatchN	(None, 17, 17, 192)	576	conv2d_67[0][0]
activation_62 (Activation)	(None, 17, 17, 192)	0	batch_normalization_120[0][0]
activation_67 (Activation)	(None, 17, 17, 192)	0	batch_normalization_125[0][0]
average_pooling2d_6 (AveragePoo	(None, 17, 17, 768)	0	mixed6[0][0]
conv2d_60 (Conv2D)	(None, 17, 17, 192)	147456	mixed6[0][0]
conv2d_63 (Conv2D)	(None, 17, 17, 192)	258048	activation_62[0][0]
conv2d_68 (Conv2D)	(None, 17, 17, 192)	258048	activation_67[0][0]
conv2d_69 (Conv2D)	(None, 17, 17, 192)	147456	average_pooling2d_6[0][0]
batch_normalization_118 (BatchN	(None, 17, 17, 192)	576	conv2d_60[0][0]
batch_normalization_121 (BatchN	(None, 17, 17, 192)	576	conv2d_63[0][0]
batch_normalization_126 (BatchN	(None, 17, 17, 192)	576	conv2d_68[0][0]
batch_normalization_127 (BatchN	(None, 17, 17, 192)	576	conv2d_69[0][0]
activation_60 (Activation)	(None, 17, 17, 192)	0	batch_normalization_118[0][0]
activation_63 (Activation)	(None, 17, 17, 192)	0	batch_normalization_121[0][0]
activation_68 (Activation)	(None, 17, 17, 192)	0	batch_normalization_126[0][0]

activation_69 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_127
mixed7 (Concatenate)	(None, 17, 17, 768) 0	activation_60[0][0] activation_63[0][0] activation_68[0][0] activation_69[0][0]
conv2d_72 (Conv2D)	(None, 17, 17, 192) 147456	mixed7[0][0]
batch_normalization_130 (BatchN [0][0])	(None, 17, 17, 192) 576	conv2d_72[0][0]
activation_72 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_130
conv2d_73 (Conv2D)	(None, 17, 17, 192) 258048	activation_72[0][0]
batch_normalization_131 (BatchN [0][0])	(None, 17, 17, 192) 576	conv2d_73[0][0]
activation_73 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_131
conv2d_70 (Conv2D)	(None, 17, 17, 192) 147456	mixed7[0][0]
conv2d_74 (Conv2D)	(None, 17, 17, 192) 258048	activation_73[0][0]
batch_normalization_128 (BatchN [0][0])	(None, 17, 17, 192) 576	conv2d_70[0][0]
batch_normalization_132 (BatchN [0][0])	(None, 17, 17, 192) 576	conv2d_74[0][0]
activation_70 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_128
activation_74 (Activation) [0][0]	(None, 17, 17, 192) 0	batch_normalization_132
conv2d_71 (Conv2D)	(None, 8, 8, 320) 552960	activation_70[0][0]
conv2d_75 (Conv2D)	(None, 8, 8, 192) 331776	activation_74[0][0]
batch_normalization_129 (BatchN [0][0])	(None, 8, 8, 320) 960	conv2d_71[0][0]
batch_normalization_133 (BatchN [0][0])	(None, 8, 8, 192) 576	conv2d_75[0][0]

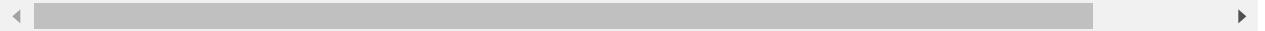
activation_71 (Activation)	(None, 8, 8, 320)	0	batch_normalization_129[0][0]
activation_75 (Activation)	(None, 8, 8, 192)	0	batch_normalization_133[0][0]
max_pooling2d_3 (MaxPooling2D)	(None, 8, 8, 768)	0	mixed7[0][0]
mixed8 (Concatenate)	(None, 8, 8, 1280)	0	activation_71[0][0] activation_75[0][0] max_pooling2d_3[0][0]
conv2d_80 (Conv2D)	(None, 8, 8, 448)	573440	mixed8[0][0]
batch_normalization_138 (BatchN)	(None, 8, 8, 448)	1344	conv2d_80[0][0]
activation_80 (Activation)	(None, 8, 8, 448)	0	batch_normalization_138[0][0]
conv2d_77 (Conv2D)	(None, 8, 8, 384)	491520	mixed8[0][0]
conv2d_81 (Conv2D)	(None, 8, 8, 384)	1548288	activation_80[0][0]
batch_normalization_135 (BatchN)	(None, 8, 8, 384)	1152	conv2d_77[0][0]
batch_normalization_139 (BatchN)	(None, 8, 8, 384)	1152	conv2d_81[0][0]
activation_77 (Activation)	(None, 8, 8, 384)	0	batch_normalization_135[0][0]
activation_81 (Activation)	(None, 8, 8, 384)	0	batch_normalization_139[0][0]
conv2d_78 (Conv2D)	(None, 8, 8, 384)	442368	activation_77[0][0]
conv2d_79 (Conv2D)	(None, 8, 8, 384)	442368	activation_77[0][0]
conv2d_82 (Conv2D)	(None, 8, 8, 384)	442368	activation_81[0][0]
conv2d_83 (Conv2D)	(None, 8, 8, 384)	442368	activation_81[0][0]
average_pooling2d_7 (AveragePoo	(None, 8, 8, 1280)	0	mixed8[0][0]

conv2d_76 (Conv2D)	(None, 8, 8, 320)	409600	mixed8[0][0]
batch_normalization_136 (BatchN)	(None, 8, 8, 384)	1152	conv2d_78[0][0]
batch_normalization_137 (BatchN)	(None, 8, 8, 384)	1152	conv2d_79[0][0]
batch_normalization_140 (BatchN)	(None, 8, 8, 384)	1152	conv2d_82[0][0]
batch_normalization_141 (BatchN)	(None, 8, 8, 384)	1152	conv2d_83[0][0]
conv2d_84 (Conv2D)	(None, 8, 8, 192)	245760	average_pooling2d_7[0][0]
batch_normalization_134 (BatchN)	(None, 8, 8, 320)	960	conv2d_76[0][0]
activation_78 (Activation)	(None, 8, 8, 384)	0	batch_normalization_136[0][0]
activation_79 (Activation)	(None, 8, 8, 384)	0	batch_normalization_137[0][0]
activation_82 (Activation)	(None, 8, 8, 384)	0	batch_normalization_140[0][0]
activation_83 (Activation)	(None, 8, 8, 384)	0	batch_normalization_141[0][0]
batch_normalization_142 (BatchN)	(None, 8, 8, 192)	576	conv2d_84[0][0]
activation_76 (Activation)	(None, 8, 8, 320)	0	batch_normalization_134[0][0]
mixed9_0 (Concatenate)	(None, 8, 8, 768)	0	activation_78[0][0] activation_79[0][0]
concatenate (Concatenate)	(None, 8, 8, 768)	0	activation_82[0][0] activation_83[0][0]
activation_84 (Activation)	(None, 8, 8, 192)	0	batch_normalization_142[0][0]
mixed9 (Concatenate)	(None, 8, 8, 2048)	0	activation_76[0][0] mixed9_0[0][0]

			concatenate[0][0]
			activation_84[0][0]
conv2d_89 (Conv2D)	(None, 8, 8, 448)	917504	mixed9[0][0]
batch_normalization_147 (BatchN	(None, 8, 8, 448)	1344	conv2d_89[0][0]
activation_89 (Activation)	(None, 8, 8, 448)	0	batch_normalization_147[0][0]
conv2d_86 (Conv2D)	(None, 8, 8, 384)	786432	mixed9[0][0]
conv2d_90 (Conv2D)	(None, 8, 8, 384)	1548288	activation_89[0][0]
batch_normalization_144 (BatchN	(None, 8, 8, 384)	1152	conv2d_86[0][0]
batch_normalization_148 (BatchN	(None, 8, 8, 384)	1152	conv2d_90[0][0]
activation_86 (Activation)	(None, 8, 8, 384)	0	batch_normalization_144[0][0]
activation_90 (Activation)	(None, 8, 8, 384)	0	batch_normalization_148[0][0]
conv2d_87 (Conv2D)	(None, 8, 8, 384)	442368	activation_86[0][0]
conv2d_88 (Conv2D)	(None, 8, 8, 384)	442368	activation_86[0][0]
conv2d_91 (Conv2D)	(None, 8, 8, 384)	442368	activation_90[0][0]
conv2d_92 (Conv2D)	(None, 8, 8, 384)	442368	activation_90[0][0]
average_pooling2d_8 (AveragePoo	(None, 8, 8, 2048)	0	mixed9[0][0]
conv2d_85 (Conv2D)	(None, 8, 8, 320)	655360	mixed9[0][0]
batch_normalization_145 (BatchN	(None, 8, 8, 384)	1152	conv2d_87[0][0]
batch_normalization_146 (BatchN	(None, 8, 8, 384)	1152	conv2d_88[0][0]
batch_normalization_149 (BatchN	(None, 8, 8, 384)	1152	conv2d_91[0][0]

batch_normalization_150 (BatchN (None, 8, 8, 384)	1152	conv2d_92[0][0]	
conv2d_93 (Conv2D [0])	(None, 8, 8, 192)	393216	average_pooling2d_8[0]
batch_normalization_143 (BatchN (None, 8, 8, 320)	960	conv2d_85[0][0]	
activation_87 (Activation) [0][0]	(None, 8, 8, 384)	0	batch_normalization_145
activation_88 (Activation) [0][0]	(None, 8, 8, 384)	0	batch_normalization_146
activation_91 (Activation) [0][0]	(None, 8, 8, 384)	0	batch_normalization_149
activation_92 (Activation) [0][0]	(None, 8, 8, 384)	0	batch_normalization_150
batch_normalization_151 (BatchN (None, 8, 8, 192)	576	conv2d_93[0][0]	
activation_85 (Activation) [0][0]	(None, 8, 8, 320)	0	batch_normalization_143
mixed9_1 (Concatenate)	(None, 8, 8, 768)	0	activation_87[0][0] activation_88[0][0]
concatenate_1 (Concatenate)	(None, 8, 8, 768)	0	activation_91[0][0] activation_92[0][0]
activation_93 (Activation) [0][0]	(None, 8, 8, 192)	0	batch_normalization_151
mixed10 (Concatenate)	(None, 8, 8, 2048)	0	activation_85[0][0] mixed9_1[0][0] concatenate_1[0][0] activation_93[0][0]
<hr/>			
=====			
Total params: 21,802,784			
Trainable params: 0			
Non-trainable params: 21,802,784			
<hr/>			
Model: "model_39"			

Layer (type)	Output Shape	Param #
input_40 (InputLayer)	[(None, 299, 299, 3)]	0

inception_v3 (Model)	(None, 8, 8, 2048)	21802784
avg_pool (GlobalAveragePooli	(None, 2048)	0
batch_normalization_152 (Bat	(None, 2048)	8192
dense_270 (Dense)	(None, 64)	131136
dense_271 (Dense)	(None, 1)	65
=====		
Total params: 21,942,177		
Trainable params: 135,297		
Non-trainable params: 21,806,880		
<hr/>		
None		
WARNING:tensorflow:sample_weight modes were coerced from		
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to		
['...']		
		
WARNING:tensorflow:sample_weight modes were coerced from		
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WARNING:tensorflow:sample_weight modes were coerced from		
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to		
['...']		
WARNING:tensorflow:sample_weight modes were coerced from		
...		
to		
['...']		
Train for 328 steps, validate for 41 steps		
Epoch 1/500		
327/328 [=====>.] - ETA: 0s - loss: 2.2475 - mean_absolute_error: 2.2475 - mean_squared_error: 11.2917		
Epoch 00001: val_loss improved from inf to 2.38307, saving model to best_inception_mode1.hdf5		
328/328 [=====] - 271s 827ms/step - loss: 2.2445 - mean_absolute_error: 2.2445 - mean_squared_error: 11.2646 - val_loss: 2.3831 - val_mean_absolute_error: 2.3831 - val_mean_squared_error: 7.1318		
Epoch 2/500		
327/328 [=====>.] - ETA: 0s - loss: 1.2342 - mean_absolute_error: 1.2342 - mean_squared_error: 2.4360		
Epoch 00002: val_loss improved from 2.38307 to 1.10506, saving model to best_inception_mode1.hdf5		
328/328 [=====] - 236s 720ms/step - loss: 1.2337 - mean_absolute_error: 1.2337 - mean_squared_error: 2.4339 - val_loss: 1.1051 - val_mean_absolute_error: 1.1051 - val_mean_squared_error: 1.8631		
Epoch 3/500		
327/328 [=====>.] - ETA: 0s - loss: 1.0911 - mean_absolute_error: 1.0911 - mean_squared_error: 1.9154		
Epoch 00003: val_loss improved from 1.10506 to 0.93422, saving model to best_inception_mode1.hdf5		
328/328 [=====] - 236s 718ms/step - loss: 1.0902 - mean_absolute_error: 1.0902 - mean_squared_error: 1.9127 - val_loss: 0.9342 - val_mean_absolute_error: 0.9342 - val_mean_squared_error: 1.3704		
Epoch 4/500		
327/328 [=====>.] - ETA: 0s - loss: 0.9901 - mean_absolute_error:		

0.9901 - mean_squared_error: 1.5569
Epoch 00004: val_loss improved from 0.93422 to 0.84158, saving model to best_inception_m
odel.hdf5
328/328 [=====] - 236s 720ms/step - loss: 0.9900 - mean_absolute_error: 0.9900 - mean_squared_error: 1.5578 - val_loss: 0.8416 - val_mean_absolute_error: 0.8416 - val_mean_squared_error: 1.1255
Epoch 5/500
327/328 [=====>.] - ETA: 0s - loss: 0.8676 - mean_absolute_error: 0.8676 - mean_squared_error: 1.1940
Epoch 00005: val_loss improved from 0.84158 to 0.76053, saving model to best_inception_m
odel.hdf5
328/328 [=====] - 235s 717ms/step - loss: 0.8674 - mean_absolute_error: 0.8674 - mean_squared_error: 1.1934 - val_loss: 0.7605 - val_mean_absolute_error: 0.7605 - val_mean_squared_error: 0.8911
Epoch 6/500
327/328 [=====>.] - ETA: 0s - loss: 0.7404 - mean_absolute_error: 0.7404 - mean_squared_error: 0.8744
Epoch 00006: val_loss improved from 0.76053 to 0.64258, saving model to best_inception_m
odel.hdf5
328/328 [=====] - 235s 717ms/step - loss: 0.7401 - mean_absolute_error: 0.7401 - mean_squared_error: 0.8734 - val_loss: 0.6426 - val_mean_absolute_error: 0.6426 - val_mean_squared_error: 0.6899
Epoch 7/500
327/328 [=====>.] - ETA: 0s - loss: 0.6220 - mean_absolute_error: 0.6220 - mean_squared_error: 0.6153
Epoch 00007: val_loss did not improve from 0.64258
328/328 [=====] - 236s 719ms/step - loss: 0.6220 - mean_absolute_error: 0.6220 - mean_squared_error: 0.6152 - val_loss: 0.7057 - val_mean_absolute_error: 0.7057 - val_mean_squared_error: 0.7437
Epoch 8/500
327/328 [=====>.] - ETA: 0s - loss: 0.5737 - mean_absolute_error: 0.5737 - mean_squared_error: 0.5341
Epoch 00008: val_loss improved from 0.64258 to 0.56186, saving model to best_inception_m
odel.hdf5
328/328 [=====] - 235s 716ms/step - loss: 0.5734 - mean_absolute_error: 0.5734 - mean_squared_error: 0.5337 - val_loss: 0.5619 - val_mean_absolute_error: 0.5619 - val_mean_squared_error: 0.5054
Epoch 9/500
327/328 [=====>.] - ETA: 0s - loss: 0.4745 - mean_absolute_error: 0.4745 - mean_squared_error: 0.3635
Epoch 00009: val_loss improved from 0.56186 to 0.50653, saving model to best_inception_m
odel.hdf5
328/328 [=====] - 237s 724ms/step - loss: 0.4742 - mean_absolute_error: 0.4742 - mean_squared_error: 0.3631 - val_loss: 0.5065 - val_mean_absolute_error: 0.5065 - val_mean_squared_error: 0.3862
Epoch 10/500
327/328 [=====>.] - ETA: 0s - loss: 0.4060 - mean_absolute_error: 0.4060 - mean_squared_error: 0.2679
Epoch 00010: val_loss improved from 0.50653 to 0.41966, saving model to best_inception_m
odel.hdf5
328/328 [=====] - 240s 733ms/step - loss: 0.4065 - mean_absolute_error: 0.4065 - mean_squared_error: 0.2684 - val_loss: 0.4197 - val_mean_absolute_error: 0.4197 - val_mean_squared_error: 0.2852
Epoch 11/500
327/328 [=====>.] - ETA: 0s - loss: 0.3654 - mean_absolute_error: 0.3654 - mean_squared_error: 0.2191
Epoch 00011: val_loss improved from 0.41966 to 0.35604, saving model to best_inception_m
odel.hdf5
328/328 [=====] - 243s 740ms/step - loss: 0.3654 - mean_absolute_error: 0.3654 - mean_squared_error: 0.2190 - val_loss: 0.3560 - val_mean_absolute_error: 0.3560 - val_mean_squared_error: 0.2117

Epoch 12/500
327/328 [=====>.] - ETA: 0s - loss: 0.3341 - mean_absolute_error: 0.3341 - mean_squared_error: 0.1855
Epoch 00012: val_loss improved from 0.35604 to 0.34434, saving model to best_inception_model.hdf5
328/328 [=====] - 242s 737ms/step - loss: 0.3341 - mean_absolute_error: 0.3341 - mean_squared_error: 0.1855 - val_loss: 0.3443 - val_mean_absolute_error: 0.3443 - val_mean_squared_error: 0.2012
Epoch 13/500
327/328 [=====>.] - ETA: 0s - loss: 0.3205 - mean_absolute_error: 0.3205 - mean_squared_error: 0.1729
Epoch 00013: val_loss did not improve from 0.34434
328/328 [=====] - 235s 717ms/step - loss: 0.3206 - mean_absolute_error: 0.3206 - mean_squared_error: 0.1731 - val_loss: 0.3585 - val_mean_absolute_error: 0.3585 - val_mean_squared_error: 0.2109
Epoch 14/500
327/328 [=====>.] - ETA: 0s - loss: 0.3097 - mean_absolute_error: 0.3097 - mean_squared_error: 0.1615
Epoch 00014: val_loss improved from 0.34434 to 0.32793, saving model to best_inception_model.hdf5
328/328 [=====] - 240s 731ms/step - loss: 0.3097 - mean_absolute_error: 0.3097 - mean_squared_error: 0.1614 - val_loss: 0.3279 - val_mean_absolute_error: 0.3279 - val_mean_squared_error: 0.1814
Epoch 15/500
327/328 [=====>.] - ETA: 0s - loss: 0.2988 - mean_absolute_error: 0.2988 - mean_squared_error: 0.1512
Epoch 00015: val_loss improved from 0.32793 to 0.31819, saving model to best_inception_model.hdf5
328/328 [=====] - 235s 717ms/step - loss: 0.2989 - mean_absolute_error: 0.2989 - mean_squared_error: 0.1513 - val_loss: 0.3182 - val_mean_absolute_error: 0.3182 - val_mean_squared_error: 0.1711
Epoch 16/500
327/328 [=====>.] - ETA: 0s - loss: 0.2986 - mean_absolute_error: 0.2986 - mean_squared_error: 0.1514
Epoch 00016: val_loss improved from 0.31819 to 0.31725, saving model to best_inception_model.hdf5
328/328 [=====] - 235s 718ms/step - loss: 0.2986 - mean_absolute_error: 0.2986 - mean_squared_error: 0.1513 - val_loss: 0.3172 - val_mean_absolute_error: 0.3172 - val_mean_squared_error: 0.1732
Epoch 17/500
327/328 [=====>.] - ETA: 0s - loss: 0.2904 - mean_absolute_error: 0.2904 - mean_squared_error: 0.1442
Epoch 00017: val_loss did not improve from 0.31725
328/328 [=====] - 235s 717ms/step - loss: 0.2907 - mean_absolute_error: 0.2907 - mean_squared_error: 0.1446 - val_loss: 0.3248 - val_mean_absolute_error: 0.3248 - val_mean_squared_error: 0.1782
Epoch 18/500
327/328 [=====>.] - ETA: 0s - loss: 0.2863 - mean_absolute_error: 0.2863 - mean_squared_error: 0.1406
Epoch 00018: val_loss did not improve from 0.31725
328/328 [=====] - 240s 731ms/step - loss: 0.2862 - mean_absolute_error: 0.2862 - mean_squared_error: 0.1407 - val_loss: 0.3292 - val_mean_absolute_error: 0.3292 - val_mean_squared_error: 0.1869
Epoch 19/500
327/328 [=====>.] - ETA: 0s - loss: 0.2835 - mean_absolute_error: 0.2835 - mean_squared_error: 0.1381
Epoch 00019: val_loss did not improve from 0.31725
328/328 [=====] - 241s 734ms/step - loss: 0.2834 - mean_absolute_error: 0.2834 - mean_squared_error: 0.1381 - val_loss: 0.3187 - val_mean_absolute_error: 0.3187 - val_mean_squared_error: 0.1733
Epoch 20/500

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327/328 [=====>.] - ETA: 0s - loss: 0.2814 - mean_absolute_error: 0.2814 - mean_squared_error: 0.1367
Epoch 00020: val_loss did not improve from 0.31725
328/328 [=====] - 238s 727ms/step - loss: 0.2815 - mean_absolute_error: 0.2815 - mean_squared_error: 0.1367 - val_loss: 0.3188 - val_mean_absolute_error: 0.3188 - val_mean_squared_error: 0.1714
Epoch 21/500
327/328 [=====>.] - ETA: 0s - loss: 0.2779 - mean_absolute_error: 0.2779 - mean_squared_error: 0.1333
Epoch 00021: val_loss improved from 0.31725 to 0.31330, saving model to best_inception_model.hdf5
328/328 [=====] - 236s 720ms/step - loss: 0.2778 - mean_absolute_error: 0.2778 - mean_squared_error: 0.1333 - val_loss: 0.3133 - val_mean_absolute_error: 0.3133 - val_mean_squared_error: 0.1683
Epoch 22/500
327/328 [=====>.] - ETA: 0s - loss: 0.2753 - mean_absolute_error: 0.2753 - mean_squared_error: 0.1324
Epoch 00022: val_loss did not improve from 0.31330
328/328 [=====] - 236s 719ms/step - loss: 0.2751 - mean_absolute_error: 0.2751 - mean_squared_error: 0.1323 - val_loss: 0.3140 - val_mean_absolute_error: 0.3140 - val_mean_squared_error: 0.1677
Epoch 23/500
327/328 [=====>.] - ETA: 0s - loss: 0.2705 - mean_absolute_error: 0.2705 - mean_squared_error: 0.1274
Epoch 00023: val_loss did not improve from 0.31330
328/328 [=====] - 240s 732ms/step - loss: 0.2707 - mean_absolute_error: 0.2707 - mean_squared_error: 0.1275 - val_loss: 0.3252 - val_mean_absolute_error: 0.3252 - val_mean_squared_error: 0.1803
Epoch 24/500
327/328 [=====>.] - ETA: 0s - loss: 0.2711 - mean_absolute_error: 0.2711 - mean_squared_error: 0.1283
Epoch 00024: val_loss did not improve from 0.31330
328/328 [=====] - 240s 732ms/step - loss: 0.2713 - mean_absolute_error: 0.2713 - mean_squared_error: 0.1284 - val_loss: 0.3246 - val_mean_absolute_error: 0.3246 - val_mean_squared_error: 0.1803
Epoch 25/500
327/328 [=====>.] - ETA: 0s - loss: 0.2681 - mean_absolute_error: 0.2681 - mean_squared_error: 0.1259
Epoch 00025: val_loss did not improve from 0.31330
328/328 [=====] - 238s 725ms/step - loss: 0.2680 - mean_absolute_error: 0.2680 - mean_squared_error: 0.1259 - val_loss: 0.3213 - val_mean_absolute_error: 0.3213 - val_mean_squared_error: 0.1718
Epoch 26/500
327/328 [=====>.] - ETA: 0s - loss: 0.2644 - mean_absolute_error: 0.2644 - mean_squared_error: 0.1230
Epoch 00026: val_loss did not improve from 0.31330
328/328 [=====] - 240s 730ms/step - loss: 0.2643 - mean_absolute_error: 0.2643 - mean_squared_error: 0.1229 - val_loss: 0.3285 - val_mean_absolute_error: 0.3285 - val_mean_squared_error: 0.1841
Epoch 27/500
327/328 [=====>.] - ETA: 0s - loss: 0.2641 - mean_absolute_error: 0.2641 - mean_squared_error: 0.1227
Epoch 00027: val_loss did not improve from 0.31330
328/328 [=====] - 240s 733ms/step - loss: 0.2640 - mean_absolute_error: 0.2640 - mean_squared_error: 0.1228 - val_loss: 0.3144 - val_mean_absolute_error: 0.3144 - val_mean_squared_error: 0.1683
Epoch 28/500
327/328 [=====>.] - ETA: 0s - loss: 0.2597 - mean_absolute_error: 0.2597 - mean_squared_error: 0.1194
Epoch 00028: val_loss did not improve from 0.31330
328/328 [=====] - 239s 728ms/step - loss: 0.2598 - mean_absolute_error:
```

```
e_error: 0.2598 - mean_squared_error: 0.1195 - val_loss: 0.3142 - val_mean_absolute_error: 0.3142 - val_mean_squared_error: 0.1673
Epoch 29/500
327/328 [=====>.] - ETA: 0s - loss: 0.2568 - mean_absolute_error: 0.2568 - mean_squared_error: 0.1158
Epoch 00029: val_loss did not improve from 0.31330
328/328 [=====] - 240s 731ms/step - loss: 0.2572 - mean_absolute_error: 0.2572 - mean_squared_error: 0.1160 - val_loss: 0.3207 - val_mean_absolute_error: 0.3207 - val_mean_squared_error: 0.1725
Epoch 30/500
327/328 [=====>.] - ETA: 0s - loss: 0.2582 - mean_absolute_error: 0.2582 - mean_squared_error: 0.1175
Epoch 00030: val_loss did not improve from 0.31330
328/328 [=====] - 242s 737ms/step - loss: 0.2586 - mean_absolute_error: 0.2586 - mean_squared_error: 0.1178 - val_loss: 0.3208 - val_mean_absolute_error: 0.3208 - val_mean_squared_error: 0.1759
Epoch 31/500
327/328 [=====>.] - ETA: 0s - loss: 0.2572 - mean_absolute_error: 0.2572 - mean_squared_error: 0.1157
Epoch 00031: val_loss did not improve from 0.31330
328/328 [=====] - 239s 730ms/step - loss: 0.2572 - mean_absolute_error: 0.2572 - mean_squared_error: 0.1156 - val_loss: 0.3237 - val_mean_absolute_error: 0.3237 - val_mean_squared_error: 0.1768
Epoch 32/500
327/328 [=====>.] - ETA: 0s - loss: 0.2529 - mean_absolute_error: 0.2529 - mean_squared_error: 0.1133
Epoch 00032: val_loss did not improve from 0.31330
328/328 [=====] - 233s 711ms/step - loss: 0.2528 - mean_absolute_error: 0.2528 - mean_squared_error: 0.1133 - val_loss: 0.3240 - val_mean_absolute_error: 0.3240 - val_mean_squared_error: 0.1787
Epoch 33/500
327/328 [=====>.] - ETA: 0s - loss: 0.2554 - mean_absolute_error: 0.2554 - mean_squared_error: 0.1158
Epoch 00033: val_loss did not improve from 0.31330
328/328 [=====] - 234s 713ms/step - loss: 0.2555 - mean_absolute_error: 0.2555 - mean_squared_error: 0.1159 - val_loss: 0.3232 - val_mean_absolute_error: 0.3232 - val_mean_squared_error: 0.1769
Epoch 34/500
327/328 [=====>.] - ETA: 0s - loss: 0.2525 - mean_absolute_error: 0.2525 - mean_squared_error: 0.1135
Epoch 00034: val_loss did not improve from 0.31330
328/328 [=====] - 236s 721ms/step - loss: 0.2523 - mean_absolute_error: 0.2523 - mean_squared_error: 0.1134 - val_loss: 0.3223 - val_mean_absolute_error: 0.3223 - val_mean_squared_error: 0.1756
Epoch 35/500
327/328 [=====>.] - ETA: 0s - loss: 0.2505 - mean_absolute_error: 0.2505 - mean_squared_error: 0.1116
Epoch 00035: val_loss did not improve from 0.31330
328/328 [=====] - 239s 728ms/step - loss: 0.2505 - mean_absolute_error: 0.2505 - mean_squared_error: 0.1117 - val_loss: 0.3183 - val_mean_absolute_error: 0.3183 - val_mean_squared_error: 0.1697
Epoch 36/500
327/328 [=====>.] - ETA: 0s - loss: 0.2468 - mean_absolute_error: 0.2468 - mean_squared_error: 0.1074Restoring model weights from the end of the best epoch.
Epoch 00036: val_loss did not improve from 0.31330
328/328 [=====] - 239s 729ms/step - loss: 0.2468 - mean_absolute_error: 0.2468 - mean_squared_error: 0.1074 - val_loss: 0.3321 - val_mean_absolute_error: 0.3321 - val_mean_squared_error: 0.1821
Epoch 00036: early stopping
```

```
WARNING:tensorflow:sample_weight modes were coerced from
...
    to
[...]  
Train for 328 steps, validate for 41 steps  
Epoch 1/500  
327/328 [=====>.] - ETA: 0s - loss: 0.2808 - mean_absolute_error:  
0.2808 - mean_squared_error: 0.1368  
Epoch 00001: val_loss did not improve from 0.31330  
328/328 [=====] - 245s 748ms/step - loss: 0.2810 - mean_absolute_error:  
0.2810 - mean_squared_error: 0.1370 - val_loss: 0.3340 - val_mean_absolute_error:  
0.3340 - val_mean_squared_error: 0.1847  
Epoch 2/500  
327/328 [=====>.] - ETA: 0s - loss: 0.2697 - mean_absolute_error:  
0.2697 - mean_squared_error: 0.1267  
Epoch 00002: val_loss improved from 0.31330 to 0.30435, saving model to best_inception_m  
odel.hdf5  
328/328 [=====] - 244s 745ms/step - loss: 0.2697 - mean_absolute_error:  
0.2697 - mean_squared_error: 0.1266 - val_loss: 0.3043 - val_mean_absolute_error:  
0.3043 - val_mean_squared_error: 0.1610  
Epoch 3/500  
327/328 [=====>.] - ETA: 0s - loss: 0.2591 - mean_absolute_error:  
0.2591 - mean_squared_error: 0.1182  
Epoch 00003: val_loss did not improve from 0.30435  
328/328 [=====] - 242s 739ms/step - loss: 0.2591 - mean_absolute_error:  
0.2591 - mean_squared_error: 0.1182 - val_loss: 0.3191 - val_mean_absolute_error:  
0.3191 - val_mean_squared_error: 0.1734  
Epoch 4/500  
327/328 [=====>.] - ETA: 0s - loss: 0.2474 - mean_absolute_error:  
0.2474 - mean_squared_error: 0.1086  
Epoch 00004: val_loss did not improve from 0.30435  
328/328 [=====] - 240s 732ms/step - loss: 0.2474 - mean_absolute_error:  
0.2474 - mean_squared_error: 0.1085 - val_loss: 0.3277 - val_mean_absolute_error:  
0.3277 - val_mean_squared_error: 0.1841  
Epoch 5/500  
327/328 [=====>.] - ETA: 0s - loss: 0.2377 - mean_absolute_error:  
0.2377 - mean_squared_error: 0.1021  
Epoch 00005: val_loss improved from 0.30435 to 0.30268, saving model to best_inception_m  
odel.hdf5  
328/328 [=====] - 239s 728ms/step - loss: 0.2377 - mean_absolute_error:  
0.2377 - mean_squared_error: 0.1020 - val_loss: 0.3027 - val_mean_absolute_error:  
0.3027 - val_mean_squared_error: 0.1550  
Epoch 6/500  
327/328 [=====>.] - ETA: 0s - loss: 0.2302 - mean_absolute_error:  
0.2302 - mean_squared_error: 0.0956  
Epoch 00006: val_loss improved from 0.30268 to 0.28833, saving model to best_inception_m  
odel.hdf5  
328/328 [=====] - 244s 745ms/step - loss: 0.2302 - mean_absolute_error:
```

e_error: 0.2302 - mean_squared_error: 0.0956 - val_loss: 0.2883 - val_mean_absolute_error: 0.2883 - val_mean_squared_error: 0.1406
Epoch 7/500
327/328 [=====>.] - ETA: 0s - loss: 0.2213 - mean_absolute_error: 0.2213 - mean_squared_error: 0.0885
Epoch 00007: val_loss did not improve from 0.28833
328/328 [=====] - 243s 741ms/step - loss: 0.2213 - mean_absolute_error: 0.2213 - mean_squared_error: 0.0885 - val_loss: 0.3055 - val_mean_absolute_error: 0.3055 - val_mean_squared_error: 0.1606
Epoch 8/500
327/328 [=====>.] - ETA: 0s - loss: 0.2143 - mean_absolute_error: 0.2143 - mean_squared_error: 0.0839
Epoch 00008: val_loss did not improve from 0.28833
328/328 [=====] - 239s 730ms/step - loss: 0.2144 - mean_absolute_error: 0.2144 - mean_squared_error: 0.0840 - val_loss: 0.2970 - val_mean_absolute_error: 0.2970 - val_mean_squared_error: 0.1515
Epoch 9/500
327/328 [=====>.] - ETA: 0s - loss: 0.2103 - mean_absolute_error: 0.2103 - mean_squared_error: 0.0803
Epoch 00009: val_loss did not improve from 0.28833
328/328 [=====] - 238s 726ms/step - loss: 0.2102 - mean_absolute_error: 0.2102 - mean_squared_error: 0.0802 - val_loss: 0.3048 - val_mean_absolute_error: 0.3048 - val_mean_squared_error: 0.1589
Epoch 10/500
327/328 [=====>.] - ETA: 0s - loss: 0.2011 - mean_absolute_error: 0.2011 - mean_squared_error: 0.0744
Epoch 00010: val_loss did not improve from 0.28833
328/328 [=====] - 239s 728ms/step - loss: 0.2011 - mean_absolute_error: 0.2011 - mean_squared_error: 0.0743 - val_loss: 0.2978 - val_mean_absolute_error: 0.2978 - val_mean_squared_error: 0.1526
Epoch 11/500
327/328 [=====>.] - ETA: 0s - loss: 0.1953 - mean_absolute_error: 0.1953 - mean_squared_error: 0.0710
Epoch 00011: val_loss improved from 0.28833 to 0.28640, saving model to best_inception_model.hdf5
328/328 [=====] - 240s 730ms/step - loss: 0.1952 - mean_absolute_error: 0.1952 - mean_squared_error: 0.0709 - val_loss: 0.2864 - val_mean_absolute_error: 0.2864 - val_mean_squared_error: 0.1462
Epoch 12/500
327/328 [=====>.] - ETA: 0s - loss: 0.1893 - mean_absolute_error: 0.1893 - mean_squared_error: 0.0674
Epoch 00012: val_loss did not improve from 0.28640
328/328 [=====] - 240s 730ms/step - loss: 0.1893 - mean_absolute_error: 0.1893 - mean_squared_error: 0.0675 - val_loss: 0.2929 - val_mean_absolute_error: 0.2929 - val_mean_squared_error: 0.1517
Epoch 13/500
327/328 [=====>.] - ETA: 0s - loss: 0.1853 - mean_absolute_error: 0.1853 - mean_squared_error: 0.0643
Epoch 00013: val_loss improved from 0.28640 to 0.28166, saving model to best_inception_model.hdf5
328/328 [=====] - 243s 740ms/step - loss: 0.1852 - mean_absolute_error: 0.1852 - mean_squared_error: 0.0643 - val_loss: 0.2817 - val_mean_absolute_error: 0.2817 - val_mean_squared_error: 0.1394
Epoch 14/500
327/328 [=====>.] - ETA: 0s - loss: 0.1819 - mean_absolute_error: 0.1819 - mean_squared_error: 0.0622
Epoch 00014: val_loss did not improve from 0.28166
328/328 [=====] - 244s 744ms/step - loss: 0.1818 - mean_absolute_error: 0.1818 - mean_squared_error: 0.0622 - val_loss: 0.3004 - val_mean_absolute_error: 0.3004 - val_mean_squared_error: 0.1543
Epoch 15/500

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327/328 [=====>.] - ETA: 0s - loss: 0.1765 - mean_absolute_error: 0.1765 - mean_squared_error: 0.0594
Epoch 00015: val_loss did not improve from 0.28166
328/328 [=====] - 243s 741ms/step - loss: 0.1765 - mean_absolute_error: 0.1765 - mean_squared_error: 0.0594 - val_loss: 0.2859 - val_mean_absolute_error: 0.2859 - val_mean_squared_error: 0.1428
Epoch 16/500
327/328 [=====>.] - ETA: 0s - loss: 0.1726 - mean_absolute_error: 0.1726 - mean_squared_error: 0.0568
Epoch 00016: val_loss did not improve from 0.28166
328/328 [=====] - 242s 737ms/step - loss: 0.1726 - mean_absolute_error: 0.1726 - mean_squared_error: 0.0567 - val_loss: 0.2856 - val_mean_absolute_error: 0.2856 - val_mean_squared_error: 0.1441
Epoch 17/500
327/328 [=====>.] - ETA: 0s - loss: 0.1706 - mean_absolute_error: 0.1706 - mean_squared_error: 0.0548
Epoch 00017: val_loss did not improve from 0.28166
328/328 [=====] - 245s 746ms/step - loss: 0.1706 - mean_absolute_error: 0.1706 - mean_squared_error: 0.0548 - val_loss: 0.2900 - val_mean_absolute_error: 0.2900 - val_mean_squared_error: 0.1485
Epoch 18/500
327/328 [=====>.] - ETA: 0s - loss: 0.1654 - mean_absolute_error: 0.1654 - mean_squared_error: 0.0522
Epoch 00018: val_loss did not improve from 0.28166
328/328 [=====] - 245s 746ms/step - loss: 0.1654 - mean_absolute_error: 0.1654 - mean_squared_error: 0.0522 - val_loss: 0.2817 - val_mean_absolute_error: 0.2817 - val_mean_squared_error: 0.1370
Epoch 19/500
327/328 [=====>.] - ETA: 0s - loss: 0.1626 - mean_absolute_error: 0.1626 - mean_squared_error: 0.0506
Epoch 00019: val_loss improved from 0.28166 to 0.27814, saving model to best_inception_model.hdf5
328/328 [=====] - 241s 735ms/step - loss: 0.1626 - mean_absolute_error: 0.1626 - mean_squared_error: 0.0506 - val_loss: 0.2781 - val_mean_absolute_error: 0.2781 - val_mean_squared_error: 0.1370
Epoch 20/500
327/328 [=====>.] - ETA: 0s - loss: 0.1579 - mean_absolute_error: 0.1579 - mean_squared_error: 0.0478
Epoch 00020: val_loss did not improve from 0.27814
328/328 [=====] - 241s 735ms/step - loss: 0.1581 - mean_absolute_error: 0.1581 - mean_squared_error: 0.0480 - val_loss: 0.2948 - val_mean_absolute_error: 0.2948 - val_mean_squared_error: 0.1482
Epoch 21/500
327/328 [=====>.] - ETA: 0s - loss: 0.1565 - mean_absolute_error: 0.1565 - mean_squared_error: 0.0474
Epoch 00021: val_loss did not improve from 0.27814
328/328 [=====] - 243s 741ms/step - loss: 0.1566 - mean_absolute_error: 0.1566 - mean_squared_error: 0.0474 - val_loss: 0.2819 - val_mean_absolute_error: 0.2819 - val_mean_squared_error: 0.1371
Epoch 22/500
327/328 [=====>.] - ETA: 0s - loss: 0.1519 - mean_absolute_error: 0.1519 - mean_squared_error: 0.0448
Epoch 00022: val_loss did not improve from 0.27814
328/328 [=====] - 243s 742ms/step - loss: 0.1518 - mean_absolute_error: 0.1518 - mean_squared_error: 0.0447 - val_loss: 0.2835 - val_mean_absolute_error: 0.2835 - val_mean_squared_error: 0.1402
Epoch 23/500
327/328 [=====>.] - ETA: 0s - loss: 0.1507 - mean_absolute_error: 0.1507 - mean_squared_error: 0.0439
Epoch 00023: val_loss did not improve from 0.27814
328/328 [=====] - 240s 731ms/step - loss: 0.1508 - mean_absolute_error:
```

e_error: 0.1508 - mean_squared_error: 0.0440 - val_loss: 0.2790 - val_mean_absolute_error: 0.2790 - val_mean_squared_error: 0.1368
Epoch 24/500
327/328 [=====>.] - ETA: 0s - loss: 0.1480 - mean_absolute_error: 0.1480 - mean_squared_error: 0.0425
Epoch 00024: val_loss did not improve from 0.27814
328/328 [=====] - 239s 728ms/step - loss: 0.1481 - mean_absolute_error: 0.1481 - mean_squared_error: 0.0425 - val_loss: 0.2808 - val_mean_absolute_error: 0.2808 - val_mean_squared_error: 0.1383
Epoch 25/500
327/328 [=====>.] - ETA: 0s - loss: 0.1452 - mean_absolute_error: 0.1452 - mean_squared_error: 0.0410
Epoch 00025: val_loss did not improve from 0.27814
328/328 [=====] - 239s 729ms/step - loss: 0.1451 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0410 - val_loss: 0.2824 - val_mean_absolute_error: 0.2824 - val_mean_squared_error: 0.1389
Epoch 26/500
327/328 [=====>.] - ETA: 0s - loss: 0.1442 - mean_absolute_error: 0.1442 - mean_squared_error: 0.0406
Epoch 00026: val_loss did not improve from 0.27814
328/328 [=====] - 240s 731ms/step - loss: 0.1441 - mean_absolute_error: 0.1441 - mean_squared_error: 0.0406 - val_loss: 0.2788 - val_mean_absolute_error: 0.2788 - val_mean_squared_error: 0.1372
Epoch 27/500
327/328 [=====>.] - ETA: 0s - loss: 0.1424 - mean_absolute_error: 0.1424 - mean_squared_error: 0.0390
Epoch 00027: val_loss improved from 0.27814 to 0.27612, saving model to best_inception_model.hdf5
328/328 [=====] - 241s 733ms/step - loss: 0.1424 - mean_absolute_error: 0.1424 - mean_squared_error: 0.0390 - val_loss: 0.2761 - val_mean_absolute_error: 0.2761 - val_mean_squared_error: 0.1373
Epoch 28/500
327/328 [=====>.] - ETA: 0s - loss: 0.1386 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0373
Epoch 00028: val_loss did not improve from 0.27612
328/328 [=====] - 245s 746ms/step - loss: 0.1386 - mean_absolute_error: 0.1386 - mean_squared_error: 0.0373 - val_loss: 0.2788 - val_mean_absolute_error: 0.2788 - val_mean_squared_error: 0.1376
Epoch 29/500
327/328 [=====>.] - ETA: 0s - loss: 0.1363 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0363
Epoch 00029: val_loss improved from 0.27612 to 0.27486, saving model to best_inception_model.hdf5
328/328 [=====] - 245s 748ms/step - loss: 0.1363 - mean_absolute_error: 0.1363 - mean_squared_error: 0.0363 - val_loss: 0.2749 - val_mean_absolute_error: 0.2749 - val_mean_squared_error: 0.1351
Epoch 30/500
327/328 [=====>.] - ETA: 0s - loss: 0.1357 - mean_absolute_error: 0.1357 - mean_squared_error: 0.0358
Epoch 00030: val_loss improved from 0.27486 to 0.27366, saving model to best_inception_model.hdf5
328/328 [=====] - 244s 744ms/step - loss: 0.1358 - mean_absolute_error: 0.1358 - mean_squared_error: 0.0359 - val_loss: 0.2737 - val_mean_absolute_error: 0.2737 - val_mean_squared_error: 0.1320
Epoch 31/500
327/328 [=====>.] - ETA: 0s - loss: 0.1321 - mean_absolute_error: 0.1321 - mean_squared_error: 0.0338
Epoch 00031: val_loss did not improve from 0.27366
328/328 [=====] - 241s 734ms/step - loss: 0.1322 - mean_absolute_error: 0.1322 - mean_squared_error: 0.0339 - val_loss: 0.2747 - val_mean_absolute_error: 0.2747 - val_mean_squared_error: 0.1335

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Epoch 32/500
327/328 [=====>.] - ETA: 0s - loss: 0.1309 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0335
Epoch 00032: val_loss did not improve from 0.27366
328/328 [=====] - 242s 738ms/step - loss: 0.1309 - mean_absolute_error: 0.1309 - mean_squared_error: 0.0335 - val_loss: 0.2768 - val_mean_absolute_error: 0.2768 - val_mean_squared_error: 0.1349
Epoch 33/500
327/328 [=====>.] - ETA: 0s - loss: 0.1289 - mean_absolute_error: 0.1289 - mean_squared_error: 0.0326
Epoch 00033: val_loss improved from 0.27366 to 0.27271, saving model to best_inception_model.hdf5
328/328 [=====] - 238s 727ms/step - loss: 0.1289 - mean_absolute_error: 0.1289 - mean_squared_error: 0.0326 - val_loss: 0.2727 - val_mean_absolute_error: 0.2727 - val_mean_squared_error: 0.1328
Epoch 34/500
327/328 [=====>.] - ETA: 0s - loss: 0.1284 - mean_absolute_error: 0.1284 - mean_squared_error: 0.0322
Epoch 00034: val_loss improved from 0.27271 to 0.27232, saving model to best_inception_model.hdf5
328/328 [=====] - 239s 727ms/step - loss: 0.1285 - mean_absolute_error: 0.1285 - mean_squared_error: 0.0322 - val_loss: 0.2723 - val_mean_absolute_error: 0.2723 - val_mean_squared_error: 0.1308
Epoch 35/500
327/328 [=====>.] - ETA: 0s - loss: 0.1268 - mean_absolute_error: 0.1268 - mean_squared_error: 0.0312
Epoch 00035: val_loss did not improve from 0.27232
328/328 [=====] - 239s 730ms/step - loss: 0.1267 - mean_absolute_error: 0.1267 - mean_squared_error: 0.0311 - val_loss: 0.2737 - val_mean_absolute_error: 0.2737 - val_mean_squared_error: 0.1317
Epoch 36/500
327/328 [=====>.] - ETA: 0s - loss: 0.1232 - mean_absolute_error: 0.1232 - mean_squared_error: 0.0299
Epoch 00036: val_loss did not improve from 0.27232
328/328 [=====] - 242s 739ms/step - loss: 0.1232 - mean_absolute_error: 0.1232 - mean_squared_error: 0.0300 - val_loss: 0.2748 - val_mean_absolute_error: 0.2748 - val_mean_squared_error: 0.1328
Epoch 37/500
327/328 [=====>.] - ETA: 0s - loss: 0.1230 - mean_absolute_error: 0.1230 - mean_squared_error: 0.0298
Epoch 00037: val_loss did not improve from 0.27232
328/328 [=====] - 271s 825ms/step - loss: 0.1230 - mean_absolute_error: 0.1230 - mean_squared_error: 0.0298 - val_loss: 0.2743 - val_mean_absolute_error: 0.2743 - val_mean_squared_error: 0.1314
Epoch 38/500
327/328 [=====>.] - ETA: 0s - loss: 0.1211 - mean_absolute_error: 0.1211 - mean_squared_error: 0.0287
Epoch 00038: val_loss did not improve from 0.27232
328/328 [=====] - 254s 773ms/step - loss: 0.1211 - mean_absolute_error: 0.1211 - mean_squared_error: 0.0286 - val_loss: 0.2764 - val_mean_absolute_error: 0.2764 - val_mean_squared_error: 0.1358
Epoch 39/500
327/328 [=====>.] - ETA: 0s - loss: 0.1194 - mean_absolute_error: 0.1194 - mean_squared_error: 0.0284
Epoch 00039: val_loss improved from 0.27232 to 0.27149, saving model to best_inception_model.hdf5
328/328 [=====] - 239s 728ms/step - loss: 0.1194 - mean_absolute_error: 0.1194 - mean_squared_error: 0.0283 - val_loss: 0.2715 - val_mean_absolute_error: 0.2715 - val_mean_squared_error: 0.1303
Epoch 40/500
327/328 [=====>.] - ETA: 0s - loss: 0.1181 - mean_absolute_error:
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0.1181 - mean_squared_error: 0.0276
Epoch 00040: val_loss did not improve from 0.27149
328/328 [=====] - 238s 725ms/step - loss: 0.1181 - mean_absolute_error: 0.1181 - mean_squared_error: 0.0276 - val_loss: 0.2770 - val_mean_absolute_error: 0.2770 - val_mean_squared_error: 0.1341
Epoch 41/500
327/328 [=====>.] - ETA: 0s - loss: 0.1167 - mean_absolute_error: 0.1167 - mean_squared_error: 0.0268
Epoch 00041: val_loss did not improve from 0.27149
328/328 [=====] - 238s 725ms/step - loss: 0.1166 - mean_absolute_error: 0.1166 - mean_squared_error: 0.0267 - val_loss: 0.2732 - val_mean_absolute_error: 0.2732 - val_mean_squared_error: 0.1316
Epoch 42/500
327/328 [=====>.] - ETA: 0s - loss: 0.1158 - mean_absolute_error: 0.1158 - mean_squared_error: 0.0267
Epoch 00042: val_loss did not improve from 0.27149
328/328 [=====] - 242s 738ms/step - loss: 0.1158 - mean_absolute_error: 0.1158 - mean_squared_error: 0.0267 - val_loss: 0.2820 - val_mean_absolute_error: 0.2820 - val_mean_squared_error: 0.1398
Epoch 43/500
327/328 [=====>.] - ETA: 0s - loss: 0.1146 - mean_absolute_error: 0.1146 - mean_squared_error: 0.0260
Epoch 00043: val_loss did not improve from 0.27149
328/328 [=====] - 243s 742ms/step - loss: 0.1146 - mean_absolute_error: 0.1146 - mean_squared_error: 0.0260 - val_loss: 0.2724 - val_mean_absolute_error: 0.2724 - val_mean_squared_error: 0.1310
Epoch 44/500
327/328 [=====>.] - ETA: 0s - loss: 0.1131 - mean_absolute_error: 0.1131 - mean_squared_error: 0.0255
Epoch 00044: val_loss did not improve from 0.27149
328/328 [=====] - 242s 739ms/step - loss: 0.1131 - mean_absolute_error: 0.1131 - mean_squared_error: 0.0254 - val_loss: 0.2751 - val_mean_absolute_error: 0.2751 - val_mean_squared_error: 0.1322
Epoch 45/500
327/328 [=====>.] - ETA: 0s - loss: 0.1141 - mean_absolute_error: 0.1141 - mean_squared_error: 0.0255
Epoch 00045: val_loss did not improve from 0.27149
328/328 [=====] - 240s 732ms/step - loss: 0.1141 - mean_absolute_error: 0.1141 - mean_squared_error: 0.0255 - val_loss: 0.2769 - val_mean_absolute_error: 0.2769 - val_mean_squared_error: 0.1343
Epoch 46/500
327/328 [=====>.] - ETA: 0s - loss: 0.1103 - mean_absolute_error: 0.1103 - mean_squared_error: 0.0243
Epoch 00046: val_loss improved from 0.27149 to 0.26950, saving model to best_inception_model.hdf5
328/328 [=====] - 243s 740ms/step - loss: 0.1103 - mean_absolute_error: 0.1103 - mean_squared_error: 0.0243 - val_loss: 0.2695 - val_mean_absolute_error: 0.2695 - val_mean_squared_error: 0.1288
Epoch 47/500
327/328 [=====>.] - ETA: 0s - loss: 0.1087 - mean_absolute_error: 0.1087 - mean_squared_error: 0.0236
Epoch 00047: val_loss did not improve from 0.26950
328/328 [=====] - 244s 745ms/step - loss: 0.1088 - mean_absolute_error: 0.1088 - mean_squared_error: 0.0236 - val_loss: 0.2699 - val_mean_absolute_error: 0.2699 - val_mean_squared_error: 0.1267
Epoch 48/500
327/328 [=====>.] - ETA: 0s - loss: 0.1079 - mean_absolute_error: 0.1079 - mean_squared_error: 0.0233
Epoch 00048: val_loss did not improve from 0.26950
328/328 [=====] - 244s 744ms/step - loss: 0.1079 - mean_absolute_error: 0.1079 - mean_squared_error: 0.0233 - val_loss: 0.2764 - val_mean_absolute_error:
```

```
r: 0.2764 - val_mean_squared_error: 0.1365
Epoch 49/500
327/328 [=====>.] - ETA: 0s - loss: 0.1074 - mean_absolute_error: 0.1074 - mean_squared_error: 0.0228
Epoch 00049: val_loss did not improve from 0.26950
328/328 [=====] - 240s 731ms/step - loss: 0.1073 - mean_absolute_error: 0.1073 - mean_squared_error: 0.0228 - val_loss: 0.2726 - val_mean_absolute_error: 0.2726 - val_mean_squared_error: 0.1299
Epoch 50/500
327/328 [=====>.] - ETA: 0s - loss: 0.1055 - mean_absolute_error: 0.1055 - mean_squared_error: 0.0223
Epoch 00050: val_loss did not improve from 0.26950
328/328 [=====] - 243s 740ms/step - loss: 0.1055 - mean_absolute_error: 0.1055 - mean_squared_error: 0.0223 - val_loss: 0.2786 - val_mean_absolute_error: 0.2786 - val_mean_squared_error: 0.1332
Epoch 51/500
327/328 [=====>.] - ETA: 0s - loss: 0.1040 - mean_absolute_error: 0.1040 - mean_squared_error: 0.0216
Epoch 00051: val_loss did not improve from 0.26950
328/328 [=====] - 246s 749ms/step - loss: 0.1041 - mean_absolute_error: 0.1041 - mean_squared_error: 0.0216 - val_loss: 0.2753 - val_mean_absolute_error: 0.2753 - val_mean_squared_error: 0.1302
Epoch 52/500
327/328 [=====>.] - ETA: 0s - loss: 0.1041 - mean_absolute_error: 0.1041 - mean_squared_error: 0.0216
Epoch 00052: val_loss did not improve from 0.26950
328/328 [=====] - 245s 748ms/step - loss: 0.1040 - mean_absolute_error: 0.1040 - mean_squared_error: 0.0215 - val_loss: 0.2715 - val_mean_absolute_error: 0.2715 - val_mean_squared_error: 0.1311
Epoch 53/500
327/328 [=====>.] - ETA: 0s - loss: 0.1025 - mean_absolute_error: 0.1025 - mean_squared_error: 0.0211
Epoch 00053: val_loss did not improve from 0.26950
328/328 [=====] - 241s 735ms/step - loss: 0.1024 - mean_absolute_error: 0.1024 - mean_squared_error: 0.0211 - val_loss: 0.2734 - val_mean_absolute_error: 0.2734 - val_mean_squared_error: 0.1318
Epoch 54/500
327/328 [=====>.] - ETA: 0s - loss: 0.1020 - mean_absolute_error: 0.1020 - mean_squared_error: 0.0210
Epoch 00054: val_loss did not improve from 0.26950
328/328 [=====] - 241s 735ms/step - loss: 0.1021 - mean_absolute_error: 0.1021 - mean_squared_error: 0.0210 - val_loss: 0.2714 - val_mean_absolute_error: 0.2714 - val_mean_squared_error: 0.1288
Epoch 55/500
327/328 [=====>.] - ETA: 0s - loss: 0.1009 - mean_absolute_error: 0.1009 - mean_squared_error: 0.0205
Epoch 00055: val_loss improved from 0.26950 to 0.26677, saving model to best_inception_model.hdf5
328/328 [=====] - 242s 737ms/step - loss: 0.1009 - mean_absolute_error: 0.1009 - mean_squared_error: 0.0205 - val_loss: 0.2668 - val_mean_absolute_error: 0.2668 - val_mean_squared_error: 0.1259
Epoch 56/500
327/328 [=====>.] - ETA: 0s - loss: 0.1002 - mean_absolute_error: 0.1002 - mean_squared_error: 0.0202
Epoch 00056: val_loss did not improve from 0.26677
328/328 [=====] - 242s 737ms/step - loss: 0.1002 - mean_absolute_error: 0.1002 - mean_squared_error: 0.0201 - val_loss: 0.2722 - val_mean_absolute_error: 0.2722 - val_mean_squared_error: 0.1294
Epoch 57/500
327/328 [=====>.] - ETA: 0s - loss: 0.0978 - mean_absolute_error: 0.0978 - mean_squared_error: 0.0193
```

```
Epoch 00057: val_loss did not improve from 0.26677
328/328 [=====] - 242s 739ms/step - loss: 0.0979 - mean_absolute_error: 0.0979 - mean_squared_error: 0.0194 - val_loss: 0.2687 - val_mean_absolute_error: 0.2687 - val_mean_squared_error: 0.1263
Epoch 58/500
327/328 [=====>.] - ETA: 0s - loss: 0.0969 - mean_absolute_error: 0.0969 - mean_squared_error: 0.0191
Epoch 00058: val_loss did not improve from 0.26677
328/328 [=====] - 246s 751ms/step - loss: 0.0969 - mean_absolute_error: 0.0969 - mean_squared_error: 0.0191 - val_loss: 0.2735 - val_mean_absolute_error: 0.2735 - val_mean_squared_error: 0.1328
Epoch 59/500
327/328 [=====>.] - ETA: 0s - loss: 0.0986 - mean_absolute_error: 0.0986 - mean_squared_error: 0.0196
Epoch 00059: val_loss did not improve from 0.26677
328/328 [=====] - 246s 751ms/step - loss: 0.0985 - mean_absolute_error: 0.0985 - mean_squared_error: 0.0196 - val_loss: 0.2762 - val_mean_absolute_error: 0.2762 - val_mean_squared_error: 0.1340
Epoch 60/500
327/328 [=====>.] - ETA: 0s - loss: 0.0964 - mean_absolute_error: 0.0964 - mean_squared_error: 0.0188
Epoch 00060: val_loss did not improve from 0.26677
328/328 [=====] - 243s 742ms/step - loss: 0.0964 - mean_absolute_error: 0.0964 - mean_squared_error: 0.0188 - val_loss: 0.2715 - val_mean_absolute_error: 0.2715 - val_mean_squared_error: 0.1291
Epoch 61/500
327/328 [=====>.] - ETA: 0s - loss: 0.0956 - mean_absolute_error: 0.0956 - mean_squared_error: 0.0186
Epoch 00061: val_loss did not improve from 0.26677
328/328 [=====] - 244s 743ms/step - loss: 0.0955 - mean_absolute_error: 0.0955 - mean_squared_error: 0.0186 - val_loss: 0.2722 - val_mean_absolute_error: 0.2722 - val_mean_squared_error: 0.1294
Epoch 62/500
327/328 [=====>.] - ETA: 0s - loss: 0.0965 - mean_absolute_error: 0.0965 - mean_squared_error: 0.0186
Epoch 00062: val_loss did not improve from 0.26677
328/328 [=====] - 247s 753ms/step - loss: 0.0965 - mean_absolute_error: 0.0965 - mean_squared_error: 0.0186 - val_loss: 0.2744 - val_mean_absolute_error: 0.2744 - val_mean_squared_error: 0.1316
Epoch 63/500
327/328 [=====>.] - ETA: 0s - loss: 0.0948 - mean_absolute_error: 0.0948 - mean_squared_error: 0.0180
Epoch 00063: val_loss did not improve from 0.26677
328/328 [=====] - 246s 750ms/step - loss: 0.0948 - mean_absolute_error: 0.0948 - mean_squared_error: 0.0180 - val_loss: 0.2757 - val_mean_absolute_error: 0.2757 - val_mean_squared_error: 0.1315
Epoch 64/500
327/328 [=====>.] - ETA: 0s - loss: 0.0936 - mean_absolute_error: 0.0936 - mean_squared_error: 0.0178
Epoch 00064: val_loss did not improve from 0.26677
328/328 [=====] - 243s 741ms/step - loss: 0.0936 - mean_absolute_error: 0.0936 - mean_squared_error: 0.0178 - val_loss: 0.2738 - val_mean_absolute_error: 0.2738 - val_mean_squared_error: 0.1316
Epoch 65/500
327/328 [=====>.] - ETA: 0s - loss: 0.0927 - mean_absolute_error: 0.0927 - mean_squared_error: 0.0174
Epoch 00065: val_loss did not improve from 0.26677
328/328 [=====] - 246s 749ms/step - loss: 0.0927 - mean_absolute_error: 0.0927 - mean_squared_error: 0.0174 - val_loss: 0.2741 - val_mean_absolute_error: 0.2741 - val_mean_squared_error: 0.1311
Epoch 66/500
```

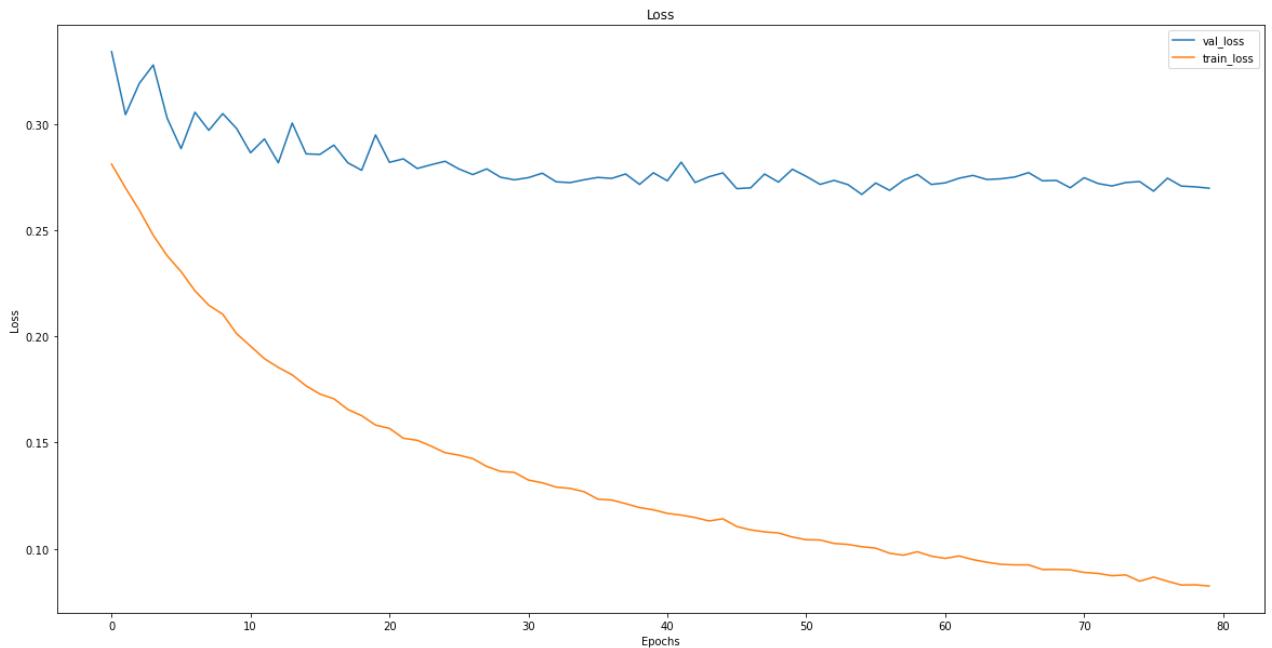
327/328 [=====>.] - ETA: 0s - loss: 0.0923 - mean_absolute_error: 0.0923 - mean_squared_error: 0.0174
Epoch 00066: val_loss did not improve from 0.26677
328/328 [=====] - 247s 752ms/step - loss: 0.0924 - mean_absolute_error: 0.0924 - mean_squared_error: 0.0174 - val_loss: 0.2750 - val_mean_absolute_error: 0.2750 - val_mean_squared_error: 0.1325
Epoch 67/500
327/328 [=====>.] - ETA: 0s - loss: 0.0922 - mean_absolute_error: 0.0922 - mean_squared_error: 0.0170
Epoch 00067: val_loss did not improve from 0.26677
328/328 [=====] - 244s 745ms/step - loss: 0.0923 - mean_absolute_error: 0.0923 - mean_squared_error: 0.0170 - val_loss: 0.2770 - val_mean_absolute_error: 0.2770 - val_mean_squared_error: 0.1322
Epoch 68/500
327/328 [=====>.] - ETA: 0s - loss: 0.0902 - mean_absolute_error: 0.0902 - mean_squared_error: 0.0163
Epoch 00068: val_loss did not improve from 0.26677
328/328 [=====] - 247s 753ms/step - loss: 0.0901 - mean_absolute_error: 0.0901 - mean_squared_error: 0.0163 - val_loss: 0.2732 - val_mean_absolute_error: 0.2732 - val_mean_squared_error: 0.1293
Epoch 69/500
327/328 [=====>.] - ETA: 0s - loss: 0.0902 - mean_absolute_error: 0.0902 - mean_squared_error: 0.0163
Epoch 00069: val_loss did not improve from 0.26677
328/328 [=====] - 247s 752ms/step - loss: 0.0902 - mean_absolute_error: 0.0902 - mean_squared_error: 0.0163 - val_loss: 0.2734 - val_mean_absolute_error: 0.2734 - val_mean_squared_error: 0.1286
Epoch 70/500
327/328 [=====>.] - ETA: 0s - loss: 0.0900 - mean_absolute_error: 0.0900 - mean_squared_error: 0.0164
Epoch 00070: val_loss did not improve from 0.26677
328/328 [=====] - 241s 736ms/step - loss: 0.0900 - mean_absolute_error: 0.0900 - mean_squared_error: 0.0164 - val_loss: 0.2699 - val_mean_absolute_error: 0.2699 - val_mean_squared_error: 0.1272
Epoch 71/500
327/328 [=====>.] - ETA: 0s - loss: 0.0888 - mean_absolute_error: 0.0888 - mean_squared_error: 0.0159
Epoch 00071: val_loss did not improve from 0.26677
328/328 [=====] - 244s 743ms/step - loss: 0.0888 - mean_absolute_error: 0.0888 - mean_squared_error: 0.0159 - val_loss: 0.2746 - val_mean_absolute_error: 0.2746 - val_mean_squared_error: 0.1318
Epoch 72/500
327/328 [=====>.] - ETA: 0s - loss: 0.0884 - mean_absolute_error: 0.0884 - mean_squared_error: 0.0159
Epoch 00072: val_loss did not improve from 0.26677
328/328 [=====] - 246s 750ms/step - loss: 0.0883 - mean_absolute_error: 0.0883 - mean_squared_error: 0.0159 - val_loss: 0.2719 - val_mean_absolute_error: 0.2719 - val_mean_squared_error: 0.1310
Epoch 73/500
327/328 [=====>.] - ETA: 0s - loss: 0.0872 - mean_absolute_error: 0.0872 - mean_squared_error: 0.0154
Epoch 00073: val_loss did not improve from 0.26677
328/328 [=====] - 246s 750ms/step - loss: 0.0872 - mean_absolute_error: 0.0872 - mean_squared_error: 0.0154 - val_loss: 0.2708 - val_mean_absolute_error: 0.2708 - val_mean_squared_error: 0.1282
Epoch 74/500
327/328 [=====>.] - ETA: 0s - loss: 0.0876 - mean_absolute_error: 0.0876 - mean_squared_error: 0.0152
Epoch 00074: val_loss did not improve from 0.26677
328/328 [=====] - 241s 735ms/step - loss: 0.0876 - mean_absolute_error: 0.0876 - mean_squared_error: 0.0152 - val_loss: 0.2724 - val_mean_absolute_error:

```
r: 0.2724 - val_mean_squared_error: 0.1291
Epoch 75/500
327/328 [=====>.] - ETA: 0s - loss: 0.0846 - mean_absolute_error: 0.0846 - mean_squared_error: 0.0145
Epoch 00075: val_loss did not improve from 0.26677
328/328 [=====] - 242s 737ms/step - loss: 0.0846 - mean_absolute_error: 0.0846 - mean_squared_error: 0.0145 - val_loss: 0.2728 - val_mean_absolute_error: 0.2728 - val_mean_squared_error: 0.1302
Epoch 76/500
327/328 [=====>.] - ETA: 0s - loss: 0.0865 - mean_absolute_error: 0.0865 - mean_squared_error: 0.0149
Epoch 00076: val_loss did not improve from 0.26677
328/328 [=====] - 245s 748ms/step - loss: 0.0866 - mean_absolute_error: 0.0866 - mean_squared_error: 0.0150 - val_loss: 0.2683 - val_mean_absolute_error: 0.2683 - val_mean_squared_error: 0.1267
Epoch 77/500
327/328 [=====>.] - ETA: 0s - loss: 0.0847 - mean_absolute_error: 0.0847 - mean_squared_error: 0.0144
Epoch 00077: val_loss did not improve from 0.26677
328/328 [=====] - 247s 753ms/step - loss: 0.0847 - mean_absolute_error: 0.0847 - mean_squared_error: 0.0144 - val_loss: 0.2744 - val_mean_absolute_error: 0.2744 - val_mean_squared_error: 0.1328
Epoch 78/500
327/328 [=====>.] - ETA: 0s - loss: 0.0829 - mean_absolute_error: 0.0829 - mean_squared_error: 0.0140
Epoch 00078: val_loss did not improve from 0.26677
328/328 [=====] - 245s 746ms/step - loss: 0.0829 - mean_absolute_error: 0.0829 - mean_squared_error: 0.0140 - val_loss: 0.2707 - val_mean_absolute_error: 0.2707 - val_mean_squared_error: 0.1286
Epoch 79/500
327/328 [=====>.] - ETA: 0s - loss: 0.0830 - mean_absolute_error: 0.0830 - mean_squared_error: 0.0138
Epoch 00079: val_loss did not improve from 0.26677
328/328 [=====] - 242s 737ms/step - loss: 0.0830 - mean_absolute_error: 0.0830 - mean_squared_error: 0.0138 - val_loss: 0.2703 - val_mean_absolute_error: 0.2703 - val_mean_squared_error: 0.1273
Epoch 80/500
327/328 [=====>.] - ETA: 0s - loss: 0.0822 - mean_absolute_error: 0.0822 - mean_squared_error: 0.0136Restoring model weights from the end of the best epoch.

Epoch 00080: val_loss did not improve from 0.26677
328/328 [=====] - 246s 750ms/step - loss: 0.0823 - mean_absolute_error: 0.0823 - mean_squared_error: 0.0136 - val_loss: 0.2697 - val_mean_absolute_error: 0.2697 - val_mean_squared_error: 0.1281
Epoch 00080: early stopping
```

In [143...]

```
visualize_training_results(results)
```



Simple CNN base

In [144...]

```
basic_cnn = basic_cnn_branch()

results, basic_cnn_aug_model = run_nn(basic_cnn, image_train_generator, y_train, image_
```

Model: "model_40"

Layer (type)	Output Shape	Param #
<hr/>		
input_41 (InputLayer)	[(None, 299, 299, 3)]	0
conv2d_94 (Conv2D)	(None, 299, 299, 64)	9472
max_pooling2d_4 (MaxPooling2	(None, 149, 149, 64)	0
conv2d_95 (Conv2D)	(None, 149, 149, 128)	73856
conv2d_96 (Conv2D)	(None, 149, 149, 128)	147584
max_pooling2d_5 (MaxPooling2	(None, 74, 74, 128)	0
conv2d_97 (Conv2D)	(None, 74, 74, 256)	295168
conv2d_98 (Conv2D)	(None, 74, 74, 256)	590080
max_pooling2d_6 (MaxPooling2	(None, 37, 37, 256)	0
conv2d_99 (Conv2D)	(None, 37, 37, 512)	1180160
conv2d_100 (Conv2D)	(None, 37, 37, 512)	2359808
max_pooling2d_7 (MaxPooling2	(None, 18, 18, 512)	0
flatten (Flatten)	(None, 165888)	0
dense_272 (Dense)	(None, 128)	21233792

dropout_6 (Dropout)	(None, 128)	0
dense_273 (Dense)	(None, 64)	8256
dropout_7 (Dropout)	(None, 64)	0
dense_274 (Dense)	(None, 1)	65

Total params: 25,898,241
Trainable params: 25,898,241
Non-trainable params: 0

None

[INFO] training model...

WARNING:tensorflow:sample_weight modes were coerced from

...
to
['...']

Train for 328 steps, validate for 41 steps

Epoch 1/500

327/328 [=====>.] - ETA: 0s - loss: 3.2443 - mean_absolute_error: 3.2443 - mean_squared_error: 19.4941

Epoch 00001: val_loss improved from inf to 1.87111, saving model to best_basic_cnn_augments_model.hdf5

328/328 [=====] - 245s 748ms/step - loss: 3.2407 - mean_absolute_error: 3.2407 - mean_squared_error: 19.4563 - val_loss: 1.8711 - val_mean_absolute_error: 1.8711 - val_mean_squared_error: 3.6912

Epoch 2/500

327/328 [=====>.] - ETA: 0s - loss: 1.5781 - mean_absolute_error: 1.5781 - mean_squared_error: 4.1218

Epoch 00002: val_loss improved from 1.87111 to 0.34057, saving model to best_basic_cnn_augments_model.hdf5

328/328 [=====] - 239s 729ms/step - loss: 1.5760 - mean_absolute_error: 1.5760 - mean_squared_error: 4.1131 - val_loss: 0.3406 - val_mean_absolute_error: 0.3406 - val_mean_squared_error: 0.1927

Epoch 3/500

327/328 [=====>.] - ETA: 0s - loss: 0.9202 - mean_absolute_error: 0.9202 - mean_squared_error: 1.3327

Epoch 00003: val_loss did not improve from 0.34057

328/328 [=====] - 242s 738ms/step - loss: 0.9203 - mean_absolute_error: 0.9203 - mean_squared_error: 1.3329 - val_loss: 0.3828 - val_mean_absolute_error: 0.3828 - val_mean_squared_error: 0.2235

Epoch 4/500

327/328 [=====>.] - ETA: 0s - loss: 0.6823 - mean_absolute_error: 0.6823 - mean_squared_error: 0.7442

Epoch 00004: val_loss did not improve from 0.34057

328/328 [=====] - 243s 741ms/step - loss: 0.6824 - mean_absolute_error: 0.6824 - mean_squared_error: 0.7442 - val_loss: 0.4119 - val_mean_absolute_error:

```
r: 0.4119 - val_mean_squared_error: 0.2802
Epoch 5/500
327/328 [=====>.] - ETA: 0s - loss: 0.4991 - mean_absolute_error: 0.4991 - mean_squared_error: 0.3987
Epoch 00005: val_loss improved from 0.34057 to 0.34010, saving model to best_basic_cnn_augments_model.hdf5
328/328 [=====] - 243s 740ms/step - loss: 0.4988 - mean_absolute_error: 0.4988 - mean_squared_error: 0.3984 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1907
Epoch 6/500
327/328 [=====>.] - ETA: 0s - loss: 0.3870 - mean_absolute_error: 0.3870 - mean_squared_error: 0.2451
Epoch 00006: val_loss did not improve from 0.34010
328/328 [=====] - 243s 740ms/step - loss: 0.3871 - mean_absolute_error: 0.3871 - mean_squared_error: 0.2453 - val_loss: 0.3405 - val_mean_absolute_error: 0.3405 - val_mean_squared_error: 0.1925
Epoch 7/500
327/328 [=====>.] - ETA: 0s - loss: 0.3465 - mean_absolute_error: 0.3465 - mean_squared_error: 0.2006
Epoch 00007: val_loss did not improve from 0.34010
328/328 [=====] - 243s 742ms/step - loss: 0.3466 - mean_absolute_error: 0.3466 - mean_squared_error: 0.2007 - val_loss: 0.3404 - val_mean_absolute_error: 0.3404 - val_mean_squared_error: 0.1905
Epoch 8/500
327/328 [=====>.] - ETA: 0s - loss: 0.3396 - mean_absolute_error: 0.3396 - mean_squared_error: 0.1932
Epoch 00008: val_loss did not improve from 0.34010
328/328 [=====] - 244s 745ms/step - loss: 0.3397 - mean_absolute_error: 0.3397 - mean_squared_error: 0.1934 - val_loss: 0.3409 - val_mean_absolute_error: 0.3409 - val_mean_squared_error: 0.1904
Epoch 9/500
327/328 [=====>.] - ETA: 0s - loss: 0.3389 - mean_absolute_error: 0.3389 - mean_squared_error: 0.1929
Epoch 00009: val_loss improved from 0.34010 to 0.34008, saving model to best_basic_cnn_augments_model.hdf5
328/328 [=====] - 243s 741ms/step - loss: 0.3388 - mean_absolute_error: 0.3388 - mean_squared_error: 0.1927 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1907
Epoch 10/500
327/328 [=====>.] - ETA: 0s - loss: 0.3377 - mean_absolute_error: 0.3377 - mean_squared_error: 0.1914
Epoch 00010: val_loss did not improve from 0.34008
328/328 [=====] - 240s 732ms/step - loss: 0.3379 - mean_absolute_error: 0.3379 - mean_squared_error: 0.1916 - val_loss: 0.3404 - val_mean_absolute_error: 0.3404 - val_mean_squared_error: 0.1905
Epoch 11/500
327/328 [=====>.] - ETA: 0s - loss: 0.3381 - mean_absolute_error: 0.3381 - mean_squared_error: 0.1920
Epoch 00011: val_loss did not improve from 0.34008
328/328 [=====] - 245s 746ms/step - loss: 0.3383 - mean_absolute_error: 0.3383 - mean_squared_error: 0.1922 - val_loss: 0.3410 - val_mean_absolute_error: 0.3410 - val_mean_squared_error: 0.1935
Epoch 12/500
327/328 [=====>.] - ETA: 0s - loss: 0.3370 - mean_absolute_error: 0.3370 - mean_squared_error: 0.1911
Epoch 00012: val_loss did not improve from 0.34008
328/328 [=====] - 245s 747ms/step - loss: 0.3367 - mean_absolute_error: 0.3367 - mean_squared_error: 0.1910 - val_loss: 0.3403 - val_mean_absolute_error: 0.3403 - val_mean_squared_error: 0.1921
Epoch 13/500
327/328 [=====>.] - ETA: 0s - loss: 0.3370 - mean_absolute_error:
```

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0.3370 - mean_squared_error: 0.1916
Epoch 00013: val_loss did not improve from 0.34008
328/328 [=====] - 242s 739ms/step - loss: 0.3369 - mean_absolute_error: 0.3369 - mean_squared_error: 0.1915 - val_loss: 0.3427 - val_mean_absolute_error: 0.3427 - val_mean_squared_error: 0.1908
Epoch 14/500
327/328 [=====>.] - ETA: 0s - loss: 0.3362 - mean_absolute_error: 0.3362 - mean_squared_error: 0.1900
Epoch 00014: val_loss did not improve from 0.34008
328/328 [=====] - 246s 749ms/step - loss: 0.3366 - mean_absolute_error: 0.3366 - mean_squared_error: 0.1905 - val_loss: 0.3402 - val_mean_absolute_error: 0.3402 - val_mean_squared_error: 0.1918
Epoch 15/500
327/328 [=====>.] - ETA: 0s - loss: 0.3365 - mean_absolute_error: 0.3365 - mean_squared_error: 0.1902
Epoch 00015: val_loss improved from 0.34008 to 0.34008, saving model to best_basic_cnn_augments_model.hdf5
328/328 [=====] - 246s 749ms/step - loss: 0.3367 - mean_absolute_error: 0.3367 - mean_squared_error: 0.1904 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1914
Epoch 16/500
327/328 [=====>.] - ETA: 0s - loss: 0.3359 - mean_absolute_error: 0.3359 - mean_squared_error: 0.1896
Epoch 00016: val_loss did not improve from 0.34008
328/328 [=====] - 242s 737ms/step - loss: 0.3362 - mean_absolute_error: 0.3362 - mean_squared_error: 0.1899 - val_loss: 0.3431 - val_mean_absolute_error: 0.3431 - val_mean_squared_error: 0.1972
Epoch 17/500
327/328 [=====>.] - ETA: 0s - loss: 0.3365 - mean_absolute_error: 0.3365 - mean_squared_error: 0.1903
Epoch 00017: val_loss did not improve from 0.34008
328/328 [=====] - 245s 747ms/step - loss: 0.3367 - mean_absolute_error: 0.3367 - mean_squared_error: 0.1907 - val_loss: 0.3408 - val_mean_absolute_error: 0.3408 - val_mean_squared_error: 0.1931
Epoch 18/500
327/328 [=====>.] - ETA: 0s - loss: 0.3359 - mean_absolute_error: 0.3359 - mean_squared_error: 0.1899
Epoch 00018: val_loss did not improve from 0.34008
328/328 [=====] - 246s 749ms/step - loss: 0.3359 - mean_absolute_error: 0.3359 - mean_squared_error: 0.1899 - val_loss: 0.3406 - val_mean_absolute_error: 0.3406 - val_mean_squared_error: 0.1904
Epoch 19/500
327/328 [=====>.] - ETA: 0s - loss: 0.3362 - mean_absolute_error: 0.3362 - mean_squared_error: 0.1900
Epoch 00019: val_loss did not improve from 0.34008
328/328 [=====] - 242s 739ms/step - loss: 0.3360 - mean_absolute_error: 0.3360 - mean_squared_error: 0.1899 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1906
Epoch 20/500
327/328 [=====>.] - ETA: 0s - loss: 0.3357 - mean_absolute_error: 0.3357 - mean_squared_error: 0.1895
Epoch 00020: val_loss did not improve from 0.34008
328/328 [=====] - 239s 730ms/step - loss: 0.3358 - mean_absolute_error: 0.3358 - mean_squared_error: 0.1897 - val_loss: 0.3416 - val_mean_absolute_error: 0.3416 - val_mean_squared_error: 0.1947
Epoch 21/500
327/328 [=====>.] - ETA: 0s - loss: 0.3357 - mean_absolute_error: 0.3357 - mean_squared_error: 0.1899
Epoch 00021: val_loss did not improve from 0.34008
328/328 [=====] - 240s 732ms/step - loss: 0.3357 - mean_absolute_error: 0.3357 - mean_squared_error: 0.1898 - val_loss: 0.3402 - val_mean_absolute_error:
```

```
r: 0.3402 - val_mean_squared_error: 0.1919
Epoch 22/500
327/328 [=====>.] - ETA: 0s - loss: 0.3365 - mean_absolute_error: 0.3365 - mean_squared_error: 0.1902
Epoch 00022: val_loss did not improve from 0.34008
328/328 [=====] - 245s 746ms/step - loss: 0.3363 - mean_absolute_error: 0.3363 - mean_squared_error: 0.1900 - val_loss: 0.3403 - val_mean_absolute_error: 0.3403 - val_mean_squared_error: 0.1920
Epoch 23/500
327/328 [=====>.] - ETA: 0s - loss: 0.3357 - mean_absolute_error: 0.3357 - mean_squared_error: 0.1898
Epoch 00023: val_loss did not improve from 0.34008
328/328 [=====] - 245s 746ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1897 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1914
Epoch 24/500
327/328 [=====>.] - ETA: 0s - loss: 0.3357 - mean_absolute_error: 0.3357 - mean_squared_error: 0.1894
Epoch 00024: val_loss did not improve from 0.34008
328/328 [=====] - 241s 735ms/step - loss: 0.3358 - mean_absolute_error: 0.3358 - mean_squared_error: 0.1896 - val_loss: 0.3424 - val_mean_absolute_error: 0.3424 - val_mean_squared_error: 0.1960
Epoch 25/500
327/328 [=====>.] - ETA: 0s - loss: 0.3361 - mean_absolute_error: 0.3361 - mean_squared_error: 0.1905
Epoch 00025: val_loss did not improve from 0.34008
328/328 [=====] - 240s 732ms/step - loss: 0.3359 - mean_absolute_error: 0.3359 - mean_squared_error: 0.1903 - val_loss: 0.3419 - val_mean_absolute_error: 0.3419 - val_mean_squared_error: 0.1905
Epoch 26/500
327/328 [=====>.] - ETA: 0s - loss: 0.3359 - mean_absolute_error: 0.3359 - mean_squared_error: 0.1897
Epoch 00026: val_loss improved from 0.34008 to 0.34005, saving model to best_basic_cnn_augments_model.hdf5
328/328 [=====] - 245s 748ms/step - loss: 0.3363 - mean_absolute_error: 0.3363 - mean_squared_error: 0.1901 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1910
Epoch 27/500
327/328 [=====>.] - ETA: 0s - loss: 0.3355 - mean_absolute_error: 0.3355 - mean_squared_error: 0.1894
Epoch 00027: val_loss did not improve from 0.34005
328/328 [=====] - 242s 737ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1896 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1907
Epoch 28/500
327/328 [=====>.] - ETA: 0s - loss: 0.3362 - mean_absolute_error: 0.3362 - mean_squared_error: 0.1902
Epoch 00028: val_loss did not improve from 0.34005
328/328 [=====] - 239s 728ms/step - loss: 0.3361 - mean_absolute_error: 0.3361 - mean_squared_error: 0.1900 - val_loss: 0.3406 - val_mean_absolute_error: 0.3406 - val_mean_squared_error: 0.1904
Epoch 29/500
327/328 [=====>.] - ETA: 0s - loss: 0.3352 - mean_absolute_error: 0.3352 - mean_squared_error: 0.1893
Epoch 00029: val_loss did not improve from 0.34005
328/328 [=====] - 243s 740ms/step - loss: 0.3353 - mean_absolute_error: 0.3353 - mean_squared_error: 0.1896 - val_loss: 0.3410 - val_mean_absolute_error: 0.3410 - val_mean_squared_error: 0.1935
Epoch 30/500
327/328 [=====>.] - ETA: 0s - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1893
```

```
Epoch 00030: val_loss did not improve from 0.34005
328/328 [=====] - 242s 738ms/step - loss: 0.3357 - mean_absolute_error: 0.3357 - mean_squared_error: 0.1896 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1914
Epoch 31/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1895
Epoch 00031: val_loss did not improve from 0.34005
328/328 [=====] - 242s 737ms/step - loss: 0.3352 - mean_absolute_error: 0.3352 - mean_squared_error: 0.1893 - val_loss: 0.3404 - val_mean_absolute_error: 0.3404 - val_mean_squared_error: 0.1923
Epoch 32/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3357 - mean_absolute_error: 0.3357 - mean_squared_error: 0.1894
Epoch 00032: val_loss did not improve from 0.34005
328/328 [=====] - 238s 724ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1895 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1914
Epoch 33/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3357 - mean_absolute_error: 0.3357 - mean_squared_error: 0.1897
Epoch 00033: val_loss did not improve from 0.34005
328/328 [=====] - 239s 728ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1895 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1911
Epoch 34/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3359 - mean_absolute_error: 0.3359 - mean_squared_error: 0.1899
Epoch 00034: val_loss improved from 0.34005 to 0.34004, saving model to best_basic_cnn_augments_model.hdf5
328/328 [=====] - 238s 725ms/step - loss: 0.3358 - mean_absolute_error: 0.3358 - mean_squared_error: 0.1898 - val_loss: 0.3400 - val_mean_absolute_error: 0.3400 - val_mean_squared_error: 0.1909
Epoch 35/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3355 - mean_absolute_error: 0.3355 - mean_squared_error: 0.1897
Epoch 00035: val_loss did not improve from 0.34004
328/328 [=====] - 237s 722ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1898 - val_loss: 0.3408 - val_mean_absolute_error: 0.3408 - val_mean_squared_error: 0.1931
Epoch 36/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3357 - mean_absolute_error: 0.3357 - mean_squared_error: 0.1900
Epoch 00036: val_loss did not improve from 0.34004
328/328 [=====] - 238s 724ms/step - loss: 0.3357 - mean_absolute_error: 0.3357 - mean_squared_error: 0.1899 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1907
Epoch 37/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3355 - mean_absolute_error: 0.3355 - mean_squared_error: 0.1894
Epoch 00037: val_loss did not improve from 0.34004
328/328 [=====] - 241s 735ms/step - loss: 0.3353 - mean_absolute_error: 0.3353 - mean_squared_error: 0.1892 - val_loss: 0.3405 - val_mean_absolute_error: 0.3405 - val_mean_squared_error: 0.1925
Epoch 38/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3358 - mean_absolute_error: 0.3358 - mean_squared_error: 0.1897
Epoch 00038: val_loss did not improve from 0.34004
328/328 [=====] - 241s 736ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1895 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1913
```

Epoch 39/500
327/328 [=====>.] - ETA: 0s - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1893
Epoch 00039: val_loss did not improve from 0.34004
328/328 [=====] - 241s 734ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1895 - val_loss: 0.3412 - val_mean_absolute_error: 0.3412 - val_mean_squared_error: 0.1940
Epoch 40/500
327/328 [=====>.] - ETA: 0s - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1898
Epoch 00040: val_loss did not improve from 0.34004
328/328 [=====] - 243s 742ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1899 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1917
Epoch 41/500
327/328 [=====>.] - ETA: 0s - loss: 0.3349 - mean_absolute_error: 0.3349 - mean_squared_error: 0.1887
Epoch 00041: val_loss improved from 0.34004 to 0.34004, saving model to best_basic_cnn_augments_model.hdf5
328/328 [=====] - 244s 744ms/step - loss: 0.3355 - mean_absolute_error: 0.3355 - mean_squared_error: 0.1894 - val_loss: 0.3400 - val_mean_absolute_error: 0.3400 - val_mean_squared_error: 0.1909
Epoch 42/500
327/328 [=====>.] - ETA: 0s - loss: 0.3352 - mean_absolute_error: 0.3352 - mean_squared_error: 0.1892
Epoch 00042: val_loss did not improve from 0.34004
328/328 [=====] - 239s 727ms/step - loss: 0.3353 - mean_absolute_error: 0.3353 - mean_squared_error: 0.1892 - val_loss: 0.3409 - val_mean_absolute_error: 0.3409 - val_mean_squared_error: 0.1904
Epoch 43/500
327/328 [=====>.] - ETA: 0s - loss: 0.3355 - mean_absolute_error: 0.3355 - mean_squared_error: 0.1892
Epoch 00043: val_loss did not improve from 0.34004
328/328 [=====] - 238s 725ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1894 - val_loss: 0.3411 - val_mean_absolute_error: 0.3411 - val_mean_squared_error: 0.1937
Epoch 44/500
327/328 [=====>.] - ETA: 0s - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1896
Epoch 00044: val_loss did not improve from 0.34004
328/328 [=====] - 241s 736ms/step - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1895 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1907
Epoch 45/500
327/328 [=====>.] - ETA: 0s - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1898
Epoch 00045: val_loss did not improve from 0.34004
328/328 [=====] - 244s 743ms/step - loss: 0.3351 - mean_absolute_error: 0.3351 - mean_squared_error: 0.1895 - val_loss: 0.3417 - val_mean_absolute_error: 0.3417 - val_mean_squared_error: 0.1905
Epoch 46/500
327/328 [=====>.] - ETA: 0s - loss: 0.3352 - mean_absolute_error: 0.3352 - mean_squared_error: 0.1896
Epoch 00046: val_loss did not improve from 0.34004
328/328 [=====] - 243s 741ms/step - loss: 0.3353 - mean_absolute_error: 0.3353 - mean_squared_error: 0.1895 - val_loss: 0.3403 - val_mean_absolute_error: 0.3403 - val_mean_squared_error: 0.1922
Epoch 47/500
327/328 [=====>.] - ETA: 0s - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1894
Epoch 00047: val_loss did not improve from 0.34004

328/328 [=====] - 238s 726ms/step - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1895 - val_loss: 0.3403 - val_mean_absolute_error: 0.3403 - val_mean_squared_error: 0.1920
Epoch 48/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3353 - mean_absolute_error: 0.3353 - mean_squared_error: 0.1893
Epoch 00048: val_loss did not improve from 0.34004
328/328 [=====] - 238s 727ms/step - loss: 0.3353 - mean_absolute_error: 0.3353 - mean_squared_error: 0.1893 - val_loss: 0.3410 - val_mean_absolute_error: 0.3410 - val_mean_squared_error: 0.1935
Epoch 49/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1895
Epoch 00049: val_loss did not improve from 0.34004
328/328 [=====] - 238s 725ms/step - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1894 - val_loss: 0.3403 - val_mean_absolute_error: 0.3403 - val_mean_squared_error: 0.1920
Epoch 50/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1896
Epoch 00050: val_loss did not improve from 0.34004
328/328 [=====] - 238s 725ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1896 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1908
Epoch 51/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1896
Epoch 00051: val_loss did not improve from 0.34004
328/328 [=====] - 239s 729ms/step - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1896 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1911
Epoch 52/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3353 - mean_absolute_error: 0.3353 - mean_squared_error: 0.1892
Epoch 00052: val_loss did not improve from 0.34004
328/328 [=====] - 244s 743ms/step - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1894 - val_loss: 0.3422 - val_mean_absolute_error: 0.3422 - val_mean_squared_error: 0.1906
Epoch 53/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1898
Epoch 00053: val_loss did not improve from 0.34004
328/328 [=====] - 244s 745ms/step - loss: 0.3356 - mean_absolute_error: 0.3356 - mean_squared_error: 0.1898 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1915
Epoch 54/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3355 - mean_absolute_error: 0.3355 - mean_squared_error: 0.1894
Epoch 00054: val_loss did not improve from 0.34004
328/328 [=====] - 240s 731ms/step - loss: 0.3354 - mean_absolute_error: 0.3354 - mean_squared_error: 0.1893 - val_loss: 0.3431 - val_mean_absolute_error: 0.3431 - val_mean_squared_error: 0.1971
Epoch 55/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3359 - mean_absolute_error: 0.3359 - mean_squared_error: 0.1899
Epoch 00055: val_loss did not improve from 0.34004
328/328 [=====] - 243s 739ms/step - loss: 0.3358 - mean_absolute_error: 0.3358 - mean_squared_error: 0.1897 - val_loss: 0.3421 - val_mean_absolute_error: 0.3421 - val_mean_squared_error: 0.1956
Epoch 56/500
327/328 [=====.>.] - ETA: 0s - loss: 0.3359 - mean_absolute_error:

```
0.3359 - mean_squared_error: 0.1901Restoring model weights from the end of the best epoch.
```

```
Epoch 00056: val_loss did not improve from 0.34004
328/328 [=====] - 243s 740ms/step - loss: 0.3358 - mean_absolute_error: 0.3358 - mean_squared_error: 0.1899 - val_loss: 0.3401 - val_mean_absolute_error: 0.3401 - val_mean_squared_error: 0.1910
Epoch 00056: early stopping
```

Multi-Input NN

In [207...]

```
mlp_baseline, mlp_inputs = mlp_branch(X_train_tabular.shape[1], [1024, 512, 256, 128, nlp_baseline, nlp_inputs = nlp_branch(num_tokens, embedding_matrix, max_words, multi=True)
cnn_baseline, cnn_inputs = inception_cnn_branch(transfer_trainable=False, multi=True)

multi_model = joined_model([mlp_baseline, nlp_baseline, cnn_baseline], [mlp_inputs, nlp_inputs, cnn_inputs])
```

```
Adding initial Dense layers with 1024
Adding Dense layer with 512
Adding Dense layer with 256
Adding Dense layer with 128
Adding last layer with 64
Outputting multi-nn model layer - Tabular
Outputting multi-nn model layer - NLP
Outputting multi-nn model layer - CNN
Model: "model_108"
```

Layer (type)	Output Shape	Param #	Connected to
<hr/>			
input_113 (InputLayer)	[(None, 61)]	0	
input_114 (InputLayer)	[(None, None)]	0	
dense_819 (Dense)	(None, 1024)	63488	input_113[0][0]
embedding_1 (Embedding)	(None, None, 300)	4559100	input_114[0][0]
input_116 (InputLayer)	[(None, 299, 299, 3)]	0	
dense_820 (Dense)	(None, 512)	524800	dense_819[0][0]
bidirectional_2 (Bidirectional)	(None, None, 300)	541200	embedding_1[0][0]
inception_v3 (Model)	(None, 8, 8, 2048)	21802784	input_116[0][0]
dense_821 (Dense)	(None, 256)	131328	dense_820[0][0]
bidirectional_3 (Bidirectional)	(None, 300)	541200	bidirectional_2[0][0]

avg_pool	(GlobalAveragePooling2 (None, 2048)	0	inception_v3[1][0]
dense_822	(Dense) (None, 128)	32896	dense_821[0][0]
dense_824	(Dense) (None, 128)	38528	bidirectional_3[0][0]
batch_normalization_501	(BatchN (None, 2048)	8192	avg_pool[0][0]
dense_823	(Dense) (None, 64)	8256	dense_822[0][0]
dense_825	(Dense) (None, 64)	8256	dense_824[0][0]
dense_826	(Dense) (None, 64)	131136	batch_normalization_501[0][0]
concatenate_7	(Concatenate) (None, 192)	0	dense_823[0][0] dense_825[0][0] dense_826[0][0]
dense_827	(Dense) (None, 1)	193	concatenate_7[0][0]
<hr/>			
=====			
Total params: 28,391,357			
Trainable params: 2,025,377			
Non-trainable params: 26,365,980			

None

```
In [208...]: results, multi_model = run_nn(multi_model, [X_train_tabular, tokenized_train, images_tr

[INFO] training model...
Train on 10471 samples, validate on 1309 samples
Epoch 1/500
10464/10471 [=====>.] - ETA: 0s - loss: 1.3145 - mean_absolute_error: 1.3145 - mean_squared_error: 6.0922
Epoch 00001: val_loss improved from inf to 0.40653, saving model to best_multi_model.hdf5
10471/10471 [=====] - 98s 9ms/sample - loss: 1.3140 - mean_absolute_error: 1.3124 - mean_squared_error: 6.0750 - val_loss: 0.4065 - val_mean_absolute_error: 0.4067 - val_mean_squared_error: 0.2654
Epoch 2/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.5519 - mean_absolute_error: 0.5519 - mean_squared_error: 0.5666
Epoch 00002: val_loss improved from 0.40653 to 0.34813, saving model to best_multi_model.hdf5
10471/10471 [=====] - 83s 8ms/sample - loss: 0.5517 - mean_absolute_error: 0.5510 - mean_squared_error: 0.5652 - val_loss: 0.3481 - val_mean_absolute_error: 0.3481 - val_mean_squared_error: 0.2004
Epoch 3/500
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10464/10471 [=====>.] - ETA: 0s - loss: 0.3977 - mean_absolute_error: 0.3977 - mean_squared_error: 0.2643
Epoch 00003: val_loss improved from 0.34813 to 0.27920, saving model to best_multi_mode1.hdf5
10471/10471 [=====] - 85s 8ms/sample - loss: 0.3979 - mean_absolute_error: 0.3985 - mean_squared_error: 0.2648 - val_loss: 0.2792 - val_mean_absolute_error: 0.2794 - val_mean_squared_error: 0.1226
Epoch 4/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3167 - mean_absolute_error: 0.3167 - mean_squared_error: 0.1643
Epoch 00004: val_loss improved from 0.27920 to 0.27622, saving model to best_multi_mode1.hdf5
10471/10471 [=====] - 85s 8ms/sample - loss: 0.3166 - mean_absolute_error: 0.3164 - mean_squared_error: 0.1641 - val_loss: 0.2762 - val_mean_absolute_error: 0.2763 - val_mean_squared_error: 0.1107
Epoch 5/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.3140 - mean_absolute_error: 0.3140 - mean_squared_error: 0.1592
Epoch 00005: val_loss did not improve from 0.27622
10471/10471 [=====] - 82s 8ms/sample - loss: 0.3139 - mean_absolute_error: 0.3136 - mean_squared_error: 0.1589 - val_loss: 0.5503 - val_mean_absolute_error: 0.5501 - val_mean_squared_error: 0.3646
Epoch 6/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2763 - mean_absolute_error: 0.2763 - mean_squared_error: 0.1273
Epoch 00006: val_loss did not improve from 0.27622
10471/10471 [=====] - 81s 8ms/sample - loss: 0.2763 - mean_absolute_error: 0.2762 - mean_squared_error: 0.1271 - val_loss: 0.7168 - val_mean_absolute_error: 0.7169 - val_mean_squared_error: 0.5911
Epoch 7/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2621 - mean_absolute_error: 0.2621 - mean_squared_error: 0.1119
Epoch 00007: val_loss did not improve from 0.27622
10471/10471 [=====] - 81s 8ms/sample - loss: 0.2621 - mean_absolute_error: 0.2623 - mean_squared_error: 0.1119 - val_loss: 0.3378 - val_mean_absolute_error: 0.3377 - val_mean_squared_error: 0.1643
Epoch 8/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2740 - mean_absolute_error: 0.2740 - mean_squared_error: 0.1250
Epoch 00008: val_loss improved from 0.27622 to 0.17741, saving model to best_multi_mode1.hdf5
10471/10471 [=====] - 85s 8ms/sample - loss: 0.2740 - mean_absolute_error: 0.2743 - mean_squared_error: 0.1251 - val_loss: 0.1774 - val_mean_absolute_error: 0.1774 - val_mean_squared_error: 0.0605
Epoch 9/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.2185 - mean_absolute_error: 0.2185 - mean_squared_error: 0.0802
Epoch 00009: val_loss improved from 0.17741 to 0.17501, saving model to best_multi_mode1.hdf5
10471/10471 [=====] - 86s 8ms/sample - loss: 0.2184 - mean_absolute_error: 0.2182 - mean_squared_error: 0.0800 - val_loss: 0.1750 - val_mean_absolute_error: 0.1750 - val_mean_squared_error: 0.0557
Epoch 10/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1929 - mean_absolute_error: 0.1929 - mean_squared_error: 0.0637
Epoch 00010: val_loss improved from 0.17501 to 0.16568, saving model to best_multi_mode1.hdf5
10471/10471 [=====] - 85s 8ms/sample - loss: 0.1930 - mean_absolute_error: 0.1933 - mean_squared_error: 0.0640 - val_loss: 0.1657 - val_mean_absolute_error: 0.1657 - val_mean_squared_error: 0.0532
Epoch 11/500
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10464/10471 [=====>.] - ETA: 0s - loss: 0.1706 - mean_absolute_error: 0.1706 - mean_squared_error: 0.0516
Epoch 00011: val_loss did not improve from 0.16568
10471/10471 [=====] - 81s 8ms/sample - loss: 0.1706 - mean_absolute_error: 0.1706 - mean_squared_error: 0.0515 - val_loss: 0.1874 - val_mean_absolute_error: 0.1874 - val_mean_squared_error: 0.0653
Epoch 12/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1576 - mean_absolute_error: 0.1576 - mean_squared_error: 0.0464
Epoch 00012: val_loss did not improve from 0.16568
10471/10471 [=====] - 81s 8ms/sample - loss: 0.1576 - mean_absolute_error: 0.1576 - mean_squared_error: 0.0464 - val_loss: 0.1893 - val_mean_absolute_error: 0.1893 - val_mean_squared_error: 0.0629
Epoch 13/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1699 - mean_absolute_error: 0.1699 - mean_squared_error: 0.0527
Epoch 00013: val_loss did not improve from 0.16568
10471/10471 [=====] - 81s 8ms/sample - loss: 0.1699 - mean_absolute_error: 0.1700 - mean_squared_error: 0.0528 - val_loss: 0.2260 - val_mean_absolute_error: 0.2262 - val_mean_squared_error: 0.0787
Epoch 14/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1444 - mean_absolute_error: 0.1444 - mean_squared_error: 0.0396
Epoch 00014: val_loss improved from 0.16568 to 0.16202, saving model to best_multi_mode1.hdf5
10471/10471 [=====] - 85s 8ms/sample - loss: 0.1444 - mean_absolute_error: 0.1444 - mean_squared_error: 0.0398 - val_loss: 0.1620 - val_mean_absolute_error: 0.1620 - val_mean_squared_error: 0.0506
Epoch 15/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1453 - mean_absolute_error: 0.1453 - mean_squared_error: 0.0397
Epoch 00015: val_loss improved from 0.16202 to 0.15895, saving model to best_multi_mode1.hdf5
10471/10471 [=====] - 86s 8ms/sample - loss: 0.1452 - mean_absolute_error: 0.1451 - mean_squared_error: 0.0396 - val_loss: 0.1590 - val_mean_absolute_error: 0.1589 - val_mean_squared_error: 0.0492
Epoch 16/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1389 - mean_absolute_error: 0.1389 - mean_squared_error: 0.0368
Epoch 00016: val_loss did not improve from 0.15895
10471/10471 [=====] - 82s 8ms/sample - loss: 0.1389 - mean_absolute_error: 0.1388 - mean_squared_error: 0.0368 - val_loss: 0.1650 - val_mean_absolute_error: 0.1649 - val_mean_squared_error: 0.0515
Epoch 17/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1356 - mean_absolute_error: 0.1356 - mean_squared_error: 0.0354
Epoch 00017: val_loss did not improve from 0.15895
10471/10471 [=====] - 81s 8ms/sample - loss: 0.1357 - mean_absolute_error: 0.1359 - mean_squared_error: 0.0357 - val_loss: 0.1915 - val_mean_absolute_error: 0.1915 - val_mean_squared_error: 0.0617
Epoch 18/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1311 - mean_absolute_error: 0.1311 - mean_squared_error: 0.0340
Epoch 00018: val_loss improved from 0.15895 to 0.15836, saving model to best_multi_mode1.hdf5
10471/10471 [=====] - 83s 8ms/sample - loss: 0.1312 - mean_absolute_error: 0.1312 - mean_squared_error: 0.0340 - val_loss: 0.1584 - val_mean_absolute_error: 0.1583 - val_mean_squared_error: 0.0487
Epoch 19/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1364 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0355
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Epoch 00019: val_loss improved from 0.15836 to 0.15765, saving model to best_multi_mode1.hdf5

10471/10471 [=====] - 83s 8ms/sample - loss: 0.1364 - mean_absolute_error: 0.1364 - mean_squared_error: 0.0355 - val_loss: 0.1576 - val_mean_absolute_error: 0.1576 - val_mean_squared_error: 0.0478

Epoch 20/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.1203 - mean_absolute_error: 0.1203 - mean_squared_error: 0.0289

Epoch 00020: val_loss did not improve from 0.15765

10471/10471 [=====] - 81s 8ms/sample - loss: 0.1203 - mean_absolute_error: 0.1203 - mean_squared_error: 0.0289 - val_loss: 0.1587 - val_mean_absolute_error: 0.1586 - val_mean_squared_error: 0.0504

Epoch 21/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.1193 - mean_absolute_error: 0.1193 - mean_squared_error: 0.0284

Epoch 00021: val_loss did not improve from 0.15765

10471/10471 [=====] - 81s 8ms/sample - loss: 0.1193 - mean_absolute_error: 0.1194 - mean_squared_error: 0.0284 - val_loss: 0.3005 - val_mean_absolute_error: 0.3007 - val_mean_squared_error: 0.1202

Epoch 22/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.1243 - mean_absolute_error: 0.1243 - mean_squared_error: 0.0302

Epoch 00022: val_loss did not improve from 0.15765

10471/10471 [=====] - 81s 8ms/sample - loss: 0.1243 - mean_absolute_error: 0.1243 - mean_squared_error: 0.0302 - val_loss: 0.2051 - val_mean_absolute_error: 0.2052 - val_mean_squared_error: 0.0669

Epoch 23/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.1217 - mean_absolute_error: 0.1217 - mean_squared_error: 0.0288

Epoch 00023: val_loss improved from 0.15765 to 0.15020, saving model to best_multi_mode1.hdf5

10471/10471 [=====] - 84s 8ms/sample - loss: 0.1217 - mean_absolute_error: 0.1217 - mean_squared_error: 0.0287 - val_loss: 0.1502 - val_mean_absolute_error: 0.1501 - val_mean_squared_error: 0.0451

Epoch 24/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.1137 - mean_absolute_error: 0.1137 - mean_squared_error: 0.0259

Epoch 00024: val_loss did not improve from 0.15020

10471/10471 [=====] - 81s 8ms/sample - loss: 0.1137 - mean_absolute_error: 0.1138 - mean_squared_error: 0.0259 - val_loss: 0.1545 - val_mean_absolute_error: 0.1545 - val_mean_squared_error: 0.0463

Epoch 25/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.1046 - mean_absolute_error: 0.1046 - mean_squared_error: 0.0228

Epoch 00025: val_loss did not improve from 0.15020

10471/10471 [=====] - 81s 8ms/sample - loss: 0.1046 - mean_absolute_error: 0.1045 - mean_squared_error: 0.0228 - val_loss: 0.1573 - val_mean_absolute_error: 0.1574 - val_mean_squared_error: 0.0476

Epoch 26/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.1151 - mean_absolute_error: 0.1151 - mean_squared_error: 0.0258

Epoch 00026: val_loss did not improve from 0.15020

10471/10471 [=====] - 81s 8ms/sample - loss: 0.1151 - mean_absolute_error: 0.1150 - mean_squared_error: 0.0258 - val_loss: 0.2166 - val_mean_absolute_error: 0.2165 - val_mean_squared_error: 0.0761

Epoch 27/500

10464/10471 [=====>.] - ETA: 0s - loss: 0.1169 - mean_absolute_error: 0.1169 - mean_squared_error: 0.0264

Epoch 00027: val_loss did not improve from 0.15020

10471/10471 [=====] - 81s 8ms/sample - loss: 0.1169 - mean_absolute_error: 0.1168 - mean_squared_error: 0.0264 - val_loss: 0.1548 - val_mean_absolute_error: 0.1548 - val_mean_squared_error: 0.0504

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rror: 0.1548 - val_mean_squared_error: 0.0468
Epoch 28/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1150 - mean_absolute_error: 0.1150 - mean_squared_error: 0.0251
Epoch 00028: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.1150 - mean_absolute_error: 0.1149 - mean_squared_error: 0.0251 - val_loss: 0.1647 - val_mean_absolute_error: 0.1647 - val_mean_squared_error: 0.0517
Epoch 29/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1099 - mean_absolute_error: 0.1099 - mean_squared_error: 0.0235
Epoch 00029: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.1099 - mean_absolute_error: 0.1098 - mean_squared_error: 0.0234 - val_loss: 0.1826 - val_mean_absolute_error: 0.1827 - val_mean_squared_error: 0.0580
Epoch 30/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1084 - mean_absolute_error: 0.1084 - mean_squared_error: 0.0231
Epoch 00030: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.1084 - mean_absolute_error: 0.1085 - mean_squared_error: 0.0231 - val_loss: 0.1654 - val_mean_absolute_error: 0.1654 - val_mean_squared_error: 0.0496
Epoch 31/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1112 - mean_absolute_error: 0.1112 - mean_squared_error: 0.0239
Epoch 00031: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.1112 - mean_absolute_error: 0.1113 - mean_squared_error: 0.0239 - val_loss: 0.1545 - val_mean_absolute_error: 0.1545 - val_mean_squared_error: 0.0478
Epoch 32/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1064 - mean_absolute_error: 0.1064 - mean_squared_error: 0.0222
Epoch 00032: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.1064 - mean_absolute_error: 0.1063 - mean_squared_error: 0.0222 - val_loss: 0.1532 - val_mean_absolute_error: 0.1532 - val_mean_squared_error: 0.0459
Epoch 33/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1071 - mean_absolute_error: 0.1071 - mean_squared_error: 0.0220
Epoch 00033: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.1071 - mean_absolute_error: 0.1071 - mean_squared_error: 0.0220 - val_loss: 0.1594 - val_mean_absolute_error: 0.1593 - val_mean_squared_error: 0.0494
Epoch 34/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.1002 - mean_absolute_error: 0.1002 - mean_squared_error: 0.0197
Epoch 00034: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.1003 - mean_absolute_error: 0.1005 - mean_squared_error: 0.0199 - val_loss: 0.1524 - val_mean_absolute_error: 0.1523 - val_mean_squared_error: 0.0456
Epoch 35/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0979 - mean_absolute_error: 0.0979 - mean_squared_error: 0.0189
Epoch 00035: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0979 - mean_absolute_error: 0.0979 - mean_squared_error: 0.0189 - val_loss: 0.1536 - val_mean_absolute_error: 0.1536 - val_mean_squared_error: 0.0478
Epoch 36/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0970 - mean_absolute_error: 0.0970 - mean_squared_error: 0.0186
Epoch 00036: val_loss did not improve from 0.15020
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10471/10471 [=====] - 80s 8ms/sample - loss: 0.0970 - mean_absolute_error: 0.0971 - mean_squared_error: 0.0187 - val_loss: 0.1876 - val_mean_absolute_error: 0.1875 - val_mean_squared_error: 0.0647
Epoch 37/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1033 - mean_absolute_error: 0.1033 - mean_squared_error: 0.0203
Epoch 00037: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.1033 - mean_absolute_error: 0.1033 - mean_squared_error: 0.0203 - val_loss: 0.1547 - val_mean_absolute_error: 0.1547 - val_mean_squared_error: 0.0477
Epoch 38/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0961 - mean_absolute_error: 0.0961 - mean_squared_error: 0.0182
Epoch 00038: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0961 - mean_absolute_error: 0.0962 - mean_squared_error: 0.0182 - val_loss: 0.1663 - val_mean_absolute_error: 0.1662 - val_mean_squared_error: 0.0511
Epoch 39/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1006 - mean_absolute_error: 0.1006 - mean_squared_error: 0.0195
Epoch 00039: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.1006 - mean_absolute_error: 0.1007 - mean_squared_error: 0.0195 - val_loss: 0.1689 - val_mean_absolute_error: 0.1689 - val_mean_squared_error: 0.0513
Epoch 40/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.1047 - mean_absolute_error: 0.1047 - mean_squared_error: 0.0202
Epoch 00040: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.1047 - mean_absolute_error: 0.1047 - mean_squared_error: 0.0202 - val_loss: 0.1917 - val_mean_absolute_error: 0.1918 - val_mean_squared_error: 0.0606
Epoch 41/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0922 - mean_absolute_error: 0.0922 - mean_squared_error: 0.0167
Epoch 00041: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0922 - mean_absolute_error: 0.0921 - mean_squared_error: 0.0167 - val_loss: 0.1925 - val_mean_absolute_error: 0.1926 - val_mean_squared_error: 0.0631
Epoch 42/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0907 - mean_absolute_error: 0.0907 - mean_squared_error: 0.0162
Epoch 00042: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0907 - mean_absolute_error: 0.0906 - mean_squared_error: 0.0162 - val_loss: 0.1553 - val_mean_absolute_error: 0.1552 - val_mean_squared_error: 0.0472
Epoch 43/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0884 - mean_absolute_error: 0.0884 - mean_squared_error: 0.0154
Epoch 00043: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0884 - mean_absolute_error: 0.0885 - mean_squared_error: 0.0154 - val_loss: 0.1539 - val_mean_absolute_error: 0.1539 - val_mean_squared_error: 0.0479
Epoch 44/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0893 - mean_absolute_error: 0.0893 - mean_squared_error: 0.0158
Epoch 00044: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0893 - mean_absolute_error: 0.0893 - mean_squared_error: 0.0158 - val_loss: 0.1742 - val_mean_absolute_error: 0.1741 - val_mean_squared_error: 0.0571
Epoch 45/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0890 - mean_absolute_error:
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ror: 0.0890 - mean_squared_error: 0.0156
Epoch 00045: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0890 - mean_absolute_error: 0.0890 - mean_squared_error: 0.0156 - val_loss: 0.1651 - val_mean_absolute_error: 0.1651 - val_mean_squared_error: 0.0513
Epoch 46/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0886 - mean_absolute_error: 0.0886 - mean_squared_error: 0.0153
Epoch 00046: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0887 - mean_absolute_error: 0.0890 - mean_squared_error: 0.0155 - val_loss: 0.1851 - val_mean_absolute_error: 0.1851 - val_mean_squared_error: 0.0597
Epoch 47/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0863 - mean_absolute_error: 0.0863 - mean_squared_error: 0.0148
Epoch 00047: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0863 - mean_absolute_error: 0.0863 - mean_squared_error: 0.0148 - val_loss: 0.2013 - val_mean_absolute_error: 0.2012 - val_mean_squared_error: 0.0698
Epoch 48/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0915 - mean_absolute_error: 0.0915 - mean_squared_error: 0.0159
Epoch 00048: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0915 - mean_absolute_error: 0.0915 - mean_squared_error: 0.0159 - val_loss: 0.1563 - val_mean_absolute_error: 0.1562 - val_mean_squared_error: 0.0489
Epoch 49/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0856 - mean_absolute_error: 0.0856 - mean_squared_error: 0.0142
Epoch 00049: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0856 - mean_absolute_error: 0.0857 - mean_squared_error: 0.0142 - val_loss: 0.1526 - val_mean_absolute_error: 0.1526 - val_mean_squared_error: 0.0471
Epoch 50/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0876 - mean_absolute_error: 0.0876 - mean_squared_error: 0.0148
Epoch 00050: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0876 - mean_absolute_error: 0.0876 - mean_squared_error: 0.0148 - val_loss: 0.1598 - val_mean_absolute_error: 0.1599 - val_mean_squared_error: 0.0479
Epoch 51/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0916 - mean_absolute_error: 0.0916 - mean_squared_error: 0.0157
Epoch 00051: val_loss did not improve from 0.15020
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0916 - mean_absolute_error: 0.0915 - mean_squared_error: 0.0157 - val_loss: 0.1563 - val_mean_absolute_error: 0.1563 - val_mean_squared_error: 0.0466
Epoch 52/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0850 - mean_absolute_error: 0.0850 - mean_squared_error: 0.0138
Epoch 00052: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0849 - mean_absolute_error: 0.0849 - mean_squared_error: 0.0138 - val_loss: 0.1578 - val_mean_absolute_error: 0.1579 - val_mean_squared_error: 0.0489
Epoch 53/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0837 - mean_absolute_error: 0.0837 - mean_squared_error: 0.0133
Epoch 00053: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0837 - mean_absolute_error: 0.0836 - mean_squared_error: 0.0133 - val_loss: 0.1551 - val_mean_absolute_error: 0.1551 - val_mean_squared_error: 0.0470
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Epoch 54/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0886 - mean_absolute_error: 0.0886 - mean_squared_error: 0.0144
Epoch 00054: val_loss did not improve from 0.15020
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0886 - mean_absolute_error: 0.0886 - mean_squared_error: 0.0143 - val_loss: 0.1516 - val_mean_absolute_error: 0.1516 - val_mean_squared_error: 0.0470
Epoch 55/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0927 - mean_absolute_error: 0.0927 - mean_squared_error: 0.0157
Epoch 00055: val_loss improved from 0.15020 to 0.14734, saving model to best_multi_mode1.hdf5
10471/10471 [=====] - 83s 8ms/sample - loss: 0.0926 - mean_absolute_error: 0.0926 - mean_squared_error: 0.0157 - val_loss: 0.1473 - val_mean_absolute_error: 0.1473 - val_mean_squared_error: 0.0430
Epoch 56/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0892 - mean_absolute_error: 0.0892 - mean_squared_error: 0.0147
Epoch 00056: val_loss did not improve from 0.14734
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0892 - mean_absolute_error: 0.0893 - mean_squared_error: 0.0147 - val_loss: 0.1519 - val_mean_absolute_error: 0.1519 - val_mean_squared_error: 0.0462
Epoch 57/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0869 - mean_absolute_error: 0.0869 - mean_squared_error: 0.0141
Epoch 00057: val_loss did not improve from 0.14734
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0869 - mean_absolute_error: 0.0869 - mean_squared_error: 0.0141 - val_loss: 0.1480 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0448
Epoch 58/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0780 - mean_absolute_error: 0.0780 - mean_squared_error: 0.0120
Epoch 00058: val_loss improved from 0.14734 to 0.14389, saving model to best_multi_mode1.hdf5
10471/10471 [=====] - 83s 8ms/sample - loss: 0.0780 - mean_absolute_error: 0.0780 - mean_squared_error: 0.0120 - val_loss: 0.1439 - val_mean_absolute_error: 0.1439 - val_mean_squared_error: 0.0433
Epoch 59/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0820 - mean_absolute_error: 0.0820 - mean_squared_error: 0.0128
Epoch 00059: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0821 - mean_absolute_error: 0.0821 - mean_squared_error: 0.0128 - val_loss: 0.1495 - val_mean_absolute_error: 0.1495 - val_mean_squared_error: 0.0466
Epoch 60/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0800 - mean_absolute_error: 0.0800 - mean_squared_error: 0.0121
Epoch 00060: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0800 - mean_absolute_error: 0.0801 - mean_squared_error: 0.0121 - val_loss: 0.1582 - val_mean_absolute_error: 0.1582 - val_mean_squared_error: 0.0490
Epoch 61/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0775 - mean_absolute_error: 0.0775 - mean_squared_error: 0.0114
Epoch 00061: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0775 - mean_absolute_error: 0.0775 - mean_squared_error: 0.0114 - val_loss: 0.1540 - val_mean_absolute_error: 0.1540 - val_mean_squared_error: 0.0474
Epoch 62/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0787 - mean_absolute_error: 0.0787 - mean_squared_error: 0.0118

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Epoch 00062: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0786 - mean_absolute_error: 0.0786 - mean_squared_error: 0.0118 - val_loss: 0.1599 - val_mean_absolute_error: 0.1599 - val_mean_squared_error: 0.0493
Epoch 63/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0769 - mean_absolute_error: 0.0769 - mean_squared_error: 0.0110
Epoch 00063: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0769 - mean_absolute_error: 0.0771 - mean_squared_error: 0.0111 - val_loss: 0.1485 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0461
Epoch 64/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0724 - mean_absolute_error: 0.0724 - mean_squared_error: 0.0102
Epoch 00064: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0723 - mean_absolute_error: 0.0722 - mean_squared_error: 0.0102 - val_loss: 0.1494 - val_mean_absolute_error: 0.1494 - val_mean_squared_error: 0.0466
Epoch 65/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0776 - mean_absolute_error: 0.0776 - mean_squared_error: 0.0115
Epoch 00065: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0776 - mean_absolute_error: 0.0776 - mean_squared_error: 0.0115 - val_loss: 0.1580 - val_mean_absolute_error: 0.1580 - val_mean_squared_error: 0.0510
Epoch 66/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0823 - mean_absolute_error: 0.0823 - mean_squared_error: 0.0123
Epoch 00066: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0823 - mean_absolute_error: 0.0823 - mean_squared_error: 0.0123 - val_loss: 0.1487 - val_mean_absolute_error: 0.1487 - val_mean_squared_error: 0.0448
Epoch 67/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0757 - mean_absolute_error: 0.0757 - mean_squared_error: 0.0109
Epoch 00067: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0757 - mean_absolute_error: 0.0758 - mean_squared_error: 0.0109 - val_loss: 0.1561 - val_mean_absolute_error: 0.1561 - val_mean_squared_error: 0.0468
Epoch 68/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0694 - mean_absolute_error: 0.0694 - mean_squared_error: 0.0093
Epoch 00068: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0695 - mean_absolute_error: 0.0695 - mean_squared_error: 0.0093 - val_loss: 0.1625 - val_mean_absolute_error: 0.1625 - val_mean_squared_error: 0.0514
Epoch 69/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0663 - mean_absolute_error: 0.0663 - mean_squared_error: 0.0086
Epoch 00069: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0663 - mean_absolute_error: 0.0665 - mean_squared_error: 0.0087 - val_loss: 0.1479 - val_mean_absolute_error: 0.1479 - val_mean_squared_error: 0.0457
Epoch 70/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0685 - mean_absolute_error: 0.0685 - mean_squared_error: 0.0091
Epoch 00070: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0686 - mean_absolute_error: 0.0686 - mean_squared_error: 0.0092 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0471
Epoch 71/500
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10464/10471 [=====>.] - ETA: 0s - loss: 0.0754 - mean_absolute_error: 0.0754 - mean_squared_error: 0.0105
Epoch 00071: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0754 - mean_absolute_error: 0.0754 - mean_squared_error: 0.0105 - val_loss: 0.1687 - val_mean_absolute_error: 0.1687 - val_mean_squared_error: 0.0532
Epoch 72/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0668 - mean_absolute_error: 0.0668 - mean_squared_error: 0.0087
Epoch 00072: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0668 - mean_absolute_error: 0.0668 - mean_squared_error: 0.0087 - val_loss: 0.1502 - val_mean_absolute_error: 0.1502 - val_mean_squared_error: 0.0461
Epoch 73/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0693 - mean_absolute_error: 0.0693 - mean_squared_error: 0.0091
Epoch 00073: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0693 - mean_absolute_error: 0.0693 - mean_squared_error: 0.0091 - val_loss: 0.1638 - val_mean_absolute_error: 0.1639 - val_mean_squared_error: 0.0524
Epoch 74/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0777 - mean_absolute_error: 0.0777 - mean_squared_error: 0.0110
Epoch 00074: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0777 - mean_absolute_error: 0.0778 - mean_squared_error: 0.0110 - val_loss: 0.1690 - val_mean_absolute_error: 0.1690 - val_mean_squared_error: 0.0533
Epoch 75/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0676 - mean_absolute_error: 0.0676 - mean_squared_error: 0.0089
Epoch 00075: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0677 - mean_absolute_error: 0.0677 - mean_squared_error: 0.0089 - val_loss: 0.1589 - val_mean_absolute_error: 0.1589 - val_mean_squared_error: 0.0495
Epoch 76/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0690 - mean_absolute_error: 0.0690 - mean_squared_error: 0.0090
Epoch 00076: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0689 - mean_absolute_error: 0.0689 - mean_squared_error: 0.0090 - val_loss: 0.1500 - val_mean_absolute_error: 0.1500 - val_mean_squared_error: 0.0466
Epoch 77/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0686 - mean_absolute_error: 0.0686 - mean_squared_error: 0.0088
Epoch 00077: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0687 - mean_absolute_error: 0.0687 - mean_squared_error: 0.0089 - val_loss: 0.1478 - val_mean_absolute_error: 0.1478 - val_mean_squared_error: 0.0455
Epoch 78/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0723 - mean_absolute_error: 0.0723 - mean_squared_error: 0.0098
Epoch 00078: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0723 - mean_absolute_error: 0.0724 - mean_squared_error: 0.0098 - val_loss: 0.1497 - val_mean_absolute_error: 0.1497 - val_mean_squared_error: 0.0450
Epoch 79/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0742 - mean_absolute_error: 0.0742 - mean_squared_error: 0.0100
Epoch 00079: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0742 - mean_absolute_error: 0.0744 - mean_squared_error: 0.0101 - val_loss: 0.1526 - val_mean_absolute_error: 0.1526 - val_mean_squared_error: 0.0474
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rror: 0.1525 - val_mean_squared_error: 0.0489
Epoch 80/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0693 - mean_absolute_error: 0.0693 - mean_squared_error: 0.0090
Epoch 00080: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0694 - mean_absolute_error: 0.0696 - mean_squared_error: 0.0091 - val_loss: 0.1544 - val_mean_absolute_error: 0.1544 - val_mean_squared_error: 0.0487
Epoch 81/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0641 - mean_absolute_error: 0.0641 - mean_squared_error: 0.0077
Epoch 00081: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0642 - mean_absolute_error: 0.0642 - mean_squared_error: 0.0077 - val_loss: 0.1535 - val_mean_absolute_error: 0.1535 - val_mean_squared_error: 0.0495
Epoch 82/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0765 - mean_absolute_error: 0.0765 - mean_squared_error: 0.0106
Epoch 00082: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0765 - mean_absolute_error: 0.0766 - mean_squared_error: 0.0106 - val_loss: 0.1491 - val_mean_absolute_error: 0.1490 - val_mean_squared_error: 0.0466
Epoch 83/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0666 - mean_absolute_error: 0.0666 - mean_squared_error: 0.0082
Epoch 00083: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0666 - mean_absolute_error: 0.0667 - mean_squared_error: 0.0082 - val_loss: 0.1647 - val_mean_absolute_error: 0.1647 - val_mean_squared_error: 0.0528
Epoch 84/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0657 - mean_absolute_error: 0.0657 - mean_squared_error: 0.0082
Epoch 00084: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0657 - mean_absolute_error: 0.0657 - mean_squared_error: 0.0081 - val_loss: 0.1560 - val_mean_absolute_error: 0.1560 - val_mean_squared_error: 0.0496
Epoch 85/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0627 - mean_absolute_error: 0.0627 - mean_squared_error: 0.0074
Epoch 00085: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0627 - mean_absolute_error: 0.0629 - mean_squared_error: 0.0077 - val_loss: 0.1654 - val_mean_absolute_error: 0.1654 - val_mean_squared_error: 0.0516
Epoch 86/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0684 - mean_absolute_error: 0.0684 - mean_squared_error: 0.0086
Epoch 00086: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0684 - mean_absolute_error: 0.0684 - mean_squared_error: 0.0086 - val_loss: 0.1523 - val_mean_absolute_error: 0.1522 - val_mean_squared_error: 0.0485
Epoch 87/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0635 - mean_absolute_error: 0.0635 - mean_squared_error: 0.0077
Epoch 00087: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0635 - mean_absolute_error: 0.0634 - mean_squared_error: 0.0077 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0455
Epoch 88/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0660 - mean_absolute_error: 0.0660 - mean_squared_error: 0.0082
Epoch 00088: val_loss did not improve from 0.14389
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10471/10471 [=====] - 81s 8ms/sample - loss: 0.0660 - mean_absolute_error: 0.0660 - mean_squared_error: 0.0082 - val_loss: 0.1569 - val_mean_absolute_error: 0.1570 - val_mean_squared_error: 0.0502
Epoch 89/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0635 - mean_absolute_error: 0.0635 - mean_squared_error: 0.0076
Epoch 00089: val_loss did not improve from 0.14389
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0635 - mean_absolute_error: 0.0636 - mean_squared_error: 0.0076 - val_loss: 0.1578 - val_mean_absolute_error: 0.1578 - val_mean_squared_error: 0.0481
Epoch 90/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0648 - mean_absolute_error: 0.0648 - mean_squared_error: 0.0079
Epoch 00090: val_loss did not improve from 0.14389
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0649 - mean_absolute_error: 0.0650 - mean_squared_error: 0.0079 - val_loss: 0.1513 - val_mean_absolute_error: 0.1513 - val_mean_squared_error: 0.0481
Epoch 91/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0660 - mean_absolute_error: 0.0660 - mean_squared_error: 0.0081
Epoch 00091: val_loss did not improve from 0.14389
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0660 - mean_absolute_error: 0.0661 - mean_squared_error: 0.0081 - val_loss: 0.1491 - val_mean_absolute_error: 0.1491 - val_mean_squared_error: 0.0472
Epoch 92/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0612 - mean_absolute_error: 0.0612 - mean_squared_error: 0.0073
Epoch 00092: val_loss did not improve from 0.14389
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0612 - mean_absolute_error: 0.0612 - mean_squared_error: 0.0073 - val_loss: 0.1481 - val_mean_absolute_error: 0.1480 - val_mean_squared_error: 0.0470
Epoch 93/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0693 - mean_absolute_error: 0.0693 - mean_squared_error: 0.0087
Epoch 00093: val_loss did not improve from 0.14389
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0693 - mean_absolute_error: 0.0693 - mean_squared_error: 0.0087 - val_loss: 0.1531 - val_mean_absolute_error: 0.1530 - val_mean_squared_error: 0.0476
Epoch 94/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0613 - mean_absolute_error: 0.0613 - mean_squared_error: 0.0071
Epoch 00094: val_loss did not improve from 0.14389
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0613 - mean_absolute_error: 0.0615 - mean_squared_error: 0.0071 - val_loss: 0.1876 - val_mean_absolute_error: 0.1875 - val_mean_squared_error: 0.0609
Epoch 95/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0636 - mean_absolute_error: 0.0636 - mean_squared_error: 0.0076
Epoch 00095: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0637 - mean_absolute_error: 0.0637 - mean_squared_error: 0.0076 - val_loss: 0.1506 - val_mean_absolute_error: 0.1506 - val_mean_squared_error: 0.0462
Epoch 96/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0643 - mean_absolute_error: 0.0643 - mean_squared_error: 0.0076
Epoch 00096: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0643 - mean_absolute_error: 0.0644 - mean_squared_error: 0.0077 - val_loss: 0.1481 - val_mean_absolute_error: 0.1481 - val_mean_squared_error: 0.0453
Epoch 97/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0632 - mean_absolute_error:
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ror: 0.0632 - mean_squared_error: 0.0074
Epoch 00097: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0633 - mean_absolute_error: 0.0633 - mean_squared_error: 0.0075 - val_loss: 0.1884 - val_mean_absolute_error: 0.1884 - val_mean_squared_error: 0.0597
Epoch 98/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0623 - mean_absolute_error: 0.0623 - mean_squared_error: 0.0072
Epoch 00098: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0623 - mean_absolute_error: 0.0622 - mean_squared_error: 0.0072 - val_loss: 0.1470 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0449
Epoch 99/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0568 - mean_absolute_error: 0.0568 - mean_squared_error: 0.0061
Epoch 00099: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0567 - mean_absolute_error: 0.0567 - mean_squared_error: 0.0061 - val_loss: 0.1750 - val_mean_absolute_error: 0.1750 - val_mean_squared_error: 0.0562
Epoch 100/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0649 - mean_absolute_error: 0.0649 - mean_squared_error: 0.0078
Epoch 00100: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0649 - mean_absolute_error: 0.0649 - mean_squared_error: 0.0078 - val_loss: 0.1470 - val_mean_absolute_error: 0.1470 - val_mean_squared_error: 0.0451
Epoch 101/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0596 - mean_absolute_error: 0.0596 - mean_squared_error: 0.0068
Epoch 00101: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0596 - mean_absolute_error: 0.0596 - mean_squared_error: 0.0068 - val_loss: 0.1464 - val_mean_absolute_error: 0.1464 - val_mean_squared_error: 0.0454
Epoch 102/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0581 - mean_absolute_error: 0.0581 - mean_squared_error: 0.0065
Epoch 00102: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0582 - mean_absolute_error: 0.0583 - mean_squared_error: 0.0065 - val_loss: 0.1589 - val_mean_absolute_error: 0.1589 - val_mean_squared_error: 0.0484
Epoch 103/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0559 - mean_absolute_error: 0.0559 - mean_squared_error: 0.0060
Epoch 00103: val_loss did not improve from 0.14389
10471/10471 [=====] - 81s 8ms/sample - loss: 0.0559 - mean_absolute_error: 0.0560 - mean_squared_error: 0.0060 - val_loss: 0.1488 - val_mean_absolute_error: 0.1488 - val_mean_squared_error: 0.0450
Epoch 104/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0551 - mean_absolute_error: 0.0551 - mean_squared_error: 0.0059
Epoch 00104: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0551 - mean_absolute_error: 0.0551 - mean_squared_error: 0.0059 - val_loss: 0.1485 - val_mean_absolute_error: 0.1485 - val_mean_squared_error: 0.0453
Epoch 105/500
10464/10471 [=====.>.] - ETA: 0s - loss: 0.0590 - mean_absolute_error: 0.0590 - mean_squared_error: 0.0065
Epoch 00105: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0590 - mean_absolute_error: 0.0590 - mean_squared_error: 0.0065 - val_loss: 0.1714 - val_mean_absolute_error: 0.1714 - val_mean_squared_error: 0.0551
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Epoch 106/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0608 - mean_absolute_error: 0.0608 - mean_squared_error: 0.0069
Epoch 00106: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0608 - mean_absolute_error: 0.0608 - mean_squared_error: 0.0069 - val_loss: 0.1472 - val_mean_absolute_error: 0.1472 - val_mean_squared_error: 0.0449
Epoch 107/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0543 - mean_absolute_error: 0.0543 - mean_squared_error: 0.0057
Epoch 00107: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0543 - mean_absolute_error: 0.0543 - mean_squared_error: 0.0057 - val_loss: 0.1445 - val_mean_absolute_error: 0.1445 - val_mean_squared_error: 0.0444
Epoch 108/500
10464/10471 [=====>.] - ETA: 0s - loss: 0.0574 - mean_absolute_error: 0.0574 - mean_squared_error: 0.0063Restoring model weights from the end of the best epoch.

Epoch 00108: val_loss did not improve from 0.14389
10471/10471 [=====] - 80s 8ms/sample - loss: 0.0574 - mean_absolute_error: 0.0574 - mean_squared_error: 0.0063 - val_loss: 0.1571 - val_mean_absolute_error: 0.1571 - val_mean_squared_error: 0.0481
Epoch 00108: early stopping

```

Standard Model Tuning

KNN

In [106...]

```

mae_val = [] #to store mae values for different k

# checks mean absolute error scores on k from 1 to 20
for K in range(0, 20):
    K = K+1
    # set up the KNN regressor
    model = KNeighborsRegressor(n_neighbors = K)
    # get accuracy cross val score for cv 5
    scores = cross_validate(model, X_train_refined, y_train, cv=5,
                           scoring=('neg_mean_absolute_error'),
                           return_train_score=True)
    mae = round(scores['test_score'].mean(), 4)
    mae_val.append(mae) #store mae values
    print('MAE value for k= ', K , 'is:', mae)

# gets optimal k-value based on score minimum
index_max = np.argmax(mae_val) + 1
print(index_max)

```

```

MAE value for k= 1 is: -0.2072
MAE value for k= 2 is: -0.1826
MAE value for k= 3 is: -0.1741
MAE value for k= 4 is: -0.1704
MAE value for k= 5 is: -0.1683
MAE value for k= 6 is: -0.1669
MAE value for k= 7 is: -0.1663
MAE value for k= 8 is: -0.1658
MAE value for k= 9 is: -0.1661
MAE value for k= 10 is: -0.1662
MAE value for k= 11 is: -0.1665

```

```

MAE value for k= 12 is: -0.1667
MAE value for k= 13 is: -0.1669
MAE value for k= 14 is: -0.1676
MAE value for k= 15 is: -0.1678
MAE value for k= 16 is: -0.1683
MAE value for k= 17 is: -0.1688
MAE value for k= 18 is: -0.1692
MAE value for k= 19 is: -0.1694
MAE value for k= 20 is: -0.1698
8

MAE value for k= 1 is: -0.2072 MAE value for k= 2 is: -0.1826 MAE value for k= 3 is: -0.1741 MAE
value for k= 4 is: -0.1704 MAE value for k= 5 is: -0.1683 MAE value for k= 6 is: -0.1669 MAE value for
k= 7 is: -0.1663 MAE value for k= 8 is: -0.1658 MAE value for k= 9 is: -0.1661 MAE value for k= 10 is:
-0.1662 MAE value for k= 11 is: -0.1665 MAE value for k= 12 is: -0.1667 MAE value for k= 13 is:
-0.1669 MAE value for k= 14 is: -0.1676 MAE value for k= 15 is: -0.1678 MAE value for k= 16 is:
-0.1683 MAE value for k= 17 is: -0.1688 MAE value for k= 18 is: -0.1692 MAE value for k= 19 is:
-0.1694 MAE value for k= 20 is: -0.1698 8

```

Extra Trees

In [109...]

```

param_grid = {"max_depth": [5, 15, 25],
              'max_features': ['auto', 'sqrt'],
              }

extra_trees = ExtraTreesRegressor(random_state = randomstate,
                                  n_estimators=250,
                                  criterion='squared_error',
                                  )

best_params = grid_optimizer(extra_trees, param_grid, X_train_refined, y_train)

```

```

Making Search
Running Grid
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3
-----
iter: 0
n_candidates: 6
n_resources: 3490
Fitting 5 folds for each of 6 candidates, totalling 30 fits
[CV 1/5; 1/6] START max_depth=5, max_features=auto.....
[CV 1/5; 1/6] END max_depth=5, max_features=auto;, score=(train=-0.181, test=-0.185) total time= 0.7s
[CV 2/5; 1/6] START max_depth=5, max_features=auto.....
[CV 2/5; 1/6] END max_depth=5, max_features=auto;, score=(train=-0.182, test=-0.188) total time= 0.7s
[CV 3/5; 1/6] START max_depth=5, max_features=auto.....
[CV 3/5; 1/6] END max_depth=5, max_features=auto;, score=(train=-0.182, test=-0.179) total time= 0.7s
[CV 4/5; 1/6] START max_depth=5, max_features=auto.....
[CV 4/5; 1/6] END max_depth=5, max_features=auto;, score=(train=-0.184, test=-0.183) total

```

```
al time= 0.7s
[CV 5/5; 1/6] START max_depth=5, max_features=auto...........................
[CV 5/5; 1/6] END max_depth=5, max_features=auto;, score=(train=-0.183, test=-0.193) tot
al time= 0.7s
[CV 1/5; 2/6] START max_depth=5, max_features=sqrt...........................
[CV 1/5; 2/6] END max_depth=5, max_features=sqrt;, score=(train=-0.232, test=-0.230) tot
al time= 0.2s
[CV 2/5; 2/6] START max_depth=5, max_features=sqrt...........................
[CV 2/5; 2/6] END max_depth=5, max_features=sqrt;, score=(train=-0.227, test=-0.238) tot
al time= 0.2s
[CV 3/5; 2/6] START max_depth=5, max_features=sqrt...........................
[CV 3/5; 2/6] END max_depth=5, max_features=sqrt;, score=(train=-0.231, test=-0.224) tot
al time= 0.2s
[CV 4/5; 2/6] START max_depth=5, max_features=sqrt...........................
[CV 4/5; 2/6] END max_depth=5, max_features=sqrt;, score=(train=-0.232, test=-0.226) tot
al time= 0.2s
[CV 5/5; 2/6] START max_depth=5, max_features=sqrt...........................
[CV 5/5; 2/6] END max_depth=5, max_features=sqrt;, score=(train=-0.234, test=-0.254) tot
al time= 0.2s
[CV 1/5; 3/6] START max_depth=15, max_features=auto...........................
[CV 1/5; 3/6] END max_depth=15, max_features=auto;, score=(train=-0.033, test=-0.147) tot
al time= 2.4s
[CV 2/5; 3/6] START max_depth=15, max_features=auto...........................
[CV 2/5; 3/6] END max_depth=15, max_features=auto;, score=(train=-0.035, test=-0.145) tot
al time= 2.4s
[CV 3/5; 3/6] START max_depth=15, max_features=auto...........................
[CV 3/5; 3/6] END max_depth=15, max_features=auto;, score=(train=-0.035, test=-0.140) tot
al time= 2.4s
[CV 4/5; 3/6] START max_depth=15, max_features=auto...........................
[CV 4/5; 3/6] END max_depth=15, max_features=auto;, score=(train=-0.039, test=-0.141) tot
al time= 2.4s
[CV 5/5; 3/6] START max_depth=15, max_features=auto...........................
[CV 5/5; 3/6] END max_depth=15, max_features=auto;, score=(train=-0.033, test=-0.149) tot
al time= 2.4s
[CV 1/5; 4/6] START max_depth=15, max_features=sqrt...........................
[CV 1/5; 4/6] END max_depth=15, max_features=sqrt;, score=(train=-0.107, test=-0.162) tot
al time= 0.5s
[CV 2/5; 4/6] START max_depth=15, max_features=sqrt...........................
[CV 2/5; 4/6] END max_depth=15, max_features=sqrt;, score=(train=-0.108, test=-0.166) tot
al time= 0.5s
[CV 3/5; 4/6] START max_depth=15, max_features=sqrt...........................
[CV 3/5; 4/6] END max_depth=15, max_features=sqrt;, score=(train=-0.109, test=-0.159) tot
al time= 0.5s
[CV 4/5; 4/6] START max_depth=15, max_features=sqrt...........................
[CV 4/5; 4/6] END max_depth=15, max_features=sqrt;, score=(train=-0.109, test=-0.160) tot
al time= 0.4s
[CV 5/5; 4/6] START max_depth=15, max_features=sqrt...........................
[CV 5/5; 4/6] END max_depth=15, max_features=sqrt;, score=(train=-0.109, test=-0.173) tot
al time= 0.4s
[CV 1/5; 5/6] START max_depth=25, max_features=auto...........................
[CV 1/5; 5/6] END max_depth=25, max_features=auto;, score=(train=-0.001, test=-0.143) tot
al time= 3.1s
[CV 2/5; 5/6] START max_depth=25, max_features=auto...........................
[CV 2/5; 5/6] END max_depth=25, max_features=auto;, score=(train=-0.001, test=-0.142) tot
al time= 3.1s
[CV 3/5; 5/6] START max_depth=25, max_features=auto...........................
[CV 3/5; 5/6] END max_depth=25, max_features=auto;, score=(train=-0.001, test=-0.139) tot
al time= 3.1s
[CV 4/5; 5/6] START max_depth=25, max_features=auto...........................
[CV 4/5; 5/6] END max_depth=25, max_features=auto;, score=(train=-0.001, test=-0.139) tot
al time= 3.1s
```

```

[CV 5/5; 5/6] START max_depth=25, max_features='auto'.....
[CV 5/5; 5/6] END max_depth=25, max_features='auto';, score=(train=-0.001, test=-0.148) total time= 3.1s
[CV 1/5; 6/6] START max_depth=25, max_features='sqrt'.....
[CV 1/5; 6/6] END max_depth=25, max_features='sqrt';, score=(train=-0.020, test=-0.147) total time= 0.7s
[CV 2/5; 6/6] START max_depth=25, max_features='sqrt'.....
[CV 2/5; 6/6] END max_depth=25, max_features='sqrt';, score=(train=-0.020, test=-0.151) total time= 0.7s
[CV 3/5; 6/6] START max_depth=25, max_features='sqrt'.....
[CV 3/5; 6/6] END max_depth=25, max_features='sqrt';, score=(train=-0.022, test=-0.145) total time= 0.7s
[CV 4/5; 6/6] START max_depth=25, max_features='sqrt'.....
[CV 4/5; 6/6] END max_depth=25, max_features='sqrt';, score=(train=-0.022, test=-0.148) total time= 0.7s
[CV 5/5; 6/6] START max_depth=25, max_features='sqrt'.....
[CV 5/5; 6/6] END max_depth=25, max_features='sqrt';, score=(train=-0.021, test=-0.157) total time= 0.7s
-----
iter: 1
n_candidates: 2
n_resources: 10470
Fitting 5 folds for each of 2 candidates, totalling 10 fits
[CV 1/5; 1/2] START max_depth=15, max_features='auto'.....
[CV 1/5; 1/2] END max_depth=15, max_features='auto';, score=(train=-0.055, test=-0.142) total time= 6.5s
[CV 2/5; 1/2] START max_depth=15, max_features='auto'.....
[CV 2/5; 1/2] END max_depth=15, max_features='auto';, score=(train=-0.055, test=-0.140) total time= 6.5s
[CV 3/5; 1/2] START max_depth=15, max_features='auto'.....
[CV 3/5; 1/2] END max_depth=15, max_features='auto';, score=(train=-0.056, test=-0.129) total time= 6.6s
[CV 4/5; 1/2] START max_depth=15, max_features='auto'.....
[CV 4/5; 1/2] END max_depth=15, max_features='auto';, score=(train=-0.056, test=-0.134) total time= 6.5s
[CV 5/5; 1/2] START max_depth=15, max_features='auto'.....
[CV 5/5; 1/2] END max_depth=15, max_features='auto';, score=(train=-0.055, test=-0.138) total time= 6.6s
[CV 1/5; 2/2] START max_depth=25, max_features='auto'.....
[CV 1/5; 2/2] END max_depth=25, max_features='auto';, score=(train=-0.003, test=-0.139) total time= 9.5s
[CV 2/5; 2/2] START max_depth=25, max_features='auto'.....
[CV 2/5; 2/2] END max_depth=25, max_features='auto';, score=(train=-0.003, test=-0.137) total time= 9.5s
[CV 3/5; 2/2] START max_depth=25, max_features='auto'.....
[CV 3/5; 2/2] END max_depth=25, max_features='auto';, score=(train=-0.003, test=-0.126) total time= 9.5s
[CV 4/5; 2/2] START max_depth=25, max_features='auto'.....
[CV 4/5; 2/2] END max_depth=25, max_features='auto';, score=(train=-0.003, test=-0.130) total time= 9.6s
[CV 5/5; 2/2] START max_depth=25, max_features='auto'.....
[CV 5/5; 2/2] END max_depth=25, max_features='auto';, score=(train=-0.003, test=-0.136) total time= 9.6s
Best mae: -0.134
Best parameters set found on train set:

{'max_depth': 25, 'max_features': 'auto'}

```

Grid scores on train set:

```
-0.186 (+/-0.010) for {'max_depth': 5, 'max_features': 'auto'}
```

```
-0.235 (+/-0.022) for {'max_depth': 5, 'max_features': 'sqrt'}  
-0.144 (+/-0.007) for {'max_depth': 15, 'max_features': 'auto'}  
-0.164 (+/-0.010) for {'max_depth': 15, 'max_features': 'sqrt'}  
-0.142 (+/-0.006) for {'max_depth': 25, 'max_features': 'auto'}  
-0.150 (+/-0.008) for {'max_depth': 25, 'max_features': 'sqrt'}  
-0.136 (+/-0.009) for {'max_depth': 15, 'max_features': 'auto'}  
-0.134 (+/-0.009) for {'max_depth': 25, 'max_features': 'auto'}  
Elapsed Time: 139.25052213668823
```

Best mae: -0.134 Best parameters set found on train set:

```
{'max_depth': 25, 'max_features': 'auto'}
```

```
In [114]: param_grid = {"max_depth": [20, 25, 30],  
                      "n_estimators": [250, 500, 1000],  
                      }  
  
extra_trees = ExtraTreesRegressor(random_state = randomstate,  
                                    criterion='squared_error',  
                                    max_features='auto'  
  
)  
  
best_params = grid_optimizer(extra_trees, param_grid, X_train_refined, y_train)
```

```
Making Search  
Running Grid  
n_iterations: 3  
n_required_iterations: 3  
n_possible_iterations: 3  
min_resources_: 1163  
max_resources_: 10471  
aggressive_elimination: False  
factor: 3  
-----  
iter: 0  
n_candidates: 9  
n_resources: 1163  
Fitting 5 folds for each of 9 candidates, totalling 45 fits  
[CV 1/5; 1/9] START max_depth=20, n_estimators=250.....  
[CV 1/5; 1/9] END max_depth=20, n_estimators=250;, score=(train=-0.002, test=-0.146) total time= 1.0s  
[CV 2/5; 1/9] START max_depth=20, n_estimators=250.....  
[CV 2/5; 1/9] END max_depth=20, n_estimators=250;, score=(train=-0.003, test=-0.173) total time= 1.0s  
[CV 3/5; 1/9] START max_depth=20, n_estimators=250.....  
[CV 3/5; 1/9] END max_depth=20, n_estimators=250;, score=(train=-0.003, test=-0.173) total time= 1.0s  
[CV 4/5; 1/9] START max_depth=20, n_estimators=250.....  
[CV 4/5; 1/9] END max_depth=20, n_estimators=250;, score=(train=-0.002, test=-0.163) total time= 1.0s  
[CV 5/5; 1/9] START max_depth=20, n_estimators=250.....  
[CV 5/5; 1/9] END max_depth=20, n_estimators=250;, score=(train=-0.002, test=-0.170) total time= 1.0s  
[CV 1/5; 2/9] START max_depth=20, n_estimators=500.....  
[CV 1/5; 2/9] END max_depth=20, n_estimators=500;, score=(train=-0.002, test=-0.146) total time= 2.1s  
[CV 2/5; 2/9] START max_depth=20, n_estimators=500.....  
[CV 2/5; 2/9] END max_depth=20, n_estimators=500;, score=(train=-0.003, test=-0.172) total time= 2.0s
```

```
[CV 3/5; 2/9] START max_depth=20, n_estimators=500.....  
[CV 3/5; 2/9] END max_depth=20, n_estimators=500;, score=(train=-0.003, test=-0.172) total time= 2.1s  
[CV 4/5; 2/9] START max_depth=20, n_estimators=500.....  
[CV 4/5; 2/9] END max_depth=20, n_estimators=500;, score=(train=-0.002, test=-0.163) total time= 2.0s  
[CV 5/5; 2/9] START max_depth=20, n_estimators=500.....  
[CV 5/5; 2/9] END max_depth=20, n_estimators=500;, score=(train=-0.002, test=-0.170) total time= 2.1s  
[CV 1/5; 3/9] START max_depth=20, n_estimators=1000.....  
[CV 1/5; 3/9] END max_depth=20, n_estimators=1000;, score=(train=-0.002, test=-0.145) total time= 4.2s  
[CV 2/5; 3/9] START max_depth=20, n_estimators=1000.....  
[CV 2/5; 3/9] END max_depth=20, n_estimators=1000;, score=(train=-0.003, test=-0.171) total time= 4.2s  
[CV 3/5; 3/9] START max_depth=20, n_estimators=1000.....  
[CV 3/5; 3/9] END max_depth=20, n_estimators=1000;, score=(train=-0.002, test=-0.173) total time= 4.2s  
[CV 4/5; 3/9] START max_depth=20, n_estimators=1000.....  
[CV 4/5; 3/9] END max_depth=20, n_estimators=1000;, score=(train=-0.002, test=-0.162) total time= 4.2s  
[CV 5/5; 3/9] START max_depth=20, n_estimators=1000.....  
[CV 5/5; 3/9] END max_depth=20, n_estimators=1000;, score=(train=-0.002, test=-0.170) total time= 4.2s  
[CV 1/5; 4/9] START max_depth=25, n_estimators=250.....  
[CV 1/5; 4/9] END max_depth=25, n_estimators=250;, score=(train=-0.000, test=-0.145) total time= 1.0s  
[CV 2/5; 4/9] START max_depth=25, n_estimators=250.....  
[CV 2/5; 4/9] END max_depth=25, n_estimators=250;, score=(train=-0.000, test=-0.171) total time= 1.0s  
[CV 3/5; 4/9] START max_depth=25, n_estimators=250.....  
[CV 3/5; 4/9] END max_depth=25, n_estimators=250;, score=(train=-0.000, test=-0.173) total time= 1.0s  
[CV 4/5; 4/9] START max_depth=25, n_estimators=250.....  
[CV 4/5; 4/9] END max_depth=25, n_estimators=250;, score=(train=-0.000, test=-0.161) total time= 1.0s  
[CV 5/5; 4/9] START max_depth=25, n_estimators=250.....  
[CV 5/5; 4/9] END max_depth=25, n_estimators=250;, score=(train=-0.000, test=-0.171) total time= 1.0s  
[CV 1/5; 5/9] START max_depth=25, n_estimators=500.....  
[CV 1/5; 5/9] END max_depth=25, n_estimators=500;, score=(train=-0.000, test=-0.145) total time= 2.1s  
[CV 2/5; 5/9] START max_depth=25, n_estimators=500.....  
[CV 2/5; 5/9] END max_depth=25, n_estimators=500;, score=(train=-0.000, test=-0.170) total time= 2.1s  
[CV 3/5; 5/9] START max_depth=25, n_estimators=500.....  
[CV 3/5; 5/9] END max_depth=25, n_estimators=500;, score=(train=-0.000, test=-0.172) total time= 2.1s  
[CV 4/5; 5/9] START max_depth=25, n_estimators=500.....  
[CV 4/5; 5/9] END max_depth=25, n_estimators=500;, score=(train=-0.000, test=-0.163) total time= 2.1s  
[CV 5/5; 5/9] START max_depth=25, n_estimators=500.....  
[CV 5/5; 5/9] END max_depth=25, n_estimators=500;, score=(train=-0.000, test=-0.171) total time= 2.1s  
[CV 1/5; 6/9] START max_depth=25, n_estimators=1000.....  
[CV 1/5; 6/9] END max_depth=25, n_estimators=1000;, score=(train=-0.000, test=-0.145) total time= 4.3s  
[CV 2/5; 6/9] START max_depth=25, n_estimators=1000.....  
[CV 2/5; 6/9] END max_depth=25, n_estimators=1000;, score=(train=-0.000, test=-0.171) total time= 4.3s  
[CV 3/5; 6/9] START max_depth=25, n_estimators=1000.....
```

```
[CV 3/5; 6/9] END max_depth=25, n_estimators=1000;, score=(train=-0.000, test=-0.172) total time= 4.3s
[CV 4/5; 6/9] START max_depth=25, n_estimators=1000...........................
[CV 4/5; 6/9] END max_depth=25, n_estimators=1000;, score=(train=-0.000, test=-0.162) total time= 4.3s
[CV 5/5; 6/9] START max_depth=25, n_estimators=1000...........................
[CV 5/5; 6/9] END max_depth=25, n_estimators=1000;, score=(train=-0.000, test=-0.171) total time= 4.3s
[CV 1/5; 7/9] START max_depth=30, n_estimators=250...........................
[CV 1/5; 7/9] END max_depth=30, n_estimators=250;, score=(train=-0.000, test=-0.147) total time= 1.0s
[CV 2/5; 7/9] START max_depth=30, n_estimators=250...........................
[CV 2/5; 7/9] END max_depth=30, n_estimators=250;, score=(train=-0.000, test=-0.172) total time= 1.0s
[CV 3/5; 7/9] START max_depth=30, n_estimators=250...........................
[CV 3/5; 7/9] END max_depth=30, n_estimators=250;, score=(train=-0.000, test=-0.173) total time= 1.0s
[CV 4/5; 7/9] START max_depth=30, n_estimators=250...........................
[CV 4/5; 7/9] END max_depth=30, n_estimators=250;, score=(train=-0.000, test=-0.162) total time= 1.0s
[CV 5/5; 7/9] START max_depth=30, n_estimators=250...........................
[CV 5/5; 7/9] END max_depth=30, n_estimators=250;, score=(train=-0.000, test=-0.171) total time= 1.0s
[CV 1/5; 8/9] START max_depth=30, n_estimators=500...........................
[CV 1/5; 8/9] END max_depth=30, n_estimators=500;, score=(train=-0.000, test=-0.146) total time= 2.1s
[CV 2/5; 8/9] START max_depth=30, n_estimators=500...........................
[CV 2/5; 8/9] END max_depth=30, n_estimators=500;, score=(train=-0.000, test=-0.171) total time= 2.1s
[CV 3/5; 8/9] START max_depth=30, n_estimators=500...........................
[CV 3/5; 8/9] END max_depth=30, n_estimators=500;, score=(train=-0.000, test=-0.173) total time= 2.2s
[CV 4/5; 8/9] START max_depth=30, n_estimators=500...........................
[CV 4/5; 8/9] END max_depth=30, n_estimators=500;, score=(train=-0.000, test=-0.162) total time= 2.1s
[CV 5/5; 8/9] START max_depth=30, n_estimators=500...........................
[CV 5/5; 8/9] END max_depth=30, n_estimators=500;, score=(train=-0.000, test=-0.171) total time= 2.1s
[CV 1/5; 9/9] START max_depth=30, n_estimators=1000...........................
[CV 1/5; 9/9] END max_depth=30, n_estimators=1000;, score=(train=-0.000, test=-0.146) total time= 4.3s
[CV 2/5; 9/9] START max_depth=30, n_estimators=1000...........................
[CV 2/5; 9/9] END max_depth=30, n_estimators=1000;, score=(train=-0.000, test=-0.171) total time= 4.3s
[CV 3/5; 9/9] START max_depth=30, n_estimators=1000...........................
[CV 3/5; 9/9] END max_depth=30, n_estimators=1000;, score=(train=-0.000, test=-0.173) total time= 4.4s
[CV 4/5; 9/9] START max_depth=30, n_estimators=1000...........................
[CV 4/5; 9/9] END max_depth=30, n_estimators=1000;, score=(train=-0.000, test=-0.162) total time= 4.2s
[CV 5/5; 9/9] START max_depth=30, n_estimators=1000...........................
[CV 5/5; 9/9] END max_depth=30, n_estimators=1000;, score=(train=-0.000, test=-0.170) total time= 4.3s
-----
iter: 1
n_candidates: 3
n_resources: 3489
Fitting 5 folds for each of 3 candidates, totalling 15 fits
[CV 1/5; 1/3] START max_depth=25, n_estimators=1000...........................
[CV 1/5; 1/3] END max_depth=25, n_estimators=1000;, score=(train=-0.001, test=-0.154) total time= 12.7s
```

```
[CV 2/5; 1/3] START max_depth=25, n_estimators=1000........................  
[CV 2/5; 1/3] END max_depth=25, n_estimators=1000;, score=(train=-0.001, test=-0.137) total time= 12.6s  
[CV 3/5; 1/3] START max_depth=25, n_estimators=1000........................  
[CV 3/5; 1/3] END max_depth=25, n_estimators=1000;, score=(train=-0.001, test=-0.131) total time= 12.6s  
[CV 4/5; 1/3] START max_depth=25, n_estimators=1000........................  
[CV 4/5; 1/3] END max_depth=25, n_estimators=1000;, score=(train=-0.001, test=-0.145) total time= 12.7s  
[CV 5/5; 1/3] START max_depth=25, n_estimators=1000........................  
[CV 5/5; 1/3] END max_depth=25, n_estimators=1000;, score=(train=-0.001, test=-0.142) total time= 12.7s  
[CV 1/5; 2/3] START max_depth=25, n_estimators=500........................  
[CV 1/5; 2/3] END max_depth=25, n_estimators=500;, score=(train=-0.001, test=-0.154) total time= 6.3s  
[CV 2/5; 2/3] START max_depth=25, n_estimators=500........................  
[CV 2/5; 2/3] END max_depth=25, n_estimators=500;, score=(train=-0.001, test=-0.137) total time= 6.3s  
[CV 3/5; 2/3] START max_depth=25, n_estimators=500........................  
[CV 3/5; 2/3] END max_depth=25, n_estimators=500;, score=(train=-0.001, test=-0.131) total time= 6.3s  
[CV 4/5; 2/3] START max_depth=25, n_estimators=500........................  
[CV 4/5; 2/3] END max_depth=25, n_estimators=500;, score=(train=-0.001, test=-0.145) total time= 6.3s  
[CV 5/5; 2/3] START max_depth=25, n_estimators=500........................  
[CV 5/5; 2/3] END max_depth=25, n_estimators=500;, score=(train=-0.001, test=-0.142) total time= 6.3s  
[CV 1/5; 3/3] START max_depth=25, n_estimators=250........................  
[CV 1/5; 3/3] END max_depth=25, n_estimators=250;, score=(train=-0.001, test=-0.155) total time= 3.1s  
[CV 2/5; 3/3] START max_depth=25, n_estimators=250........................  
[CV 2/5; 3/3] END max_depth=25, n_estimators=250;, score=(train=-0.001, test=-0.138) total time= 3.1s  
[CV 3/5; 3/3] START max_depth=25, n_estimators=250........................  
[CV 3/5; 3/3] END max_depth=25, n_estimators=250;, score=(train=-0.001, test=-0.131) total time= 3.1s  
[CV 4/5; 3/3] START max_depth=25, n_estimators=250........................  
[CV 4/5; 3/3] END max_depth=25, n_estimators=250;, score=(train=-0.001, test=-0.146) total time= 3.1s  
[CV 5/5; 3/3] START max_depth=25, n_estimators=250........................  
[CV 5/5; 3/3] END max_depth=25, n_estimators=250;, score=(train=-0.001, test=-0.142) total time= 3.1s  
-----  
iter: 2  
n_candidates: 1  
n_resources: 10467  
Fitting 5 folds for each of 1 candidates, totalling 5 fits  
[CV 1/5; 1/1] START max_depth=25, n_estimators=500........................  
[CV 1/5; 1/1] END max_depth=25, n_estimators=500;, score=(train=-0.003, test=-0.139) total time= 19.3s  
[CV 2/5; 1/1] START max_depth=25, n_estimators=500........................  
[CV 2/5; 1/1] END max_depth=25, n_estimators=500;, score=(train=-0.003, test=-0.137) total time= 19.0s  
[CV 3/5; 1/1] START max_depth=25, n_estimators=500........................  
[CV 3/5; 1/1] END max_depth=25, n_estimators=500;, score=(train=-0.003, test=-0.126) total time= 19.2s  
[CV 4/5; 1/1] START max_depth=25, n_estimators=500........................  
[CV 4/5; 1/1] END max_depth=25, n_estimators=500;, score=(train=-0.003, test=-0.131) total time= 19.2s  
[CV 5/5; 1/1] START max_depth=25, n_estimators=500........................  
[CV 5/5; 1/1] END max_depth=25, n_estimators=500;, score=(train=-0.003, test=-0.135) total
```

```
al time= 19.0s
Best mae: -0.133
Best parameters set found on train set:

{'max_depth': 25, 'n_estimators': 500}

Grid scores on train set:

-0.165 (+/-0.020) for {'max_depth': 20, 'n_estimators': 250}
-0.164 (+/-0.020) for {'max_depth': 20, 'n_estimators': 500}
-0.164 (+/-0.020) for {'max_depth': 20, 'n_estimators': 1000}
-0.164 (+/-0.021) for {'max_depth': 25, 'n_estimators': 250}
-0.164 (+/-0.021) for {'max_depth': 25, 'n_estimators': 500}
-0.164 (+/-0.020) for {'max_depth': 25, 'n_estimators': 1000}
-0.165 (+/-0.020) for {'max_depth': 30, 'n_estimators': 250}
-0.165 (+/-0.020) for {'max_depth': 30, 'n_estimators': 500}
-0.164 (+/-0.020) for {'max_depth': 30, 'n_estimators': 1000}
-0.142 (+/-0.015) for {'max_depth': 25, 'n_estimators': 1000}
-0.142 (+/-0.015) for {'max_depth': 25, 'n_estimators': 500}
-0.142 (+/-0.016) for {'max_depth': 25, 'n_estimators': 250}
-0.133 (+/-0.009) for {'max_depth': 25, 'n_estimators': 500}
Elapsed Time: 358.09334802627563
```

Best mae: -0.133 Best parameters set found on train set:

```
{'max_depth': 25, 'n_estimators': 500}
```

```
In [ ]: extra_trees = ExtraTreesRegressor(random_state = randomstate,
                                         n_estimators=500,
                                         criterion='squared_error',
                                         max_depth=25,
                                         max_features='auto')
```

Random Forest

```
In [110...]: param_grid = {"max_depth": [5, 10, 15],
                    "criterion" : ['squared_error', 'absolute_error']}
                    }

random_forest = RandomForestRegressor(
    n_estimators=250,
    random_state=randomstate,
    n_jobs=-1)

best_params = grid_optimizer(random_forest, param_grid, X_train_refined, y_train)
```

```
Making Search
Running Grid
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3
-----
iter: 0
n_candidates: 6
```

```
n_resources: 3490
Fitting 5 folds for each of 6 candidates, totalling 30 fits
[CV 1/5; 1/6] START criterion=squared_error, max_depth=5.....
[CV 1/5; 1/6] END criterion=squared_error, max_depth=5;, score=(train=-0.164, test=-0.16
9) total time= 1.3s
[CV 2/5; 1/6] START criterion=squared_error, max_depth=5.....
[CV 2/5; 1/6] END criterion=squared_error, max_depth=5;, score=(train=-0.166, test=-0.18
4) total time= 0.3s
[CV 3/5; 1/6] START criterion=squared_error, max_depth=5.....
[CV 3/5; 1/6] END criterion=squared_error, max_depth=5;, score=(train=-0.166, test=-0.18
0) total time= 0.3s
[CV 4/5; 1/6] START criterion=squared_error, max_depth=5.....
[CV 4/5; 1/6] END criterion=squared_error, max_depth=5;, score=(train=-0.165, test=-0.18
2) total time= 0.3s
[CV 5/5; 1/6] START criterion=squared_error, max_depth=5.....
[CV 5/5; 1/6] END criterion=squared_error, max_depth=5;, score=(train=-0.168, test=-0.17
4) total time= 0.3s
[CV 1/5; 2/6] START criterion=squared_error, max_depth=10.....
[CV 1/5; 2/6] END criterion=squared_error, max_depth=10;, score=(train=-0.089, test=-0.1
46) total time= 0.4s
[CV 2/5; 2/6] START criterion=squared_error, max_depth=10.....
[CV 2/5; 2/6] END criterion=squared_error, max_depth=10;, score=(train=-0.087, test=-0.1
57) total time= 0.4s
[CV 3/5; 2/6] START criterion=squared_error, max_depth=10.....
[CV 3/5; 2/6] END criterion=squared_error, max_depth=10;, score=(train=-0.088, test=-0.1
57) total time= 0.4s
[CV 4/5; 2/6] START criterion=squared_error, max_depth=10.....
[CV 4/5; 2/6] END criterion=squared_error, max_depth=10;, score=(train=-0.090, test=-0.1
57) total time= 0.4s
[CV 5/5; 2/6] START criterion=squared_error, max_depth=10.....
[CV 5/5; 2/6] END criterion=squared_error, max_depth=10;, score=(train=-0.091, test=-0.1
47) total time= 0.4s
[CV 1/5; 3/6] START criterion=squared_error, max_depth=15.....
[CV 1/5; 3/6] END criterion=squared_error, max_depth=15;, score=(train=-0.059, test=-0.1
42) total time= 0.5s
[CV 2/5; 3/6] START criterion=squared_error, max_depth=15.....
[CV 2/5; 3/6] END criterion=squared_error, max_depth=15;, score=(train=-0.058, test=-0.1
54) total time= 0.5s
[CV 3/5; 3/6] START criterion=squared_error, max_depth=15.....
[CV 3/5; 3/6] END criterion=squared_error, max_depth=15;, score=(train=-0.059, test=-0.1
53) total time= 0.5s
[CV 4/5; 3/6] START criterion=squared_error, max_depth=15.....
[CV 4/5; 3/6] END criterion=squared_error, max_depth=15;, score=(train=-0.060, test=-0.1
52) total time= 0.5s
[CV 5/5; 3/6] START criterion=squared_error, max_depth=15.....
[CV 5/5; 3/6] END criterion=squared_error, max_depth=15;, score=(train=-0.061, test=-0.1
43) total time= 0.5s
[CV 1/5; 4/6] START criterion=absolute_error, max_depth=5.....
[CV 1/5; 4/6] END criterion=absolute_error, max_depth=5;, score=(train=-0.161, test=-0.1
68) total time= 5.2s
[CV 2/5; 4/6] START criterion=absolute_error, max_depth=5.....
[CV 2/5; 4/6] END criterion=absolute_error, max_depth=5;, score=(train=-0.163, test=-0.1
83) total time= 5.2s
[CV 3/5; 4/6] START criterion=absolute_error, max_depth=5.....
[CV 3/5; 4/6] END criterion=absolute_error, max_depth=5;, score=(train=-0.165, test=-0.1
78) total time= 5.5s
[CV 4/5; 4/6] START criterion=absolute_error, max_depth=5.....
[CV 4/5; 4/6] END criterion=absolute_error, max_depth=5;, score=(train=-0.163, test=-0.1
76) total time= 5.2s
[CV 5/5; 4/6] START criterion=absolute_error, max_depth=5.....
[CV 5/5; 4/6] END criterion=absolute_error, max_depth=5;, score=(train=-0.168, test=-0.1
```

```
78) total time= 5.2s
[CV 1/5; 5/6] START criterion=absolute_error, max_depth=10.....
[CV 1/5; 5/6] END criterion=absolute_error, max_depth=10;, score=(train=-0.095, test=-0.
143) total time= 6.4s
[CV 2/5; 5/6] START criterion=absolute_error, max_depth=10.....
[CV 2/5; 5/6] END criterion=absolute_error, max_depth=10;, score=(train=-0.094, test=-0.
157) total time= 6.4s
[CV 3/5; 5/6] START criterion=absolute_error, max_depth=10.....
[CV 3/5; 5/6] END criterion=absolute_error, max_depth=10;, score=(train=-0.095, test=-0.
154) total time= 6.4s
[CV 4/5; 5/6] START criterion=absolute_error, max_depth=10.....
[CV 4/5; 5/6] END criterion=absolute_error, max_depth=10;, score=(train=-0.094, test=-0.
154) total time= 6.5s
[CV 5/5; 5/6] START criterion=absolute_error, max_depth=10.....
[CV 5/5; 5/6] END criterion=absolute_error, max_depth=10;, score=(train=-0.098, test=-0.
150) total time= 6.5s
[CV 1/5; 6/6] START criterion=absolute_error, max_depth=15.....
[CV 1/5; 6/6] END criterion=absolute_error, max_depth=15;, score=(train=-0.064, test=-0.
140) total time= 6.9s
[CV 2/5; 6/6] START criterion=absolute_error, max_depth=15.....
[CV 2/5; 6/6] END criterion=absolute_error, max_depth=15;, score=(train=-0.063, test=-0.
154) total time= 6.9s
[CV 3/5; 6/6] START criterion=absolute_error, max_depth=15.....
[CV 3/5; 6/6] END criterion=absolute_error, max_depth=15;, score=(train=-0.064, test=-0.
151) total time= 7.2s
[CV 4/5; 6/6] START criterion=absolute_error, max_depth=15.....
[CV 4/5; 6/6] END criterion=absolute_error, max_depth=15;, score=(train=-0.064, test=-0.
151) total time= 7.1s
[CV 5/5; 6/6] START criterion=absolute_error, max_depth=15.....
[CV 5/5; 6/6] END criterion=absolute_error, max_depth=15;, score=(train=-0.067, test=-0.
146) total time= 7.1s
-----
iter: 1
n_candidates: 2
n_resources: 10470
Fitting 5 folds for each of 2 candidates, totalling 10 fits
[CV 1/5; 1/2] START criterion=squared_error, max_depth=15.....
[CV 1/5; 1/2] END criterion=squared_error, max_depth=15;, score=(train=-0.063, test=-0.1
44) total time= 1.3s
[CV 2/5; 1/2] START criterion=squared_error, max_depth=15.....
[CV 2/5; 1/2] END criterion=squared_error, max_depth=15;, score=(train=-0.062, test=-0.1
41) total time= 1.3s
[CV 3/5; 1/2] START criterion=squared_error, max_depth=15.....
[CV 3/5; 1/2] END criterion=squared_error, max_depth=15;, score=(train=-0.063, test=-0.1
32) total time= 1.3s
[CV 4/5; 1/2] START criterion=squared_error, max_depth=15.....
[CV 4/5; 1/2] END criterion=squared_error, max_depth=15;, score=(train=-0.063, test=-0.1
36) total time= 1.3s
[CV 5/5; 1/2] START criterion=squared_error, max_depth=15.....
[CV 5/5; 1/2] END criterion=squared_error, max_depth=15;, score=(train=-0.063, test=-0.1
39) total time= 1.3s
[CV 1/5; 2/2] START criterion=absolute_error, max_depth=15.....
[CV 1/5; 2/2] END criterion=absolute_error, max_depth=15;, score=(train=-0.068, test=-0.
142) total time= 46.1s
[CV 2/5; 2/2] START criterion=absolute_error, max_depth=15.....
[CV 2/5; 2/2] END criterion=absolute_error, max_depth=15;, score=(train=-0.070, test=-0.
140) total time= 46.3s
[CV 3/5; 2/2] START criterion=absolute_error, max_depth=15.....
[CV 3/5; 2/2] END criterion=absolute_error, max_depth=15;, score=(train=-0.070, test=-0.
132) total time= 46.0s
[CV 4/5; 2/2] START criterion=absolute_error, max_depth=15.....
```

```
[CV 4/5; 2/2] END criterion=absolute_error, max_depth=15;, score=(train=-0.071, test=-0.135) total time= 48.5s
[CV 5/5; 2/2] START criterion=absolute_error, max_depth=15.....
[CV 5/5; 2/2] END criterion=absolute_error, max_depth=15;, score=(train=-0.070, test=-0.141) total time= 47.7s
Best mae: -0.138
Best parameters set found on train set:
```

```
{'criterion': 'absolute_error', 'max_depth': 15}
```

```
Grid scores on train set:
```

```
-0.178 (+/-0.011) for {'criterion': 'squared_error', 'max_depth': 5}
-0.153 (+/-0.010) for {'criterion': 'squared_error', 'max_depth': 10}
-0.149 (+/-0.010) for {'criterion': 'squared_error', 'max_depth': 15}
-0.176 (+/-0.010) for {'criterion': 'absolute_error', 'max_depth': 5}
-0.152 (+/-0.010) for {'criterion': 'absolute_error', 'max_depth': 10}
-0.149 (+/-0.010) for {'criterion': 'absolute_error', 'max_depth': 15}
-0.138 (+/-0.009) for {'criterion': 'squared_error', 'max_depth': 15}
-0.138 (+/-0.008) for {'criterion': 'absolute_error', 'max_depth': 15}
Elapsed Time: 421.6340985298157
```

```
Best mae: -0.138 Best parameters set found on train set:
```

```
{'criterion': 'absolute_error', 'max_depth': 15}
```

```
In [119]:
```

```
param_grid = {'bootstrap': [True, False],
              'min_samples_leaf' : [1, 10],
              "max_depth": [15, 25]
             }

random_forest = RandomForestRegressor(
                n_estimators=250,
                random_state=randomstate,
                criterion='squared_error',
                max_features='auto',)

best_params = grid_optimizer(random_forest, param_grid, X_train_refined, y_train)
```

```
Making Search
Running Grid
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3
-----
iter: 0
n_candidates: 8
n_resources: 3490
Fitting 5 folds for each of 8 candidates, totalling 40 fits
[CV 1/5; 1/8] START bootstrap=True, max_depth=15, min_samples_leaf=1.....
[CV 1/5; 1/8] END bootstrap=True, max_depth=15, min_samples_leaf=1;, score=(train=-0.059, test=-0.153) total time= 3.8s
[CV 2/5; 1/8] START bootstrap=True, max_depth=15, min_samples_leaf=1.....
[CV 2/5; 1/8] END bootstrap=True, max_depth=15, min_samples_leaf=1;, score=(train=-0.061, test=-0.158) total time= 3.7s
[CV 3/5; 1/8] START bootstrap=True, max_depth=15, min_samples_leaf=1.....
```

```
[CV 3/5; 1/8] END bootstrap=True, max_depth=15, min_samples_leaf=1;, score=(train=-0.05
8, test=-0.147) total time= 3.7s
[CV 4/5; 1/8] START bootstrap=True, max_depth=15, min_samples_leaf=1.....
[CV 4/5; 1/8] END bootstrap=True, max_depth=15, min_samples_leaf=1;, score=(train=-0.05
9, test=-0.146) total time= 3.7s
[CV 5/5; 1/8] START bootstrap=True, max_depth=15, min_samples_leaf=1.....
[CV 5/5; 1/8] END bootstrap=True, max_depth=15, min_samples_leaf=1;, score=(train=-0.05
7, test=-0.141) total time= 3.8s
[CV 1/5; 2/8] START bootstrap=True, max_depth=15, min_samples_leaf=10.....
[CV 1/5; 2/8] END bootstrap=True, max_depth=15, min_samples_leaf=10;, score=(train=-0.12
1, test=-0.160) total time= 2.2s
[CV 2/5; 2/8] START bootstrap=True, max_depth=15, min_samples_leaf=10.....
[CV 2/5; 2/8] END bootstrap=True, max_depth=15, min_samples_leaf=10;, score=(train=-0.12
4, test=-0.167) total time= 2.3s
[CV 3/5; 2/8] START bootstrap=True, max_depth=15, min_samples_leaf=10.....
[CV 3/5; 2/8] END bootstrap=True, max_depth=15, min_samples_leaf=10;, score=(train=-0.12
0, test=-0.155) total time= 2.2s
[CV 4/5; 2/8] START bootstrap=True, max_depth=15, min_samples_leaf=10.....
[CV 4/5; 2/8] END bootstrap=True, max_depth=15, min_samples_leaf=10;, score=(train=-0.12
2, test=-0.157) total time= 2.2s
[CV 5/5; 2/8] START bootstrap=True, max_depth=15, min_samples_leaf=10.....
[CV 5/5; 2/8] END bootstrap=True, max_depth=15, min_samples_leaf=10;, score=(train=-0.11
7, test=-0.147) total time= 2.3s
[CV 1/5; 3/8] START bootstrap=True, max_depth=25, min_samples_leaf=1.....
[CV 1/5; 3/8] END bootstrap=True, max_depth=25, min_samples_leaf=1;, score=(train=-0.05
4, test=-0.152) total time= 3.9s
[CV 2/5; 3/8] START bootstrap=True, max_depth=25, min_samples_leaf=1.....
[CV 2/5; 3/8] END bootstrap=True, max_depth=25, min_samples_leaf=1;, score=(train=-0.05
6, test=-0.158) total time= 4.0s
[CV 3/5; 3/8] START bootstrap=True, max_depth=25, min_samples_leaf=1.....
[CV 3/5; 3/8] END bootstrap=True, max_depth=25, min_samples_leaf=1;, score=(train=-0.05
4, test=-0.147) total time= 4.0s
[CV 4/5; 3/8] START bootstrap=True, max_depth=25, min_samples_leaf=1.....
[CV 4/5; 3/8] END bootstrap=True, max_depth=25, min_samples_leaf=1;, score=(train=-0.05
5, test=-0.146) total time= 3.9s
[CV 5/5; 3/8] START bootstrap=True, max_depth=25, min_samples_leaf=1.....
[CV 5/5; 3/8] END bootstrap=True, max_depth=25, min_samples_leaf=1;, score=(train=-0.05
3, test=-0.141) total time= 4.0s
[CV 1/5; 4/8] START bootstrap=True, max_depth=25, min_samples_leaf=10.....
[CV 1/5; 4/8] END bootstrap=True, max_depth=25, min_samples_leaf=10;, score=(train=-0.12
1, test=-0.160) total time= 2.2s
[CV 2/5; 4/8] START bootstrap=True, max_depth=25, min_samples_leaf=10.....
[CV 2/5; 4/8] END bootstrap=True, max_depth=25, min_samples_leaf=10;, score=(train=-0.12
4, test=-0.167) total time= 2.3s
[CV 3/5; 4/8] START bootstrap=True, max_depth=25, min_samples_leaf=10.....
[CV 3/5; 4/8] END bootstrap=True, max_depth=25, min_samples_leaf=10;, score=(train=-0.12
0, test=-0.155) total time= 2.3s
[CV 4/5; 4/8] START bootstrap=True, max_depth=25, min_samples_leaf=10.....
[CV 4/5; 4/8] END bootstrap=True, max_depth=25, min_samples_leaf=10;, score=(train=-0.12
2, test=-0.157) total time= 2.3s
[CV 5/5; 4/8] START bootstrap=True, max_depth=25, min_samples_leaf=10.....
[CV 5/5; 4/8] END bootstrap=True, max_depth=25, min_samples_leaf=10;, score=(train=-0.11
7, test=-0.147) total time= 2.2s
[CV 1/5; 5/8] START bootstrap=False, max_depth=15, min_samples_leaf=1.....
[CV 1/5; 5/8] END bootstrap=False, max_depth=15, min_samples_leaf=1;, score=(train=-0.01
8, test=-0.202) total time= 5.7s
[CV 2/5; 5/8] START bootstrap=False, max_depth=15, min_samples_leaf=1.....
[CV 2/5; 5/8] END bootstrap=False, max_depth=15, min_samples_leaf=1;, score=(train=-0.02
3, test=-0.207) total time= 5.7s
[CV 3/5; 5/8] START bootstrap=False, max_depth=15, min_samples_leaf=1.....
[CV 3/5; 5/8] END bootstrap=False, max_depth=15, min_samples_leaf=1;, score=(train=-0.02
```

```
1, test=-0.197) total time= 5.7s
[CV 4/5; 5/8] START bootstrap=False, max_depth=15, min_samples_leaf=1.....
[CV 4/5; 5/8] END bootstrap=False, max_depth=15, min_samples_leaf=1;, score=(train=-0.01
4, test=-0.202) total time= 5.8s
[CV 5/5; 5/8] START bootstrap=False, max_depth=15, min_samples_leaf=1.....
[CV 5/5; 5/8] END bootstrap=False, max_depth=15, min_samples_leaf=1;, score=(train=-0.02
2, test=-0.201) total time= 5.7s
[CV 1/5; 6/8] START bootstrap=False, max_depth=15, min_samples_leaf=10.....
[CV 1/5; 6/8] END bootstrap=False, max_depth=15, min_samples_leaf=10;, score=(train=-0.1
28, test=-0.185) total time= 3.6s
[CV 2/5; 6/8] START bootstrap=False, max_depth=15, min_samples_leaf=10.....
[CV 2/5; 6/8] END bootstrap=False, max_depth=15, min_samples_leaf=10;, score=(train=-0.1
35, test=-0.193) total time= 3.6s
[CV 3/5; 6/8] START bootstrap=False, max_depth=15, min_samples_leaf=10.....
[CV 3/5; 6/8] END bootstrap=False, max_depth=15, min_samples_leaf=10;, score=(train=-0.1
30, test=-0.180) total time= 3.8s
[CV 4/5; 6/8] START bootstrap=False, max_depth=15, min_samples_leaf=10.....
[CV 4/5; 6/8] END bootstrap=False, max_depth=15, min_samples_leaf=10;, score=(train=-0.1
30, test=-0.186) total time= 3.8s
[CV 5/5; 6/8] START bootstrap=False, max_depth=15, min_samples_leaf=10.....
[CV 5/5; 6/8] END bootstrap=False, max_depth=15, min_samples_leaf=10;, score=(train=-0.1
30, test=-0.186) total time= 3.8s
[CV 1/5; 7/8] START bootstrap=False, max_depth=25, min_samples_leaf=1.....
[CV 1/5; 7/8] END bootstrap=False, max_depth=25, min_samples_leaf=1;, score=(train=-0.00
0, test=-0.204) total time= 6.4s
[CV 2/5; 7/8] START bootstrap=False, max_depth=25, min_samples_leaf=1.....
[CV 2/5; 7/8] END bootstrap=False, max_depth=25, min_samples_leaf=1;, score=(train=-0.00
0, test=-0.209) total time= 6.5s
[CV 3/5; 7/8] START bootstrap=False, max_depth=25, min_samples_leaf=1.....
[CV 3/5; 7/8] END bootstrap=False, max_depth=25, min_samples_leaf=1;, score=(train=-0.00
0, test=-0.201) total time= 6.4s
[CV 4/5; 7/8] START bootstrap=False, max_depth=25, min_samples_leaf=1.....
[CV 4/5; 7/8] END bootstrap=False, max_depth=25, min_samples_leaf=1;, score=(train=-0.00
0, test=-0.204) total time= 6.3s
[CV 5/5; 7/8] START bootstrap=False, max_depth=25, min_samples_leaf=1.....
[CV 5/5; 7/8] END bootstrap=False, max_depth=25, min_samples_leaf=1;, score=(train=-0.00
0, test=-0.202) total time= 6.5s
[CV 1/5; 8/8] START bootstrap=False, max_depth=25, min_samples_leaf=10.....
[CV 1/5; 8/8] END bootstrap=False, max_depth=25, min_samples_leaf=10;, score=(train=-0.1
28, test=-0.185) total time= 3.6s
[CV 2/5; 8/8] START bootstrap=False, max_depth=25, min_samples_leaf=10.....
[CV 2/5; 8/8] END bootstrap=False, max_depth=25, min_samples_leaf=10;, score=(train=-0.1
35, test=-0.193) total time= 3.6s
[CV 3/5; 8/8] START bootstrap=False, max_depth=25, min_samples_leaf=10.....
[CV 3/5; 8/8] END bootstrap=False, max_depth=25, min_samples_leaf=10;, score=(train=-0.1
30, test=-0.180) total time= 3.8s
[CV 4/5; 8/8] START bootstrap=False, max_depth=25, min_samples_leaf=10.....
[CV 4/5; 8/8] END bootstrap=False, max_depth=25, min_samples_leaf=10;, score=(train=-0.1
30, test=-0.186) total time= 3.7s
[CV 5/5; 8/8] START bootstrap=False, max_depth=25, min_samples_leaf=10.....
[CV 5/5; 8/8] END bootstrap=False, max_depth=25, min_samples_leaf=10;, score=(train=-0.1
30, test=-0.186) total time= 3.8s
-----
iter: 1
n_candidates: 3
n_resources: 10470
Fitting 5 folds for each of 3 candidates, totalling 15 fits
[CV 1/5; 1/3] START bootstrap=True, max_depth=25, min_samples_leaf=10.....
[CV 1/5; 1/3] END bootstrap=True, max_depth=25, min_samples_leaf=10;, score=(train=-0.11
1, test=-0.146) total time= 7.8s
[CV 2/5; 1/3] START bootstrap=True, max_depth=25, min_samples_leaf=10.....
```

```

[CV 2/5; 1/3] END bootstrap=True, max_depth=25, min_samples_leaf=10;, score=(train=-0.11
1, test=-0.146) total time= 7.7s
[CV 3/5; 1/3] START bootstrap=True, max_depth=25, min_samples_leaf=10.....
[CV 3/5; 1/3] END bootstrap=True, max_depth=25, min_samples_leaf=10;, score=(train=-0.11
3, test=-0.135) total time= 7.8s
[CV 4/5; 1/3] START bootstrap=True, max_depth=25, min_samples_leaf=10.....
[CV 4/5; 1/3] END bootstrap=True, max_depth=25, min_samples_leaf=10;, score=(train=-0.11
2, test=-0.139) total time= 8.1s
[CV 5/5; 1/3] START bootstrap=True, max_depth=25, min_samples_leaf=10.....
[CV 5/5; 1/3] END bootstrap=True, max_depth=25, min_samples_leaf=10;, score=(train=-0.11
2, test=-0.143) total time= 7.9s
[CV 1/5; 2/3] START bootstrap=True, max_depth=15, min_samples_leaf=1.....
[CV 1/5; 2/3] END bootstrap=True, max_depth=15, min_samples_leaf=1;, score=(train=-0.06
2, test=-0.144) total time= 11.0s
[CV 2/5; 2/3] START bootstrap=True, max_depth=15, min_samples_leaf=1.....
[CV 2/5; 2/3] END bootstrap=True, max_depth=15, min_samples_leaf=1;, score=(train=-0.06
2, test=-0.141) total time= 11.0s
[CV 3/5; 2/3] START bootstrap=True, max_depth=15, min_samples_leaf=1.....
[CV 3/5; 2/3] END bootstrap=True, max_depth=15, min_samples_leaf=1;, score=(train=-0.06
4, test=-0.132) total time= 11.0s
[CV 4/5; 2/3] START bootstrap=True, max_depth=15, min_samples_leaf=1.....
[CV 4/5; 2/3] END bootstrap=True, max_depth=15, min_samples_leaf=1;, score=(train=-0.06
3, test=-0.136) total time= 11.1s
[CV 5/5; 2/3] START bootstrap=True, max_depth=15, min_samples_leaf=1.....
[CV 5/5; 2/3] END bootstrap=True, max_depth=15, min_samples_leaf=1;, score=(train=-0.06
3, test=-0.140) total time= 11.0s
[CV 1/5; 3/3] START bootstrap=True, max_depth=25, min_samples_leaf=1.....
[CV 1/5; 3/3] END bootstrap=True, max_depth=25, min_samples_leaf=1;, score=(train=-0.05
0, test=-0.143) total time= 12.9s
[CV 2/5; 3/3] START bootstrap=True, max_depth=25, min_samples_leaf=1.....
[CV 2/5; 3/3] END bootstrap=True, max_depth=25, min_samples_leaf=1;, score=(train=-0.05
1, test=-0.140) total time= 12.9s
[CV 3/5; 3/3] START bootstrap=True, max_depth=25, min_samples_leaf=1.....
[CV 3/5; 3/3] END bootstrap=True, max_depth=25, min_samples_leaf=1;, score=(train=-0.05
2, test=-0.131) total time= 12.8s
[CV 4/5; 3/3] START bootstrap=True, max_depth=25, min_samples_leaf=1.....
[CV 4/5; 3/3] END bootstrap=True, max_depth=25, min_samples_leaf=1;, score=(train=-0.05
1, test=-0.135) total time= 12.8s
[CV 5/5; 3/3] START bootstrap=True, max_depth=25, min_samples_leaf=1.....
[CV 5/5; 3/3] END bootstrap=True, max_depth=25, min_samples_leaf=1;, score=(train=-0.05
1, test=-0.139) total time= 12.8s
Best mae: -0.138
Best parameters set found on train set:
```

```
{'bootstrap': True, 'max_depth': 25, 'min_samples_leaf': 1}
```

Grid scores on train set:

```

-0.149 (+/-0.012) for {'bootstrap': True, 'max_depth': 15, 'min_samples_leaf': 1}
-0.157 (+/-0.013) for {'bootstrap': True, 'max_depth': 15, 'min_samples_leaf': 10}
-0.149 (+/-0.012) for {'bootstrap': True, 'max_depth': 25, 'min_samples_leaf': 1}
-0.157 (+/-0.013) for {'bootstrap': True, 'max_depth': 25, 'min_samples_leaf': 10}
-0.202 (+/-0.007) for {'bootstrap': False, 'max_depth': 15, 'min_samples_leaf': 1}
-0.186 (+/-0.008) for {'bootstrap': False, 'max_depth': 15, 'min_samples_leaf': 10}
-0.204 (+/-0.006) for {'bootstrap': False, 'max_depth': 25, 'min_samples_leaf': 1}
-0.186 (+/-0.008) for {'bootstrap': False, 'max_depth': 25, 'min_samples_leaf': 10}
-0.142 (+/-0.008) for {'bootstrap': True, 'max_depth': 25, 'min_samples_leaf': 10}
-0.138 (+/-0.009) for {'bootstrap': True, 'max_depth': 15, 'min_samples_leaf': 1}
-0.138 (+/-0.008) for {'bootstrap': True, 'max_depth': 25, 'min_samples_leaf': 1}

Elapsed Time: 346.1164572238922
```

Best mae: -0.138 Best parameters set found on train set:

```
{'bootstrap': True, 'max_depth': 25, 'min_samples_leaf': 1}
```

```
In [ ]: random_forest = RandomForestRegressor(  
        n_estimators=250,  
        random_state=randomstate,  
        criterion='squared_error',  
        max_depth=25,  
        min_samples_leaf=1,  
        max_features='auto',  
        bootstrap=True,  
        )
```

XGB

```
In [111... param_grid = {"max_depth": [5, 10, 15],  
                      "min_child_weight" : [2, 7],  
                      'eta': [.05, .1],  
                      }  
  
xgbr = xgb.XGBRegressor(  
        n_estimators=250,  
        seed=randomstate,  
        missing=0,  
        eval_metric='mae',  
        verbosity=1)  
  
best_params = grid_optimizer(xgbr, param_grid, X_train_refined, y_train)
```

```
Making Search  
Running Grid  
n_iterations: 3  
n_required_iterations: 3  
n_possible_iterations: 3  
min_resources_: 1163  
max_resources_: 10471  
aggressive_elimination: False  
factor: 3  
-----  
iter: 0  
n_candidates: 12  
n_resources: 1163  
Fitting 5 folds for each of 12 candidates, totalling 60 fits  
[CV 1/5; 1/12] START eta=0.05, max_depth=5, min_child_weight=2.....  
[CV 1/5; 1/12] END eta=0.05, max_depth=5, min_child_weight=2;, score=(train=-0.069, test=-0.185) total time= 0.1s  
[CV 2/5; 1/12] START eta=0.05, max_depth=5, min_child_weight=2.....  
[CV 2/5; 1/12] END eta=0.05, max_depth=5, min_child_weight=2;, score=(train=-0.062, test=-0.152) total time= 0.1s  
[CV 3/5; 1/12] START eta=0.05, max_depth=5, min_child_weight=2.....  
[CV 3/5; 1/12] END eta=0.05, max_depth=5, min_child_weight=2;, score=(train=-0.064, test=-0.149) total time= 0.1s  
[CV 4/5; 1/12] START eta=0.05, max_depth=5, min_child_weight=2.....  
[CV 4/5; 1/12] END eta=0.05, max_depth=5, min_child_weight=2;, score=(train=-0.063, test=-0.145) total time= 0.1s  
[CV 5/5; 1/12] START eta=0.05, max_depth=5, min_child_weight=2.....  
[CV 5/5; 1/12] END eta=0.05, max_depth=5, min_child_weight=2;, score=(train=-0.070, test
```

```
--0.150) total time= 0.1s
[CV 1/5; 2/12] START eta=0.05, max_depth=5, min_child_weight=7.....
[CV 1/5; 2/12] END eta=0.05, max_depth=5, min_child_weight=7;, score=(train=-0.080, test
=-0.183) total time= 0.1s
[CV 2/5; 2/12] START eta=0.05, max_depth=5, min_child_weight=7.....
[CV 2/5; 2/12] END eta=0.05, max_depth=5, min_child_weight=7;, score=(train=-0.073, test
=-0.152) total time= 0.1s
[CV 3/5; 2/12] START eta=0.05, max_depth=5, min_child_weight=7.....
[CV 3/5; 2/12] END eta=0.05, max_depth=5, min_child_weight=7;, score=(train=-0.073, test
=-0.149) total time= 0.1s
[CV 4/5; 2/12] START eta=0.05, max_depth=5, min_child_weight=7.....
[CV 4/5; 2/12] END eta=0.05, max_depth=5, min_child_weight=7;, score=(train=-0.077, test
=-0.141) total time= 0.1s
[CV 5/5; 2/12] START eta=0.05, max_depth=5, min_child_weight=7.....
[CV 5/5; 2/12] END eta=0.05, max_depth=5, min_child_weight=7;, score=(train=-0.079, test
=-0.149) total time= 0.1s
[CV 1/5; 3/12] START eta=0.05, max_depth=10, min_child_weight=2.....
[CV 1/5; 3/12] END eta=0.05, max_depth=10, min_child_weight=2;, score=(train=-0.007, tes
t=-0.185) total time= 0.3s
[CV 2/5; 3/12] START eta=0.05, max_depth=10, min_child_weight=2.....
[CV 2/5; 3/12] END eta=0.05, max_depth=10, min_child_weight=2;, score=(train=-0.008, tes
t=-0.161) total time= 0.3s
[CV 3/5; 3/12] START eta=0.05, max_depth=10, min_child_weight=2.....
[CV 3/5; 3/12] END eta=0.05, max_depth=10, min_child_weight=2;, score=(train=-0.007, tes
t=-0.156) total time= 0.3s
[CV 4/5; 3/12] START eta=0.05, max_depth=10, min_child_weight=2.....
[CV 4/5; 3/12] END eta=0.05, max_depth=10, min_child_weight=2;, score=(train=-0.007, tes
t=-0.151) total time= 0.3s
[CV 5/5; 3/12] START eta=0.05, max_depth=10, min_child_weight=2.....
[CV 5/5; 3/12] END eta=0.05, max_depth=10, min_child_weight=2;, score=(train=-0.012, tes
t=-0.154) total time= 0.3s
[CV 1/5; 4/12] START eta=0.05, max_depth=10, min_child_weight=7.....
[CV 1/5; 4/12] END eta=0.05, max_depth=10, min_child_weight=7;, score=(train=-0.027, tes
t=-0.185) total time= 0.2s
[CV 2/5; 4/12] START eta=0.05, max_depth=10, min_child_weight=7.....
[CV 2/5; 4/12] END eta=0.05, max_depth=10, min_child_weight=7;, score=(train=-0.021, tes
t=-0.155) total time= 0.2s
[CV 3/5; 4/12] START eta=0.05, max_depth=10, min_child_weight=7.....
[CV 3/5; 4/12] END eta=0.05, max_depth=10, min_child_weight=7;, score=(train=-0.029, tes
t=-0.153) total time= 0.2s
[CV 4/5; 4/12] START eta=0.05, max_depth=10, min_child_weight=7.....
[CV 4/5; 4/12] END eta=0.05, max_depth=10, min_child_weight=7;, score=(train=-0.028, tes
t=-0.144) total time= 0.2s
[CV 5/5; 4/12] START eta=0.05, max_depth=10, min_child_weight=7.....
[CV 5/5; 4/12] END eta=0.05, max_depth=10, min_child_weight=7;, score=(train=-0.030, tes
t=-0.148) total time= 0.2s
[CV 1/5; 5/12] START eta=0.05, max_depth=15, min_child_weight=2.....
[CV 1/5; 5/12] END eta=0.05, max_depth=15, min_child_weight=2;, score=(train=-0.001, tes
t=-0.184) total time= 0.5s
[CV 2/5; 5/12] START eta=0.05, max_depth=15, min_child_weight=2.....
[CV 2/5; 5/12] END eta=0.05, max_depth=15, min_child_weight=2;, score=(train=-0.001, tes
t=-0.159) total time= 0.5s
[CV 3/5; 5/12] START eta=0.05, max_depth=15, min_child_weight=2.....
[CV 3/5; 5/12] END eta=0.05, max_depth=15, min_child_weight=2;, score=(train=-0.001, tes
t=-0.152) total time= 0.5s
[CV 4/5; 5/12] START eta=0.05, max_depth=15, min_child_weight=2.....
[CV 4/5; 5/12] END eta=0.05, max_depth=15, min_child_weight=2;, score=(train=-0.001, tes
t=-0.151) total time= 0.5s
[CV 5/5; 5/12] START eta=0.05, max_depth=15, min_child_weight=2.....
[CV 5/5; 5/12] END eta=0.05, max_depth=15, min_child_weight=2;, score=(train=-0.003, tes
t=-0.151) total time= 0.4s
```

```
[CV 1/5; 6/12] START eta=0.05, max_depth=15, min_child_weight=7.....  
[CV 1/5; 6/12] END eta=0.05, max_depth=15, min_child_weight=7;, score=(train=-0.013, test=-0.191) total time= 0.3s  
[CV 2/5; 6/12] START eta=0.05, max_depth=15, min_child_weight=7.....  
[CV 2/5; 6/12] END eta=0.05, max_depth=15, min_child_weight=7;, score=(train=-0.009, test=-0.157) total time= 0.3s  
[CV 3/5; 6/12] START eta=0.05, max_depth=15, min_child_weight=7.....  
[CV 3/5; 6/12] END eta=0.05, max_depth=15, min_child_weight=7;, score=(train=-0.013, test=-0.154) total time= 0.3s  
[CV 4/5; 6/12] START eta=0.05, max_depth=15, min_child_weight=7.....  
[CV 4/5; 6/12] END eta=0.05, max_depth=15, min_child_weight=7;, score=(train=-0.014, test=-0.144) total time= 0.3s  
[CV 5/5; 6/12] START eta=0.05, max_depth=15, min_child_weight=7.....  
[CV 5/5; 6/12] END eta=0.05, max_depth=15, min_child_weight=7;, score=(train=-0.015, test=-0.149) total time= 0.3s  
[CV 1/5; 7/12] START eta=0.1, max_depth=5, min_child_weight=2.....  
[CV 1/5; 7/12] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.031, test=-0.182) total time= 0.1s  
[CV 2/5; 7/12] START eta=0.1, max_depth=5, min_child_weight=2.....  
[CV 2/5; 7/12] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.034, test=-0.157) total time= 0.1s  
[CV 3/5; 7/12] START eta=0.1, max_depth=5, min_child_weight=2.....  
[CV 3/5; 7/12] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.033, test=-0.150) total time= 0.1s  
[CV 4/5; 7/12] START eta=0.1, max_depth=5, min_child_weight=2.....  
[CV 4/5; 7/12] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.033, test=-0.137) total time= 0.1s  
[CV 5/5; 7/12] START eta=0.1, max_depth=5, min_child_weight=2.....  
[CV 5/5; 7/12] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.035, test=-0.150) total time= 0.1s  
[CV 1/5; 8/12] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 1/5; 8/12] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.045, test=-0.178) total time= 0.1s  
[CV 2/5; 8/12] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 2/5; 8/12] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.041, test=-0.157) total time= 0.1s  
[CV 3/5; 8/12] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 3/5; 8/12] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.045, test=-0.153) total time= 0.1s  
[CV 4/5; 8/12] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 4/5; 8/12] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.044, test=-0.144) total time= 0.1s  
[CV 5/5; 8/12] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 5/5; 8/12] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.044, test=-0.146) total time= 0.1s  
[CV 1/5; 9/12] START eta=0.1, max_depth=10, min_child_weight=2.....  
[CV 1/5; 9/12] END eta=0.1, max_depth=10, min_child_weight=2;, score=(train=-0.001, test=-0.185) total time= 0.3s  
[CV 2/5; 9/12] START eta=0.1, max_depth=10, min_child_weight=2.....  
[CV 2/5; 9/12] END eta=0.1, max_depth=10, min_child_weight=2;, score=(train=-0.001, test=-0.161) total time= 0.3s  
[CV 3/5; 9/12] START eta=0.1, max_depth=10, min_child_weight=2.....  
[CV 3/5; 9/12] END eta=0.1, max_depth=10, min_child_weight=2;, score=(train=-0.001, test=-0.162) total time= 0.3s  
[CV 4/5; 9/12] START eta=0.1, max_depth=10, min_child_weight=2.....  
[CV 4/5; 9/12] END eta=0.1, max_depth=10, min_child_weight=2;, score=(train=-0.001, test=-0.146) total time= 0.3s  
[CV 5/5; 9/12] START eta=0.1, max_depth=10, min_child_weight=2.....  
[CV 5/5; 9/12] END eta=0.1, max_depth=10, min_child_weight=2;, score=(train=-0.001, test=-0.151) total time= 0.3s  
[CV 1/5; 10/12] START eta=0.1, max_depth=10, min_child_weight=7.....
```

```
[CV 1/5; 10/12] END eta=0.1, max_depth=10, min_child_weight=7;, score=(train=-0.005, test=-0.182) total time= 0.2s
[CV 2/5; 10/12] START eta=0.1, max_depth=10, min_child_weight=7.....
[CV 2/5; 10/12] END eta=0.1, max_depth=10, min_child_weight=7;, score=(train=-0.003, test=-0.157) total time= 0.2s
[CV 3/5; 10/12] START eta=0.1, max_depth=10, min_child_weight=7.....
[CV 3/5; 10/12] END eta=0.1, max_depth=10, min_child_weight=7;, score=(train=-0.009, test=-0.155) total time= 0.2s
[CV 4/5; 10/12] START eta=0.1, max_depth=10, min_child_weight=7.....
[CV 4/5; 10/12] END eta=0.1, max_depth=10, min_child_weight=7;, score=(train=-0.004, test=-0.147) total time= 0.2s
[CV 5/5; 10/12] START eta=0.1, max_depth=10, min_child_weight=7.....
[CV 5/5; 10/12] END eta=0.1, max_depth=10, min_child_weight=7;, score=(train=-0.008, test=-0.144) total time= 0.2s
[CV 1/5; 11/12] START eta=0.1, max_depth=15, min_child_weight=2.....
[CV 1/5; 11/12] END eta=0.1, max_depth=15, min_child_weight=2;, score=(train=-0.001, test=-0.187) total time= 0.3s
[CV 2/5; 11/12] START eta=0.1, max_depth=15, min_child_weight=2.....
[CV 2/5; 11/12] END eta=0.1, max_depth=15, min_child_weight=2;, score=(train=-0.001, test=-0.162) total time= 0.3s
[CV 3/5; 11/12] START eta=0.1, max_depth=15, min_child_weight=2.....
[CV 3/5; 11/12] END eta=0.1, max_depth=15, min_child_weight=2;, score=(train=-0.001, test=-0.162) total time= 0.3s
[CV 4/5; 11/12] START eta=0.1, max_depth=15, min_child_weight=2.....
[CV 4/5; 11/12] END eta=0.1, max_depth=15, min_child_weight=2;, score=(train=-0.000, test=-0.146) total time= 0.3s
[CV 5/5; 11/12] START eta=0.1, max_depth=15, min_child_weight=2.....
[CV 5/5; 11/12] END eta=0.1, max_depth=15, min_child_weight=2;, score=(train=-0.001, test=-0.157) total time= 0.3s
[CV 1/5; 12/12] START eta=0.1, max_depth=15, min_child_weight=7.....
[CV 1/5; 12/12] END eta=0.1, max_depth=15, min_child_weight=7;, score=(train=-0.002, test=-0.185) total time= 0.3s
[CV 2/5; 12/12] START eta=0.1, max_depth=15, min_child_weight=7.....
[CV 2/5; 12/12] END eta=0.1, max_depth=15, min_child_weight=7;, score=(train=-0.001, test=-0.156) total time= 0.3s
[CV 3/5; 12/12] START eta=0.1, max_depth=15, min_child_weight=7.....
[CV 3/5; 12/12] END eta=0.1, max_depth=15, min_child_weight=7;, score=(train=-0.003, test=-0.152) total time= 0.3s
[CV 4/5; 12/12] START eta=0.1, max_depth=15, min_child_weight=7.....
[CV 4/5; 12/12] END eta=0.1, max_depth=15, min_child_weight=7;, score=(train=-0.002, test=-0.142) total time= 0.3s
[CV 5/5; 12/12] START eta=0.1, max_depth=15, min_child_weight=7.....
[CV 5/5; 12/12] END eta=0.1, max_depth=15, min_child_weight=7;, score=(train=-0.002, test=-0.148) total time= 0.3s
-----
iter: 1
n_candidates: 4
n_resources: 3489
Fitting 5 folds for each of 4 candidates, totalling 20 fits
[CV 1/5; 1/4] START eta=0.05, max_depth=5, min_child_weight=2.....
[CV 1/5; 1/4] END eta=0.05, max_depth=5, min_child_weight=2;, score=(train=-0.093, test=-0.146) total time= 0.2s
[CV 2/5; 1/4] START eta=0.05, max_depth=5, min_child_weight=2.....
[CV 2/5; 1/4] END eta=0.05, max_depth=5, min_child_weight=2;, score=(train=-0.098, test=-0.147) total time= 0.2s
[CV 3/5; 1/4] START eta=0.05, max_depth=5, min_child_weight=2.....
[CV 3/5; 1/4] END eta=0.05, max_depth=5, min_child_weight=2;, score=(train=-0.096, test=-0.147) total time= 0.2s
[CV 4/5; 1/4] START eta=0.05, max_depth=5, min_child_weight=2.....
[CV 4/5; 1/4] END eta=0.05, max_depth=5, min_child_weight=2;, score=(train=-0.103, test=-0.144) total time= 0.2s
```

```
[CV 5/5; 1/4] START eta=0.05, max_depth=5, min_child_weight=2.....  
[CV 5/5; 1/4] END eta=0.05, max_depth=5, min_child_weight=2;, score=(train=-0.098, test=-0.143) total time= 0.2s  
[CV 1/5; 2/4] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 1/5; 2/4] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.073, test=-0.146) total time= 0.2s  
[CV 2/5; 2/4] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 2/5; 2/4] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.077, test=-0.147) total time= 0.2s  
[CV 3/5; 2/4] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 3/5; 2/4] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.076, test=-0.145) total time= 0.2s  
[CV 4/5; 2/4] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 4/5; 2/4] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.079, test=-0.139) total time= 0.2s  
[CV 5/5; 2/4] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 5/5; 2/4] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.077, test=-0.142) total time= 0.2s  
[CV 1/5; 3/4] START eta=0.1, max_depth=5, min_child_weight=2.....  
[CV 1/5; 3/4] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.068, test=-0.147) total time= 0.2s  
[CV 2/5; 3/4] START eta=0.1, max_depth=5, min_child_weight=2.....  
[CV 2/5; 3/4] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.071, test=-0.145) total time= 0.2s  
[CV 3/5; 3/4] START eta=0.1, max_depth=5, min_child_weight=2.....  
[CV 3/5; 3/4] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.072, test=-0.145) total time= 0.2s  
[CV 4/5; 3/4] START eta=0.1, max_depth=5, min_child_weight=2.....  
[CV 4/5; 3/4] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.075, test=-0.140) total time= 0.2s  
[CV 5/5; 3/4] START eta=0.1, max_depth=5, min_child_weight=2.....  
[CV 5/5; 3/4] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.073, test=-0.140) total time= 0.2s  
[CV 1/5; 4/4] START eta=0.05, max_depth=5, min_child_weight=7.....  
[CV 1/5; 4/4] END eta=0.05, max_depth=5, min_child_weight=7;, score=(train=-0.095, test=-0.146) total time= 0.2s  
[CV 2/5; 4/4] START eta=0.05, max_depth=5, min_child_weight=7.....  
[CV 2/5; 4/4] END eta=0.05, max_depth=5, min_child_weight=7;, score=(train=-0.101, test=-0.148) total time= 0.2s  
[CV 3/5; 4/4] START eta=0.05, max_depth=5, min_child_weight=7.....  
[CV 3/5; 4/4] END eta=0.05, max_depth=5, min_child_weight=7;, score=(train=-0.101, test=-0.147) total time= 0.2s  
[CV 4/5; 4/4] START eta=0.05, max_depth=5, min_child_weight=7.....  
[CV 4/5; 4/4] END eta=0.05, max_depth=5, min_child_weight=7;, score=(train=-0.107, test=-0.142) total time= 0.2s  
[CV 5/5; 4/4] START eta=0.05, max_depth=5, min_child_weight=7.....  
[CV 5/5; 4/4] END eta=0.05, max_depth=5, min_child_weight=7;, score=(train=-0.102, test=-0.143) total time= 0.2s  
-----  
iter: 2  
n_candidates: 2  
n_resources: 10467  
Fitting 5 folds for each of 2 candidates, totalling 10 fits  
[CV 1/5; 1/2] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 1/5; 1/2] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.100, test=-0.139) total time= 0.5s  
[CV 2/5; 1/2] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 2/5; 1/2] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.100, test=-0.136) total time= 0.5s  
[CV 3/5; 1/2] START eta=0.1, max_depth=5, min_child_weight=7.....  
[CV 3/5; 1/2] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.101, test=-
```

```

0.128) total time= 0.5s
[CV 4/5; 1/2] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 4/5; 1/2] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.102, test=-0.130) total time= 0.5s
[CV 5/5; 1/2] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 5/5; 1/2] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.100, test=-0.134) total time= 0.4s
[CV 1/5; 2/2] START eta=0.1, max_depth=5, min_child_weight=2.....
[CV 1/5; 2/2] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.098, test=-0.139) total time= 0.5s
[CV 2/5; 2/2] START eta=0.1, max_depth=5, min_child_weight=2.....
[CV 2/5; 2/2] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.098, test=-0.137) total time= 0.4s
[CV 3/5; 2/2] START eta=0.1, max_depth=5, min_child_weight=2.....
[CV 3/5; 2/2] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.099, test=-0.128) total time= 0.4s
[CV 4/5; 2/2] START eta=0.1, max_depth=5, min_child_weight=2.....
[CV 4/5; 2/2] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.099, test=-0.129) total time= 0.5s
[CV 5/5; 2/2] START eta=0.1, max_depth=5, min_child_weight=2.....
[CV 5/5; 2/2] END eta=0.1, max_depth=5, min_child_weight=2;, score=(train=-0.098, test=-0.135) total time= 0.5s
Best mae: -0.133
Best parameters set found on train set:

```

```
{'eta': 0.1, 'max_depth': 5, 'min_child_weight': 7}
```

Grid scores on train set:

```

-0.156 (+/-0.029) for {'eta': 0.05, 'max_depth': 5, 'min_child_weight': 2}
-0.155 (+/-0.029) for {'eta': 0.05, 'max_depth': 5, 'min_child_weight': 7}
-0.161 (+/-0.025) for {'eta': 0.05, 'max_depth': 10, 'min_child_weight': 2}
-0.157 (+/-0.029) for {'eta': 0.05, 'max_depth': 10, 'min_child_weight': 7}
-0.159 (+/-0.025) for {'eta': 0.05, 'max_depth': 15, 'min_child_weight': 2}
-0.159 (+/-0.033) for {'eta': 0.05, 'max_depth': 15, 'min_child_weight': 7}
-0.155 (+/-0.030) for {'eta': 0.1, 'max_depth': 5, 'min_child_weight': 2}
-0.156 (+/-0.025) for {'eta': 0.1, 'max_depth': 5, 'min_child_weight': 7}
-0.161 (+/-0.027) for {'eta': 0.1, 'max_depth': 10, 'min_child_weight': 2}
-0.157 (+/-0.027) for {'eta': 0.1, 'max_depth': 10, 'min_child_weight': 7}
-0.163 (+/-0.027) for {'eta': 0.1, 'max_depth': 15, 'min_child_weight': 2}
-0.157 (+/-0.030) for {'eta': 0.1, 'max_depth': 15, 'min_child_weight': 7}
-0.145 (+/-0.003) for {'eta': 0.05, 'max_depth': 5, 'min_child_weight': 2}
-0.144 (+/-0.005) for {'eta': 0.1, 'max_depth': 5, 'min_child_weight': 7}
-0.143 (+/-0.006) for {'eta': 0.1, 'max_depth': 5, 'min_child_weight': 2}
-0.145 (+/-0.004) for {'eta': 0.05, 'max_depth': 5, 'min_child_weight': 7}
-0.133 (+/-0.008) for {'eta': 0.1, 'max_depth': 5, 'min_child_weight': 7}
-0.134 (+/-0.009) for {'eta': 0.1, 'max_depth': 5, 'min_child_weight': 2}
Elapsed Time: 32.02709722518921

```

Best mae: -0.133 Best parameters set found on train set:

```
{'eta': 0.1, 'max_depth': 5, 'min_child_weight': 7}
```

In [117...]

```

param_grid = {"max_depth": [3, 5, 7],
              "min_child_weight" : [7, 10],
              'eta': [.1, .3],
            }

xgbr = xgb.XGBRegressor(
    n_estimators=250,

```

```

        seed=randomstate,
        missing=0,
        eval_metric='mae',
        verbosity=1)

best_params = grid_optimizer(xgbr, param_grid, X_train_refined, y_train)

```

Making Search
Running Grid
n_iterations: 3
n_required_iterations: 3
n_possible_iterations: 3
min_resources_: 1163
max_resources_: 10471
aggressive_elimination: False
factor: 3

iter: 0
n_candidates: 12
n_resources: 1163
Fitting 5 folds for each of 12 candidates, totalling 60 fits
[CV 1/5; 1/12] START eta=0.1, max_depth=3, min_child_weight=7.....
ERROR! Session/line number was not unique in database. History logging moved to new session 3454
[CV 1/5; 1/12] END eta=0.1, max_depth=3, min_child_weight=7;, score=(train=-0.092, test=-0.173) total time= 0.0s
[CV 2/5; 1/12] START eta=0.1, max_depth=3, min_child_weight=7.....
[CV 2/5; 1/12] END eta=0.1, max_depth=3, min_child_weight=7;, score=(train=-0.093, test=-0.163) total time= 0.0s
[CV 3/5; 1/12] START eta=0.1, max_depth=3, min_child_weight=7.....
[CV 3/5; 1/12] END eta=0.1, max_depth=3, min_child_weight=7;, score=(train=-0.098, test=-0.155) total time= 0.0s
[CV 4/5; 1/12] START eta=0.1, max_depth=3, min_child_weight=7.....
[CV 4/5; 1/12] END eta=0.1, max_depth=3, min_child_weight=7;, score=(train=-0.093, test=-0.152) total time= 0.0s
[CV 5/5; 1/12] START eta=0.1, max_depth=3, min_child_weight=7.....
[CV 5/5; 1/12] END eta=0.1, max_depth=3, min_child_weight=7;, score=(train=-0.088, test=-0.159) total time= 0.0s
[CV 1/5; 2/12] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 1/5; 2/12] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.091, test=-0.173) total time= 0.0s
[CV 2/5; 2/12] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 2/5; 2/12] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.094, test=-0.168) total time= 0.0s
[CV 3/5; 2/12] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 3/5; 2/12] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.105, test=-0.158) total time= 0.0s
[CV 4/5; 2/12] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 4/5; 2/12] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.092, test=-0.148) total time= 0.0s
[CV 5/5; 2/12] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 5/5; 2/12] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.089, test=-0.162) total time= 0.0s
[CV 1/5; 3/12] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 1/5; 3/12] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.046, test=-0.167) total time= 0.1s
[CV 2/5; 3/12] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 2/5; 3/12] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.040, test=-0.164) total time= 0.1s
[CV 3/5; 3/12] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 3/5; 3/12] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.053, test=

```
-0.164) total time= 0.1s
[CV 4/5; 3/12] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 4/5; 3/12] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.042, test=-0.156) total time= 0.1s
[CV 5/5; 3/12] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 5/5; 3/12] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.041, test=-0.163) total time= 0.1s
[CV 1/5; 4/12] START eta=0.1, max_depth=5, min_child_weight=10.....
[CV 1/5; 4/12] END eta=0.1, max_depth=5, min_child_weight=10;, score=(train=-0.051, test=-0.175) total time= 0.1s
[CV 2/5; 4/12] START eta=0.1, max_depth=5, min_child_weight=10.....
[CV 2/5; 4/12] END eta=0.1, max_depth=5, min_child_weight=10;, score=(train=-0.047, test=-0.167) total time= 0.1s
[CV 3/5; 4/12] START eta=0.1, max_depth=5, min_child_weight=10.....
[CV 3/5; 4/12] END eta=0.1, max_depth=5, min_child_weight=10;, score=(train=-0.057, test=-0.167) total time= 0.1s
[CV 4/5; 4/12] START eta=0.1, max_depth=5, min_child_weight=10.....
[CV 4/5; 4/12] END eta=0.1, max_depth=5, min_child_weight=10;, score=(train=-0.047, test=-0.153) total time= 0.1s
[CV 5/5; 4/12] START eta=0.1, max_depth=5, min_child_weight=10.....
[CV 5/5; 4/12] END eta=0.1, max_depth=5, min_child_weight=10;, score=(train=-0.048, test=-0.161) total time= 0.1s
[CV 1/5; 5/12] START eta=0.1, max_depth=7, min_child_weight=7.....
[CV 1/5; 5/12] END eta=0.1, max_depth=7, min_child_weight=7;, score=(train=-0.017, test=-0.164) total time= 0.1s
[CV 2/5; 5/12] START eta=0.1, max_depth=7, min_child_weight=7.....
[CV 2/5; 5/12] END eta=0.1, max_depth=7, min_child_weight=7;, score=(train=-0.018, test=-0.166) total time= 0.1s
[CV 3/5; 5/12] START eta=0.1, max_depth=7, min_child_weight=7.....
[CV 3/5; 5/12] END eta=0.1, max_depth=7, min_child_weight=7;, score=(train=-0.019, test=-0.166) total time= 0.1s
[CV 4/5; 5/12] START eta=0.1, max_depth=7, min_child_weight=7.....
[CV 4/5; 5/12] END eta=0.1, max_depth=7, min_child_weight=7;, score=(train=-0.015, test=-0.160) total time= 0.1s
[CV 5/5; 5/12] START eta=0.1, max_depth=7, min_child_weight=7.....
[CV 5/5; 5/12] END eta=0.1, max_depth=7, min_child_weight=7;, score=(train=-0.016, test=-0.162) total time= 0.1s
[CV 1/5; 6/12] START eta=0.1, max_depth=7, min_child_weight=10.....
[CV 1/5; 6/12] END eta=0.1, max_depth=7, min_child_weight=10;, score=(train=-0.025, test=-0.166) total time= 0.1s
[CV 2/5; 6/12] START eta=0.1, max_depth=7, min_child_weight=10.....
[CV 2/5; 6/12] END eta=0.1, max_depth=7, min_child_weight=10;, score=(train=-0.022, test=-0.166) total time= 0.1s
[CV 3/5; 6/12] START eta=0.1, max_depth=7, min_child_weight=10.....
[CV 3/5; 6/12] END eta=0.1, max_depth=7, min_child_weight=10;, score=(train=-0.032, test=-0.167) total time= 0.1s
[CV 4/5; 6/12] START eta=0.1, max_depth=7, min_child_weight=10.....
[CV 4/5; 6/12] END eta=0.1, max_depth=7, min_child_weight=10;, score=(train=-0.022, test=-0.159) total time= 0.1s
[CV 5/5; 6/12] START eta=0.1, max_depth=7, min_child_weight=10.....
[CV 5/5; 6/12] END eta=0.1, max_depth=7, min_child_weight=10;, score=(train=-0.024, test=-0.164) total time= 0.1s
[CV 1/5; 7/12] START eta=0.3, max_depth=3, min_child_weight=7.....
[CV 1/5; 7/12] END eta=0.3, max_depth=3, min_child_weight=7;, score=(train=-0.044, test=-0.173) total time= 0.0s
[CV 2/5; 7/12] START eta=0.3, max_depth=3, min_child_weight=7.....
[CV 2/5; 7/12] END eta=0.3, max_depth=3, min_child_weight=7;, score=(train=-0.044, test=-0.168) total time= 0.0s
[CV 3/5; 7/12] START eta=0.3, max_depth=3, min_child_weight=7.....
[CV 3/5; 7/12] END eta=0.3, max_depth=3, min_child_weight=7;, score=(train=-0.047, test=-0.173) total time= 0.0s
```

```
[CV 4/5; 7/12] START eta=0.3, max_depth=3, min_child_weight=7.....  
[CV 4/5; 7/12] END eta=0.3, max_depth=3, min_child_weight=7;, score=(train=-0.043, test=-0.169) total time= 0.0s  
[CV 5/5; 7/12] START eta=0.3, max_depth=3, min_child_weight=7.....  
[CV 5/5; 7/12] END eta=0.3, max_depth=3, min_child_weight=7;, score=(train=-0.042, test=-0.169) total time= 0.0s  
[CV 1/5; 8/12] START eta=0.3, max_depth=3, min_child_weight=10.....  
[CV 1/5; 8/12] END eta=0.3, max_depth=3, min_child_weight=10;, score=(train=-0.049, test=-0.173) total time= 0.0s  
[CV 2/5; 8/12] START eta=0.3, max_depth=3, min_child_weight=10.....  
[CV 2/5; 8/12] END eta=0.3, max_depth=3, min_child_weight=10;, score=(train=-0.049, test=-0.178) total time= 0.0s  
[CV 3/5; 8/12] START eta=0.3, max_depth=3, min_child_weight=10.....  
[CV 3/5; 8/12] END eta=0.3, max_depth=3, min_child_weight=10;, score=(train=-0.055, test=-0.173) total time= 0.0s  
[CV 4/5; 8/12] START eta=0.3, max_depth=3, min_child_weight=10.....  
[CV 4/5; 8/12] END eta=0.3, max_depth=3, min_child_weight=10;, score=(train=-0.048, test=-0.163) total time= 0.0s  
[CV 5/5; 8/12] START eta=0.3, max_depth=3, min_child_weight=10.....  
[CV 5/5; 8/12] END eta=0.3, max_depth=3, min_child_weight=10;, score=(train=-0.046, test=-0.164) total time= 0.0s  
[CV 1/5; 9/12] START eta=0.3, max_depth=5, min_child_weight=7.....  
[CV 1/5; 9/12] END eta=0.3, max_depth=5, min_child_weight=7;, score=(train=-0.006, test=-0.177) total time= 0.1s  
[CV 2/5; 9/12] START eta=0.3, max_depth=5, min_child_weight=7.....  
[CV 2/5; 9/12] END eta=0.3, max_depth=5, min_child_weight=7;, score=(train=-0.006, test=-0.175) total time= 0.1s  
[CV 3/5; 9/12] START eta=0.3, max_depth=5, min_child_weight=7.....  
[CV 3/5; 9/12] END eta=0.3, max_depth=5, min_child_weight=7;, score=(train=-0.006, test=-0.180) total time= 0.1s  
[CV 4/5; 9/12] START eta=0.3, max_depth=5, min_child_weight=7.....  
[CV 4/5; 9/12] END eta=0.3, max_depth=5, min_child_weight=7;, score=(train=-0.005, test=-0.168) total time= 0.1s  
[CV 5/5; 9/12] START eta=0.3, max_depth=5, min_child_weight=7.....  
[CV 5/5; 9/12] END eta=0.3, max_depth=5, min_child_weight=7;, score=(train=-0.005, test=-0.158) total time= 0.1s  
[CV 1/5; 10/12] START eta=0.3, max_depth=5, min_child_weight=10.....  
[CV 1/5; 10/12] END eta=0.3, max_depth=5, min_child_weight=10;, score=(train=-0.007, test=-0.178) total time= 0.1s  
[CV 2/5; 10/12] START eta=0.3, max_depth=5, min_child_weight=10.....  
[CV 2/5; 10/12] END eta=0.3, max_depth=5, min_child_weight=10;, score=(train=-0.007, test=-0.175) total time= 0.1s  
[CV 3/5; 10/12] START eta=0.3, max_depth=5, min_child_weight=10.....  
[CV 3/5; 10/12] END eta=0.3, max_depth=5, min_child_weight=10;, score=(train=-0.009, test=-0.176) total time= 0.1s  
[CV 4/5; 10/12] START eta=0.3, max_depth=5, min_child_weight=10.....  
[CV 4/5; 10/12] END eta=0.3, max_depth=5, min_child_weight=10;, score=(train=-0.007, test=-0.165) total time= 0.1s  
[CV 5/5; 10/12] START eta=0.3, max_depth=5, min_child_weight=10.....  
[CV 5/5; 10/12] END eta=0.3, max_depth=5, min_child_weight=10;, score=(train=-0.008, test=-0.166) total time= 0.1s  
[CV 1/5; 11/12] START eta=0.3, max_depth=7, min_child_weight=7.....  
[CV 1/5; 11/12] END eta=0.3, max_depth=7, min_child_weight=7;, score=(train=-0.001, test=-0.177) total time= 0.1s  
[CV 2/5; 11/12] START eta=0.3, max_depth=7, min_child_weight=7.....  
[CV 2/5; 11/12] END eta=0.3, max_depth=7, min_child_weight=7;, score=(train=-0.001, test=-0.179) total time= 0.1s  
[CV 3/5; 11/12] START eta=0.3, max_depth=7, min_child_weight=7.....  
[CV 3/5; 11/12] END eta=0.3, max_depth=7, min_child_weight=7;, score=(train=-0.001, test=-0.182) total time= 0.1s  
[CV 4/5; 11/12] START eta=0.3, max_depth=7, min_child_weight=7.....
```

```

[CV 4/5; 11/12] END eta=0.3, max_depth=7, min_child_weight=7;, score=(train=-0.001, test
=-0.169) total time= 0.1s
[CV 5/5; 11/12] START eta=0.3, max_depth=7, min_child_weight=7.....
[CV 5/5; 11/12] END eta=0.3, max_depth=7, min_child_weight=7;, score=(train=-0.001, test
=-0.164) total time= 0.1s
[CV 1/5; 12/12] START eta=0.3, max_depth=7, min_child_weight=10.....
[CV 1/5; 12/12] END eta=0.3, max_depth=7, min_child_weight=10;, score=(train=-0.001, tes
t=-0.180) total time= 0.1s
[CV 2/5; 12/12] START eta=0.3, max_depth=7, min_child_weight=10.....
[CV 2/5; 12/12] END eta=0.3, max_depth=7, min_child_weight=10;, score=(train=-0.001, tes
t=-0.176) total time= 0.1s
[CV 3/5; 12/12] START eta=0.3, max_depth=7, min_child_weight=10.....
[CV 3/5; 12/12] END eta=0.3, max_depth=7, min_child_weight=10;, score=(train=-0.001, tes
t=-0.176) total time= 0.1s
[CV 4/5; 12/12] START eta=0.3, max_depth=7, min_child_weight=10.....
[CV 4/5; 12/12] END eta=0.3, max_depth=7, min_child_weight=10;, score=(train=-0.001, tes
t=-0.163) total time= 0.1s
[CV 5/5; 12/12] START eta=0.3, max_depth=7, min_child_weight=10.....
[CV 5/5; 12/12] END eta=0.3, max_depth=7, min_child_weight=10;, score=(train=-0.001, tes
t=-0.167) total time= 0.1s
-----
iter: 1
n_candidates: 4
n_resources: 3489
Fitting 5 folds for each of 4 candidates, totalling 20 fits
[CV 1/5; 1/4] START eta=0.1, max_depth=7, min_child_weight=7.....
[CV 1/5; 1/4] END eta=0.1, max_depth=7, min_child_weight=7;, score=(train=-0.044, test=-
0.156) total time= 0.3s
[CV 2/5; 1/4] START eta=0.1, max_depth=7, min_child_weight=7.....
[CV 2/5; 1/4] END eta=0.1, max_depth=7, min_child_weight=7;, score=(train=-0.042, test=-
0.151) total time= 0.3s
[CV 3/5; 1/4] START eta=0.1, max_depth=7, min_child_weight=7.....
[CV 3/5; 1/4] END eta=0.1, max_depth=7, min_child_weight=7;, score=(train=-0.045, test=-
0.143) total time= 0.3s
[CV 4/5; 1/4] START eta=0.1, max_depth=7, min_child_weight=7.....
[CV 4/5; 1/4] END eta=0.1, max_depth=7, min_child_weight=7;, score=(train=-0.046, test=-
0.137) total time= 0.3s
[CV 5/5; 1/4] START eta=0.1, max_depth=7, min_child_weight=7.....
[CV 5/5; 1/4] END eta=0.1, max_depth=7, min_child_weight=7;, score=(train=-0.043, test=-
0.142) total time= 0.3s
[CV 1/5; 2/4] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 1/5; 2/4] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.078, test=-
0.151) total time= 0.2s
[CV 2/5; 2/4] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 2/5; 2/4] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.077, test=-
0.148) total time= 0.2s
[CV 3/5; 2/4] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 3/5; 2/4] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.080, test=-
0.138) total time= 0.2s
[CV 4/5; 2/4] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 4/5; 2/4] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.079, test=-
0.137) total time= 0.2s
[CV 5/5; 2/4] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 5/5; 2/4] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.079, test=-
0.138) total time= 0.2s
[CV 1/5; 3/4] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 1/5; 3/4] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.117, test=
-0.153) total time= 0.1s
[CV 2/5; 3/4] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 2/5; 3/4] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.114, test=
-0.152) total time= 0.1s

```

```

[CV 3/5; 3/4] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 3/5; 3/4] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.116, test=-0.136) total time= 0.1s
[CV 4/5; 3/4] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 4/5; 3/4] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.117, test=-0.137) total time= 0.1s
[CV 5/5; 3/4] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 5/5; 3/4] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.116, test=-0.142) total time= 0.1s
[CV 1/5; 4/4] START eta=0.1, max_depth=3, min_child_weight=7.....
[CV 1/5; 4/4] END eta=0.1, max_depth=3, min_child_weight=7;, score=(train=-0.116, test=-0.153) total time= 0.1s
[CV 2/5; 4/4] START eta=0.1, max_depth=3, min_child_weight=7.....
[CV 2/5; 4/4] END eta=0.1, max_depth=3, min_child_weight=7;, score=(train=-0.114, test=-0.152) total time= 0.1s
[CV 3/5; 4/4] START eta=0.1, max_depth=3, min_child_weight=7.....
[CV 3/5; 4/4] END eta=0.1, max_depth=3, min_child_weight=7;, score=(train=-0.115, test=-0.136) total time= 0.1s
[CV 4/5; 4/4] START eta=0.1, max_depth=3, min_child_weight=7.....
[CV 4/5; 4/4] END eta=0.1, max_depth=3, min_child_weight=7;, score=(train=-0.115, test=-0.138) total time= 0.1s
[CV 5/5; 4/4] START eta=0.1, max_depth=3, min_child_weight=7.....
[CV 5/5; 4/4] END eta=0.1, max_depth=3, min_child_weight=7;, score=(train=-0.116, test=-0.142) total time= 0.1s
-----
iter: 2
n_candidates: 2
n_resources: 10467
Fitting 5 folds for each of 2 candidates, totalling 10 fits
[CV 1/5; 1/2] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 1/5; 1/2] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.124, test=-0.143) total time= 0.2s
[CV 2/5; 1/2] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 2/5; 1/2] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.125, test=-0.141) total time= 0.2s
[CV 3/5; 1/2] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 3/5; 1/2] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.128, test=-0.131) total time= 0.2s
[CV 4/5; 1/2] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 4/5; 1/2] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.127, test=-0.134) total time= 0.2s
[CV 5/5; 1/2] START eta=0.1, max_depth=3, min_child_weight=10.....
[CV 5/5; 1/2] END eta=0.1, max_depth=3, min_child_weight=10;, score=(train=-0.124, test=-0.139) total time= 0.2s
[CV 1/5; 2/2] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 1/5; 2/2] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.100, test=-0.139) total time= 0.4s
[CV 2/5; 2/2] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 2/5; 2/2] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.100, test=-0.137) total time= 0.4s
[CV 3/5; 2/2] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 3/5; 2/2] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.102, test=-0.128) total time= 0.5s
[CV 4/5; 2/2] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 4/5; 2/2] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.103, test=-0.129) total time= 0.4s
[CV 5/5; 2/2] START eta=0.1, max_depth=5, min_child_weight=7.....
[CV 5/5; 2/2] END eta=0.1, max_depth=5, min_child_weight=7;, score=(train=-0.101, test=-0.134) total time= 0.4s
Best mae: -0.133
Best parameters set found on train set:

```

```
{'eta': 0.1, 'max_depth': 5, 'min_child_weight': 7}
```

Grid scores on train set:

```
-0.161 (+/-0.015) for {'eta': 0.1, 'max_depth': 3, 'min_child_weight': 7}
-0.162 (+/-0.017) for {'eta': 0.1, 'max_depth': 3, 'min_child_weight': 10}
-0.163 (+/-0.007) for {'eta': 0.1, 'max_depth': 5, 'min_child_weight': 7}
-0.165 (+/-0.014) for {'eta': 0.1, 'max_depth': 5, 'min_child_weight': 10}
-0.163 (+/-0.005) for {'eta': 0.1, 'max_depth': 7, 'min_child_weight': 7}
-0.165 (+/-0.006) for {'eta': 0.1, 'max_depth': 7, 'min_child_weight': 10}
-0.170 (+/-0.004) for {'eta': 0.3, 'max_depth': 3, 'min_child_weight': 7}
-0.170 (+/-0.012) for {'eta': 0.3, 'max_depth': 3, 'min_child_weight': 10}
-0.172 (+/-0.015) for {'eta': 0.3, 'max_depth': 5, 'min_child_weight': 7}
-0.172 (+/-0.011) for {'eta': 0.3, 'max_depth': 5, 'min_child_weight': 10}
-0.175 (+/-0.014) for {'eta': 0.3, 'max_depth': 7, 'min_child_weight': 7}
-0.172 (+/-0.013) for {'eta': 0.3, 'max_depth': 7, 'min_child_weight': 10}
-0.146 (+/-0.013) for {'eta': 0.1, 'max_depth': 7, 'min_child_weight': 7}
-0.143 (+/-0.012) for {'eta': 0.1, 'max_depth': 5, 'min_child_weight': 7}
-0.144 (+/-0.015) for {'eta': 0.1, 'max_depth': 3, 'min_child_weight': 10}
-0.144 (+/-0.014) for {'eta': 0.1, 'max_depth': 3, 'min_child_weight': 7}
-0.138 (+/-0.009) for {'eta': 0.1, 'max_depth': 3, 'min_child_weight': 10}
-0.133 (+/-0.009) for {'eta': 0.1, 'max_depth': 5, 'min_child_weight': 7}
Elapsed Time: 21.34038805961609
```

Best mae: -0.133 Best parameters set found on train set:

```
{'eta': 0.1, 'max_depth': 5, 'min_child_weight': 7}
```

In [120...]

```
param_grid = {'gamma': [0, .4, .8],
              'subsample':[.2, .6, 1],}

xgbr = xgb.XGBRegressor(
    n_estimators=250,
    seed=randomstate,
    missing=0,
    eval_metric='mae',
    verbosity=1,
    max_depth = 5,
    eta = .1,
    min_child_weight = 7)

best_params = grid_optimizer(xgbr, param_grid, X_train_refined, y_train)
```

```
Making Search
Running Grid
n_iterations: 3
n_required_iterations: 3
n_possible_iterations: 3
min_resources_: 1163
max_resources_: 10471
aggressive_elimination: False
factor: 3
-----
iter: 0
n_candidates: 9
n_resources: 1163
Fitting 5 folds for each of 9 candidates, totalling 45 fits
```

```
[CV 1/5; 1/9] START gamma=0, subsample=0.2.....  
[CV 1/5; 1/9] END gamma=0, subsample=0.2;, score=(train=-0.047, test=-0.175) total time=  
0.2s  
[CV 2/5; 1/9] START gamma=0, subsample=0.2.....  
[CV 2/5; 1/9] END gamma=0, subsample=0.2;, score=(train=-0.050, test=-0.185) total time=  
0.2s  
[CV 3/5; 1/9] START gamma=0, subsample=0.2.....  
[CV 3/5; 1/9] END gamma=0, subsample=0.2;, score=(train=-0.048, test=-0.164) total time=  
0.2s  
[CV 4/5; 1/9] START gamma=0, subsample=0.2.....  
[CV 4/5; 1/9] END gamma=0, subsample=0.2;, score=(train=-0.054, test=-0.175) total time=  
0.2s  
[CV 5/5; 1/9] START gamma=0, subsample=0.2.....  
[CV 5/5; 1/9] END gamma=0, subsample=0.2;, score=(train=-0.055, test=-0.171) total time=  
0.2s  
[CV 1/5; 2/9] START gamma=0, subsample=0.6.....  
[CV 1/5; 2/9] END gamma=0, subsample=0.6;, score=(train=-0.014, test=-0.171) total time=  
0.2s  
[CV 2/5; 2/9] START gamma=0, subsample=0.6.....  
[CV 2/5; 2/9] END gamma=0, subsample=0.6;, score=(train=-0.017, test=-0.182) total time=  
0.2s  
[CV 3/5; 2/9] START gamma=0, subsample=0.6.....  
[CV 3/5; 2/9] END gamma=0, subsample=0.6;, score=(train=-0.016, test=-0.158) total time=  
0.3s  
[CV 4/5; 2/9] START gamma=0, subsample=0.6.....  
[CV 4/5; 2/9] END gamma=0, subsample=0.6;, score=(train=-0.019, test=-0.153) total time=  
0.2s  
[CV 5/5; 2/9] START gamma=0, subsample=0.6.....  
[CV 5/5; 2/9] END gamma=0, subsample=0.6;, score=(train=-0.016, test=-0.158) total time=  
0.3s  
[CV 1/5; 3/9] START gamma=0, subsample=1.....  
[CV 1/5; 3/9] END gamma=0, subsample=1;, score=(train=-0.015, test=-0.170) total time=  
0.3s  
[CV 2/5; 3/9] START gamma=0, subsample=1.....  
[CV 2/5; 3/9] END gamma=0, subsample=1;, score=(train=-0.019, test=-0.177) total time=  
0.3s  
[CV 3/5; 3/9] START gamma=0, subsample=1.....  
[CV 3/5; 3/9] END gamma=0, subsample=1;, score=(train=-0.016, test=-0.162) total time=  
0.2s  
[CV 4/5; 3/9] START gamma=0, subsample=1.....  
[CV 4/5; 3/9] END gamma=0, subsample=1;, score=(train=-0.018, test=-0.156) total time=  
0.3s  
[CV 5/5; 3/9] START gamma=0, subsample=1.....  
[CV 5/5; 3/9] END gamma=0, subsample=1;, score=(train=-0.017, test=-0.154) total time=  
0.3s  
[CV 1/5; 4/9] START gamma=0.4, subsample=0.2.....  
[CV 1/5; 4/9] END gamma=0.4, subsample=0.2;, score=(train=-0.133, test=-0.185) total tim  
e= 0.2s  
[CV 2/5; 4/9] START gamma=0.4, subsample=0.2.....  
[CV 2/5; 4/9] END gamma=0.4, subsample=0.2;, score=(train=-0.139, test=-0.183) total tim  
e= 0.2s  
[CV 3/5; 4/9] START gamma=0.4, subsample=0.2.....  
[CV 3/5; 4/9] END gamma=0.4, subsample=0.2;, score=(train=-0.134, test=-0.165) total tim  
e= 0.2s  
[CV 4/5; 4/9] START gamma=0.4, subsample=0.2.....  
[CV 4/5; 4/9] END gamma=0.4, subsample=0.2;, score=(train=-0.139, test=-0.161) total tim  
e= 0.2s  
[CV 5/5; 4/9] START gamma=0.4, subsample=0.2.....  
[CV 5/5; 4/9] END gamma=0.4, subsample=0.2;, score=(train=-0.136, test=-0.161) total tim  
e= 0.2s  
[CV 1/5; 5/9] START gamma=0.4, subsample=0.6.....
```

```
[CV 1/5; 5/9] END gamma=0.4, subsample=0.6;, score=(train=-0.120, test=-0.176) total time= 0.2s
[CV 2/5; 5/9] START gamma=0.4, subsample=0.6.....
[CV 2/5; 5/9] END gamma=0.4, subsample=0.6;, score=(train=-0.129, test=-0.177) total time= 0.3s
[CV 3/5; 5/9] START gamma=0.4, subsample=0.6.....
[CV 3/5; 5/9] END gamma=0.4, subsample=0.6;, score=(train=-0.123, test=-0.158) total time= 0.2s
[CV 4/5; 5/9] START gamma=0.4, subsample=0.6.....
[CV 4/5; 5/9] END gamma=0.4, subsample=0.6;, score=(train=-0.128, test=-0.154) total time= 0.2s
[CV 5/5; 5/9] START gamma=0.4, subsample=0.6.....
[CV 5/5; 5/9] END gamma=0.4, subsample=0.6;, score=(train=-0.123, test=-0.164) total time= 0.3s
[CV 1/5; 6/9] START gamma=0.4, subsample=1.....
[CV 1/5; 6/9] END gamma=0.4, subsample=1;, score=(train=-0.131, test=-0.182) total time= 0.3s
[CV 2/5; 6/9] START gamma=0.4, subsample=1.....
[CV 2/5; 6/9] END gamma=0.4, subsample=1;, score=(train=-0.147, test=-0.192) total time= 0.2s
[CV 3/5; 6/9] START gamma=0.4, subsample=1.....
[CV 3/5; 6/9] END gamma=0.4, subsample=1;, score=(train=-0.136, test=-0.165) total time= 0.3s
[CV 4/5; 6/9] START gamma=0.4, subsample=1.....
[CV 4/5; 6/9] END gamma=0.4, subsample=1;, score=(train=-0.144, test=-0.170) total time= 0.3s
[CV 5/5; 6/9] START gamma=0.4, subsample=1.....
[CV 5/5; 6/9] END gamma=0.4, subsample=1;, score=(train=-0.135, test=-0.170) total time= 0.3s
[CV 1/5; 7/9] START gamma=0.8, subsample=0.2.....
[CV 1/5; 7/9] END gamma=0.8, subsample=0.2;, score=(train=-0.155, test=-0.192) total time= 0.2s
[CV 2/5; 7/9] START gamma=0.8, subsample=0.2.....
[CV 2/5; 7/9] END gamma=0.8, subsample=0.2;, score=(train=-0.171, test=-0.196) total time= 0.2s
[CV 3/5; 7/9] START gamma=0.8, subsample=0.2.....
[CV 3/5; 7/9] END gamma=0.8, subsample=0.2;, score=(train=-0.160, test=-0.173) total time= 0.2s
[CV 4/5; 7/9] START gamma=0.8, subsample=0.2.....
[CV 4/5; 7/9] END gamma=0.8, subsample=0.2;, score=(train=-0.169, test=-0.174) total time= 0.2s
[CV 5/5; 7/9] START gamma=0.8, subsample=0.2.....
[CV 5/5; 7/9] END gamma=0.8, subsample=0.2;, score=(train=-0.165, test=-0.180) total time= 0.2s
[CV 1/5; 8/9] START gamma=0.8, subsample=0.6.....
[CV 1/5; 8/9] END gamma=0.8, subsample=0.6;, score=(train=-0.145, test=-0.190) total time= 0.2s
[CV 2/5; 8/9] START gamma=0.8, subsample=0.6.....
[CV 2/5; 8/9] END gamma=0.8, subsample=0.6;, score=(train=-0.159, test=-0.193) total time= 0.2s
[CV 3/5; 8/9] START gamma=0.8, subsample=0.6.....
[CV 3/5; 8/9] END gamma=0.8, subsample=0.6;, score=(train=-0.147, test=-0.165) total time= 0.2s
[CV 4/5; 8/9] START gamma=0.8, subsample=0.6.....
[CV 4/5; 8/9] END gamma=0.8, subsample=0.6;, score=(train=-0.156, test=-0.166) total time= 0.2s
[CV 5/5; 8/9] START gamma=0.8, subsample=0.6.....
[CV 5/5; 8/9] END gamma=0.8, subsample=0.6;, score=(train=-0.151, test=-0.170) total time= 0.3s
[CV 1/5; 9/9] START gamma=0.8, subsample=1.....
[CV 1/5; 9/9] END gamma=0.8, subsample=1;, score=(train=-0.153, test=-0.190) total time=
```

```
0.3s
[CV 2/5; 9/9] START gamma=0.8, subsample=1...........................
[CV 2/5; 9/9] END gamma=0.8, subsample=1;, score=(train=-0.169, test=-0.202) total time=
0.3s
[CV 3/5; 9/9] START gamma=0.8, subsample=1...........................
[CV 3/5; 9/9] END gamma=0.8, subsample=1;, score=(train=-0.157, test=-0.172) total time=
0.3s
[CV 4/5; 9/9] START gamma=0.8, subsample=1...........................
[CV 4/5; 9/9] END gamma=0.8, subsample=1;, score=(train=-0.165, test=-0.180) total time=
0.2s
[CV 5/5; 9/9] START gamma=0.8, subsample=1...........................
[CV 5/5; 9/9] END gamma=0.8, subsample=1;, score=(train=-0.154, test=-0.181) total time=
0.3s
-----
iter: 1
n_candidates: 3
n_resources: 3489
Fitting 5 folds for each of 3 candidates, totalling 15 fits
[CV 1/5; 1/3] START gamma=0.4, subsample=0.6...........................
[CV 1/5; 1/3] END gamma=0.4, subsample=0.6;, score=(train=-0.119, test=-0.152) total tim
e= 0.5s
[CV 2/5; 1/3] START gamma=0.4, subsample=0.6...........................
[CV 2/5; 1/3] END gamma=0.4, subsample=0.6;, score=(train=-0.123, test=-0.147) total tim
e= 0.5s
[CV 3/5; 1/3] START gamma=0.4, subsample=0.6...........................
[CV 3/5; 1/3] END gamma=0.4, subsample=0.6;, score=(train=-0.121, test=-0.142) total tim
e= 0.5s
[CV 4/5; 1/3] START gamma=0.4, subsample=0.6...........................
[CV 4/5; 1/3] END gamma=0.4, subsample=0.6;, score=(train=-0.119, test=-0.144) total tim
e= 0.5s
[CV 5/5; 1/3] START gamma=0.4, subsample=0.6...........................
[CV 5/5; 1/3] END gamma=0.4, subsample=0.6;, score=(train=-0.118, test=-0.147) total tim
e= 0.5s
[CV 1/5; 2/3] START gamma=0, subsample=0.6...........................
[CV 1/5; 2/3] END gamma=0, subsample=0.6;, score=(train=-0.046, test=-0.149) total time=
0.5s
[CV 2/5; 2/3] START gamma=0, subsample=0.6...........................
[CV 2/5; 2/3] END gamma=0, subsample=0.6;, score=(train=-0.049, test=-0.148) total time=
0.5s
[CV 3/5; 2/3] START gamma=0, subsample=0.6...........................
[CV 3/5; 2/3] END gamma=0, subsample=0.6;, score=(train=-0.048, test=-0.143) total time=
0.5s
[CV 4/5; 2/3] START gamma=0, subsample=0.6...........................
[CV 4/5; 2/3] END gamma=0, subsample=0.6;, score=(train=-0.045, test=-0.141) total time=
0.5s
[CV 5/5; 2/3] START gamma=0, subsample=0.6...........................
[CV 5/5; 2/3] END gamma=0, subsample=0.6;, score=(train=-0.045, test=-0.145) total time=
0.5s
[CV 1/5; 3/3] START gamma=0, subsample=1...........................
[CV 1/5; 3/3] END gamma=0, subsample=1;, score=(train=-0.047, test=-0.148) total time=
0.5s
[CV 2/5; 3/3] START gamma=0, subsample=1...........................
[CV 2/5; 3/3] END gamma=0, subsample=1;, score=(train=-0.052, test=-0.150) total time=
0.5s
[CV 3/5; 3/3] START gamma=0, subsample=1...........................
[CV 3/5; 3/3] END gamma=0, subsample=1;, score=(train=-0.049, test=-0.139) total time=
0.5s
[CV 4/5; 3/3] START gamma=0, subsample=1...........................
[CV 4/5; 3/3] END gamma=0, subsample=1;, score=(train=-0.046, test=-0.137) total time=
0.5s
[CV 5/5; 3/3] START gamma=0, subsample=1...........................
```

```
[CV 5/5; 3/3] END gamma=0, subsample=1;, score=(train=-0.049, test=-0.139) total time= 0.5s
-----
iter: 2
n_candidates: 1
n_resources: 10467
Fitting 5 folds for each of 1 candidates, totalling 5 fits
[CV 1/5; 1/1] START gamma=0, subsample=1.....
[CV 1/5; 1/1] END gamma=0, subsample=1;, score=(train=-0.080, test=-0.139) total time= 1.0s
[CV 2/5; 1/1] START gamma=0, subsample=1.....
[CV 2/5; 1/1] END gamma=0, subsample=1;, score=(train=-0.079, test=-0.137) total time= 1.0s
[CV 3/5; 1/1] START gamma=0, subsample=1.....
[CV 3/5; 1/1] END gamma=0, subsample=1;, score=(train=-0.081, test=-0.128) total time= 1.0s
[CV 4/5; 1/1] START gamma=0, subsample=1.....
[CV 4/5; 1/1] END gamma=0, subsample=1;, score=(train=-0.081, test=-0.128) total time= 0.9s
[CV 5/5; 1/1] START gamma=0, subsample=1.....
[CV 5/5; 1/1] END gamma=0, subsample=1;, score=(train=-0.080, test=-0.135) total time= 1.0s
Best mae: -0.133
Best parameters set found on train set:
```

```
{'gamma': 0, 'subsample': 1}
```

```
Grid scores on train set:
```

```
-0.174 (+/-0.014) for {'gamma': 0, 'subsample': 0.2}
-0.164 (+/-0.022) for {'gamma': 0, 'subsample': 0.6}
-0.164 (+/-0.017) for {'gamma': 0, 'subsample': 1}
-0.171 (+/-0.022) for {'gamma': 0.4, 'subsample': 0.2}
-0.166 (+/-0.019) for {'gamma': 0.4, 'subsample': 0.6}
-0.176 (+/-0.020) for {'gamma': 0.4, 'subsample': 1}
-0.183 (+/-0.019) for {'gamma': 0.8, 'subsample': 0.2}
-0.177 (+/-0.024) for {'gamma': 0.8, 'subsample': 0.6}
-0.185 (+/-0.020) for {'gamma': 0.8, 'subsample': 1}
-0.146 (+/-0.007) for {'gamma': 0.4, 'subsample': 0.6}
-0.145 (+/-0.006) for {'gamma': 0, 'subsample': 0.6}
-0.143 (+/-0.011) for {'gamma': 0, 'subsample': 1}
-0.133 (+/-0.009) for {'gamma': 0, 'subsample': 1}
Elapsed Time: 31.23236846923828
```

```
Best mae: -0.133 Best parameters set found on train set:
```

```
{'gamma': 0, 'subsample': 1}
```

```
In [122]:
```

```
param_grid = {'colsample_bytree':[.2, .4, .6, .8, 1],
}

xgbr = xgb.XGBRegressor(
    n_estimators=250,
    seed=randomstate,
    missing=0,
    eval_metric='mae',
    verbosity=1,
    max_depth = 5,
    eta = .1,
    min_child_weight = 7,
```

```

        gamma = 0,
        subsample=1,
    )

best_params = grid_optimizer(xgbr, param_grid, X_train_refined, y_train)

```

Making Search
Running Grid
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3

iter: 0
n_candidates: 5
n_resources: 3490
Fitting 5 folds for each of 5 candidates, totalling 25 fits
[CV 1/5; 1/5] START colsample_bytree=0.2.....
[CV 1/5; 1/5] END colsample_bytree=0.2;, score=(train=-0.088, test=-0.150) total time=0.1s
[CV 2/5; 1/5] START colsample_bytree=0.2.....
[CV 2/5; 1/5] END colsample_bytree=0.2;, score=(train=-0.092, test=-0.145) total time=0.1s
[CV 3/5; 1/5] START colsample_bytree=0.2.....
[CV 3/5; 1/5] END colsample_bytree=0.2;, score=(train=-0.089, test=-0.135) total time=0.2s
[CV 4/5; 1/5] START colsample_bytree=0.2.....
[CV 4/5; 1/5] END colsample_bytree=0.2;, score=(train=-0.089, test=-0.135) total time=0.1s
[CV 5/5; 1/5] START colsample_bytree=0.2.....
[CV 5/5; 1/5] END colsample_bytree=0.2;, score=(train=-0.084, test=-0.152) total time=0.2s
[CV 1/5; 2/5] START colsample_bytree=0.4.....
[CV 1/5; 2/5] END colsample_bytree=0.4;, score=(train=-0.083, test=-0.151) total time=0.2s
[CV 2/5; 2/5] START colsample_bytree=0.4.....
[CV 2/5; 2/5] END colsample_bytree=0.4;, score=(train=-0.084, test=-0.147) total time=0.1s
[CV 3/5; 2/5] START colsample_bytree=0.4.....
[CV 3/5; 2/5] END colsample_bytree=0.4;, score=(train=-0.082, test=-0.134) total time=0.1s
[CV 4/5; 2/5] START colsample_bytree=0.4.....
[CV 4/5; 2/5] END colsample_bytree=0.4;, score=(train=-0.081, test=-0.134) total time=0.2s
[CV 5/5; 2/5] START colsample_bytree=0.4.....
[CV 5/5; 2/5] END colsample_bytree=0.4;, score=(train=-0.081, test=-0.152) total time=0.1s
[CV 1/5; 3/5] START colsample_bytree=0.6.....
[CV 1/5; 3/5] END colsample_bytree=0.6;, score=(train=-0.083, test=-0.150) total time=0.2s
[CV 2/5; 3/5] START colsample_bytree=0.6.....
[CV 2/5; 3/5] END colsample_bytree=0.6;, score=(train=-0.082, test=-0.150) total time=0.2s
[CV 3/5; 3/5] START colsample_bytree=0.6.....
[CV 3/5; 3/5] END colsample_bytree=0.6;, score=(train=-0.079, test=-0.136) total time=0.2s
[CV 4/5; 3/5] START colsample_bytree=0.6.....
[CV 4/5; 3/5] END colsample_bytree=0.6;, score=(train=-0.078, test=-0.137) total time=

```
0.2s
[CV 5/5; 3/5] START colsample_bytree=0.6...........................
[CV 5/5; 3/5] END colsample_bytree=0.6;, score=(train=-0.077, test=-0.152) total time=
0.2s
[CV 1/5; 4/5] START colsample_bytree=0.8...........................
[CV 1/5; 4/5] END colsample_bytree=0.8;, score=(train=-0.081, test=-0.149) total time=
0.2s
[CV 2/5; 4/5] START colsample_bytree=0.8...........................
[CV 2/5; 4/5] END colsample_bytree=0.8;, score=(train=-0.080, test=-0.149) total time=
0.2s
[CV 3/5; 4/5] START colsample_bytree=0.8...........................
[CV 3/5; 4/5] END colsample_bytree=0.8;, score=(train=-0.078, test=-0.133) total time=
0.2s
[CV 4/5; 4/5] START colsample_bytree=0.8...........................
[CV 4/5; 4/5] END colsample_bytree=0.8;, score=(train=-0.078, test=-0.138) total time=
0.2s
[CV 5/5; 4/5] START colsample_bytree=0.8...........................
[CV 5/5; 4/5] END colsample_bytree=0.8;, score=(train=-0.078, test=-0.153) total time=
0.2s
[CV 1/5; 5/5] START colsample_bytree=1...........................
[CV 1/5; 5/5] END colsample_bytree=1;, score=(train=-0.078, test=-0.151) total time=
0.2s
[CV 2/5; 5/5] START colsample_bytree=1...........................
[CV 2/5; 5/5] END colsample_bytree=1;, score=(train=-0.080, test=-0.148) total time=
0.2s
[CV 3/5; 5/5] START colsample_bytree=1...........................
[CV 3/5; 5/5] END colsample_bytree=1;, score=(train=-0.078, test=-0.136) total time=
0.2s
[CV 4/5; 5/5] START colsample_bytree=1...........................
[CV 4/5; 5/5] END colsample_bytree=1;, score=(train=-0.077, test=-0.138) total time=
0.2s
[CV 5/5; 5/5] START colsample_bytree=1...........................
[CV 5/5; 5/5] END colsample_bytree=1;, score=(train=-0.076, test=-0.150) total time=
0.2s
-----
iter: 1
n_candidates: 2
n_resources: 10470
Fitting 5 folds for each of 2 candidates, totalling 10 fits
[CV 1/5; 1/2] START colsample_bytree=0.4...........................
[CV 1/5; 1/2] END colsample_bytree=0.4;, score=(train=-0.103, test=-0.137) total time=
0.3s
[CV 2/5; 1/2] START colsample_bytree=0.4...........................
[CV 2/5; 1/2] END colsample_bytree=0.4;, score=(train=-0.104, test=-0.136) total time=
0.3s
[CV 3/5; 1/2] START colsample_bytree=0.4...........................
[CV 3/5; 1/2] END colsample_bytree=0.4;, score=(train=-0.105, test=-0.127) total time=
0.3s
[CV 4/5; 1/2] START colsample_bytree=0.4...........................
[CV 4/5; 1/2] END colsample_bytree=0.4;, score=(train=-0.105, test=-0.129) total time=
0.3s
[CV 5/5; 1/2] START colsample_bytree=0.4...........................
[CV 5/5; 1/2] END colsample_bytree=0.4;, score=(train=-0.104, test=-0.136) total time=
0.3s
[CV 1/5; 2/2] START colsample_bytree=0.2...........................
[CV 1/5; 2/2] END colsample_bytree=0.2;, score=(train=-0.107, test=-0.138) total time=
0.3s
[CV 2/5; 2/2] START colsample_bytree=0.2...........................
[CV 2/5; 2/2] END colsample_bytree=0.2;, score=(train=-0.107, test=-0.136) total time=
0.3s
[CV 3/5; 2/2] START colsample_bytree=0.2...........................
```

```

[CV 3/5; 2/2] END colsample_bytree=0.2;, score=(train=-0.109, test=-0.127) total time=
0.3s
[CV 4/5; 2/2] START colsample_bytree=0.2.............................
[CV 4/5; 2/2] END colsample_bytree=0.2;, score=(train=-0.108, test=-0.129) total time=
0.3s
[CV 5/5; 2/2] START colsample_bytree=0.2.............................
[CV 5/5; 2/2] END colsample_bytree=0.2;, score=(train=-0.107, test=-0.137) total time=
0.3s
Best mae: -0.133
Best parameters set found on train set:

{'colsample_bytree': 0.4}

Grid scores on train set:

-0.143 (+/-0.014) for {'colsample_bytree': 0.2}
-0.144 (+/-0.016) for {'colsample_bytree': 0.4}
-0.145 (+/-0.014) for {'colsample_bytree': 0.6}
-0.144 (+/-0.015) for {'colsample_bytree': 0.8}
-0.145 (+/-0.013) for {'colsample_bytree': 1}
-0.133 (+/-0.008) for {'colsample_bytree': 0.4}
-0.133 (+/-0.009) for {'colsample_bytree': 0.2}
Elapsed Time: 11.445398807525635

Best mae: -0.133 Best parameters set found on train set:
```

{'colsample_bytree': 0.4}

```
In [123...]
param_grid = {'reg_alpha':[1e-5, 1, 100],
              'reg_lambda':[1e-5, 1, 100],
              }

xgbr = xgb.XGBRegressor(
    n_estimators=250,
    seed=randomstate,
    missing=0,
    eval_metric='mae',
    verbosity=1,
    max_depth = 5,
    eta = .1,
    min_child_weight = 7,
    gamma = 0,
    subsample=1,
    colsample_bytree=.4

)
best_params = grid_optimizer(xgbr, param_grid, X_train_refined, y_train)
```

```

Making Search
Running Grid
n_iterations: 3
n_required_iterations: 3
n_possible_iterations: 3
min_resources_: 1163
max_resources_: 10471
aggressive_elimination: False
factor: 3
-----
iter: 0
```

```
n_candidates: 9
n_resources: 1163
Fitting 5 folds for each of 9 candidates, totalling 45 fits
[CV 1/5; 1/9] START reg_alpha=1e-05, reg_lambda=1e-05........................
[CV 1/5; 1/9] END reg_alpha=1e-05, reg_lambda=1e-05;, score=(train=-0.042, test=-0.173)
total time= 0.1s
[CV 2/5; 1/9] START reg_alpha=1e-05, reg_lambda=1e-05........................
[CV 2/5; 1/9] END reg_alpha=1e-05, reg_lambda=1e-05;, score=(train=-0.041, test=-0.164)
total time= 0.1s
[CV 3/5; 1/9] START reg_alpha=1e-05, reg_lambda=1e-05........................
[CV 3/5; 1/9] END reg_alpha=1e-05, reg_lambda=1e-05;, score=(train=-0.041, test=-0.145)
total time= 0.1s
[CV 4/5; 1/9] START reg_alpha=1e-05, reg_lambda=1e-05........................
[CV 4/5; 1/9] END reg_alpha=1e-05, reg_lambda=1e-05;, score=(train=-0.040, test=-0.177)
total time= 0.1s
[CV 5/5; 1/9] START reg_alpha=1e-05, reg_lambda=1e-05........................
[CV 5/5; 1/9] END reg_alpha=1e-05, reg_lambda=1e-05;, score=(train=-0.041, test=-0.175)
total time= 0.1s
[CV 1/5; 2/9] START reg_alpha=1e-05, reg_lambda=1........................
[CV 1/5; 2/9] END reg_alpha=1e-05, reg_lambda=1;, score=(train=-0.051, test=-0.168) total time= 0.1s
[CV 2/5; 2/9] START reg_alpha=1e-05, reg_lambda=1........................
[CV 2/5; 2/9] END reg_alpha=1e-05, reg_lambda=1;, score=(train=-0.048, test=-0.163) total time= 0.1s
[CV 3/5; 2/9] START reg_alpha=1e-05, reg_lambda=1........................
[CV 3/5; 2/9] END reg_alpha=1e-05, reg_lambda=1;, score=(train=-0.049, test=-0.143) total time= 0.1s
[CV 4/5; 2/9] START reg_alpha=1e-05, reg_lambda=1........................
[CV 4/5; 2/9] END reg_alpha=1e-05, reg_lambda=1;, score=(train=-0.052, test=-0.177) total time= 0.1s
[CV 5/5; 2/9] START reg_alpha=1e-05, reg_lambda=1........................
[CV 5/5; 2/9] END reg_alpha=1e-05, reg_lambda=1;, score=(train=-0.044, test=-0.174) total time= 0.1s
[CV 1/5; 3/9] START reg_alpha=1e-05, reg_lambda=100........................
[CV 1/5; 3/9] END reg_alpha=1e-05, reg_lambda=100;, score=(train=-0.095, test=-0.159) total time= 0.1s
[CV 2/5; 3/9] START reg_alpha=1e-05, reg_lambda=100........................
[CV 2/5; 3/9] END reg_alpha=1e-05, reg_lambda=100;, score=(train=-0.093, test=-0.165) total time= 0.1s
[CV 3/5; 3/9] START reg_alpha=1e-05, reg_lambda=100........................
[CV 3/5; 3/9] END reg_alpha=1e-05, reg_lambda=100;, score=(train=-0.096, test=-0.139) total time= 0.1s
[CV 4/5; 3/9] START reg_alpha=1e-05, reg_lambda=100........................
[CV 4/5; 3/9] END reg_alpha=1e-05, reg_lambda=100;, score=(train=-0.098, test=-0.169) total time= 0.1s
[CV 5/5; 3/9] START reg_alpha=1e-05, reg_lambda=100........................
[CV 5/5; 3/9] END reg_alpha=1e-05, reg_lambda=100;, score=(train=-0.094, test=-0.164) total time= 0.1s
[CV 1/5; 4/9] START reg_alpha=1, reg_lambda=1e-05........................
[CV 1/5; 4/9] END reg_alpha=1, reg_lambda=1e-05;, score=(train=-0.078, test=-0.167) total time= 0.1s
[CV 2/5; 4/9] START reg_alpha=1, reg_lambda=1e-05........................
[CV 2/5; 4/9] END reg_alpha=1, reg_lambda=1e-05;, score=(train=-0.073, test=-0.159) total time= 0.1s
[CV 3/5; 4/9] START reg_alpha=1, reg_lambda=1e-05........................
[CV 3/5; 4/9] END reg_alpha=1, reg_lambda=1e-05;, score=(train=-0.076, test=-0.142) total time= 0.1s
[CV 4/5; 4/9] START reg_alpha=1, reg_lambda=1e-05........................
[CV 4/5; 4/9] END reg_alpha=1, reg_lambda=1e-05;, score=(train=-0.079, test=-0.171) total time= 0.1s
[CV 5/5; 4/9] START reg_alpha=1, reg_lambda=1e-05........................
```

```
[CV 5/5; 4/9] END reg_alpha=1, reg_lambda=1e-05;, score=(train=-0.074, test=-0.173) total time= 0.1s
[CV 1/5; 5/9] START reg_alpha=1, reg_lambda=1...........................
[CV 1/5; 5/9] END reg_alpha=1, reg_lambda=1;, score=(train=-0.076, test=-0.165) total time= 0.1s
[CV 2/5; 5/9] START reg_alpha=1, reg_lambda=1...........................
[CV 2/5; 5/9] END reg_alpha=1, reg_lambda=1;, score=(train=-0.073, test=-0.160) total time= 0.1s
[CV 3/5; 5/9] START reg_alpha=1, reg_lambda=1...........................
[CV 3/5; 5/9] END reg_alpha=1, reg_lambda=1;, score=(train=-0.075, test=-0.142) total time= 0.1s
[CV 4/5; 5/9] START reg_alpha=1, reg_lambda=1...........................
[CV 4/5; 5/9] END reg_alpha=1, reg_lambda=1;, score=(train=-0.077, test=-0.172) total time= 0.1s
[CV 5/5; 5/9] START reg_alpha=1, reg_lambda=1...........................
[CV 5/5; 5/9] END reg_alpha=1, reg_lambda=1;, score=(train=-0.074, test=-0.172) total time= 0.1s
[CV 1/5; 6/9] START reg_alpha=1, reg_lambda=100...........................
[CV 1/5; 6/9] END reg_alpha=1, reg_lambda=100;, score=(train=-0.105, test=-0.159) total time= 0.1s
[CV 2/5; 6/9] START reg_alpha=1, reg_lambda=100...........................
[CV 2/5; 6/9] END reg_alpha=1, reg_lambda=100;, score=(train=-0.100, test=-0.165) total time= 0.1s
[CV 3/5; 6/9] START reg_alpha=1, reg_lambda=100...........................
[CV 3/5; 6/9] END reg_alpha=1, reg_lambda=100;, score=(train=-0.105, test=-0.141) total time= 0.1s
[CV 4/5; 6/9] START reg_alpha=1, reg_lambda=100...........................
[CV 4/5; 6/9] END reg_alpha=1, reg_lambda=100;, score=(train=-0.108, test=-0.168) total time= 0.1s
[CV 5/5; 6/9] START reg_alpha=1, reg_lambda=100...........................
[CV 5/5; 6/9] END reg_alpha=1, reg_lambda=100;, score=(train=-0.104, test=-0.167) total time= 0.1s
[CV 1/5; 7/9] START reg_alpha=100, reg_lambda=1e-05...........................
[CV 1/5; 7/9] END reg_alpha=100, reg_lambda=1e-05;, score=(train=-0.241, test=-0.270) total time= 0.0s
[CV 2/5; 7/9] START reg_alpha=100, reg_lambda=1e-05...........................
[CV 2/5; 7/9] END reg_alpha=100, reg_lambda=1e-05;, score=(train=-0.240, test=-0.260) total time= 0.0s
[CV 3/5; 7/9] START reg_alpha=100, reg_lambda=1e-05...........................
[CV 3/5; 7/9] END reg_alpha=100, reg_lambda=1e-05;, score=(train=-0.245, test=-0.207) total time= 0.0s
[CV 4/5; 7/9] START reg_alpha=100, reg_lambda=1e-05...........................
[CV 4/5; 7/9] END reg_alpha=100, reg_lambda=1e-05;, score=(train=-0.245, test=-0.263) total time= 0.0s
[CV 5/5; 7/9] START reg_alpha=100, reg_lambda=1e-05...........................
[CV 5/5; 7/9] END reg_alpha=100, reg_lambda=1e-05;, score=(train=-0.241, test=-0.262) total time= 0.0s
[CV 1/5; 8/9] START reg_alpha=100, reg_lambda=1...........................
[CV 1/5; 8/9] END reg_alpha=100, reg_lambda=1;, score=(train=-0.241, test=-0.271) total time= 0.0s
[CV 2/5; 8/9] START reg_alpha=100, reg_lambda=1...........................
[CV 2/5; 8/9] END reg_alpha=100, reg_lambda=1;, score=(train=-0.239, test=-0.260) total time= 0.0s
[CV 3/5; 8/9] START reg_alpha=100, reg_lambda=1...........................
[CV 3/5; 8/9] END reg_alpha=100, reg_lambda=1;, score=(train=-0.245, test=-0.207) total time= 0.0s
[CV 4/5; 8/9] START reg_alpha=100, reg_lambda=1...........................
[CV 4/5; 8/9] END reg_alpha=100, reg_lambda=1;, score=(train=-0.245, test=-0.263) total time= 0.0s
[CV 5/5; 8/9] START reg_alpha=100, reg_lambda=1...........................
[CV 5/5; 8/9] END reg_alpha=100, reg_lambda=1;, score=(train=-0.241, test=-0.261) total
```

```
time= 0.0s
[CV 1/5; 9/9] START reg_alpha=100, reg_lambda=100...........................
[CV 1/5; 9/9] END reg_alpha=100, reg_lambda=100;, score=(train=-0.243, test=-0.274) total time= 0.0s
[CV 2/5; 9/9] START reg_alpha=100, reg_lambda=100...........................
[CV 2/5; 9/9] END reg_alpha=100, reg_lambda=100;, score=(train=-0.240, test=-0.261) total time= 0.0s
[CV 3/5; 9/9] START reg_alpha=100, reg_lambda=100...........................
[CV 3/5; 9/9] END reg_alpha=100, reg_lambda=100;, score=(train=-0.246, test=-0.209) total time= 0.0s
[CV 4/5; 9/9] START reg_alpha=100, reg_lambda=100...........................
[CV 4/5; 9/9] END reg_alpha=100, reg_lambda=100;, score=(train=-0.246, test=-0.264) total time= 0.0s
[CV 5/5; 9/9] START reg_alpha=100, reg_lambda=100...........................
[CV 5/5; 9/9] END reg_alpha=100, reg_lambda=100;, score=(train=-0.241, test=-0.261) total time= 0.0s
-----
iter: 1
n_candidates: 3
n_resources: 3489
Fitting 5 folds for each of 3 candidates, totalling 15 fits
[CV 1/5; 1/3] START reg_alpha=1, reg_lambda=1...........................
[CV 1/5; 1/3] END reg_alpha=1, reg_lambda=1;, score=(train=-0.091, test=-0.148) total time= 0.2s
[CV 2/5; 1/3] START reg_alpha=1, reg_lambda=1...........................
[CV 2/5; 1/3] END reg_alpha=1, reg_lambda=1;, score=(train=-0.090, test=-0.144) total time= 0.2s
[CV 3/5; 1/3] START reg_alpha=1, reg_lambda=1...........................
[CV 3/5; 1/3] END reg_alpha=1, reg_lambda=1;, score=(train=-0.095, test=-0.136) total time= 0.1s
[CV 4/5; 1/3] START reg_alpha=1, reg_lambda=1...........................
[CV 4/5; 1/3] END reg_alpha=1, reg_lambda=1;, score=(train=-0.093, test=-0.140) total time= 0.1s
[CV 5/5; 1/3] START reg_alpha=1, reg_lambda=1...........................
[CV 5/5; 1/3] END reg_alpha=1, reg_lambda=1;, score=(train=-0.087, test=-0.149) total time= 0.2s
[CV 1/5; 2/3] START reg_alpha=1, reg_lambda=100...........................
[CV 1/5; 2/3] END reg_alpha=1, reg_lambda=100;, score=(train=-0.112, test=-0.149) total time= 0.1s
[CV 2/5; 2/3] START reg_alpha=1, reg_lambda=100...........................
[CV 2/5; 2/3] END reg_alpha=1, reg_lambda=100;, score=(train=-0.112, test=-0.146) total time= 0.2s
[CV 3/5; 2/3] START reg_alpha=1, reg_lambda=100...........................
[CV 3/5; 2/3] END reg_alpha=1, reg_lambda=100;, score=(train=-0.118, test=-0.137) total time= 0.1s
[CV 4/5; 2/3] START reg_alpha=1, reg_lambda=100...........................
[CV 4/5; 2/3] END reg_alpha=1, reg_lambda=100;, score=(train=-0.117, test=-0.145) total time= 0.1s
[CV 5/5; 2/3] START reg_alpha=1, reg_lambda=100...........................
[CV 5/5; 2/3] END reg_alpha=1, reg_lambda=100;, score=(train=-0.109, test=-0.150) total time= 0.1s
[CV 1/5; 3/3] START reg_alpha=1e-05, reg_lambda=100...........................
[CV 1/5; 3/3] END reg_alpha=1e-05, reg_lambda=100;, score=(train=-0.109, test=-0.148) total time= 0.1s
[CV 2/5; 3/3] START reg_alpha=1e-05, reg_lambda=100...........................
[CV 2/5; 3/3] END reg_alpha=1e-05, reg_lambda=100;, score=(train=-0.110, test=-0.147) total time= 0.1s
[CV 3/5; 3/3] START reg_alpha=1e-05, reg_lambda=100...........................
[CV 3/5; 3/3] END reg_alpha=1e-05, reg_lambda=100;, score=(train=-0.116, test=-0.136) total time= 0.1s
[CV 4/5; 3/3] START reg_alpha=1e-05, reg_lambda=100...........................
```

```

[CV 4/5; 3/3] END reg_alpha=1e-05, reg_lambda=100;, score=(train=-0.115, test=-0.144) total time= 0.1s
[CV 5/5; 3/3] START reg_alpha=1e-05, reg_lambda=100........................
[CV 5/5; 3/3] END reg_alpha=1e-05, reg_lambda=100;, score=(train=-0.107, test=-0.151) total time= 0.1s
-----
iter: 2
n_candidates: 1
n_resources: 10467
Fitting 5 folds for each of 1 candidates, totalling 5 fits
[CV 1/5; 1/1] START reg_alpha=1, reg_lambda=1........................
[CV 1/5; 1/1] END reg_alpha=1, reg_lambda=1;, score=(train=-0.107, test=-0.137) total time= 0.3s
[CV 2/5; 1/1] START reg_alpha=1, reg_lambda=1........................
[CV 2/5; 1/1] END reg_alpha=1, reg_lambda=1;, score=(train=-0.108, test=-0.135) total time= 0.3s
[CV 3/5; 1/1] START reg_alpha=1, reg_lambda=1........................
[CV 3/5; 1/1] END reg_alpha=1, reg_lambda=1;, score=(train=-0.110, test=-0.126) total time= 0.3s
[CV 4/5; 1/1] START reg_alpha=1, reg_lambda=1........................
[CV 4/5; 1/1] END reg_alpha=1, reg_lambda=1;, score=(train=-0.109, test=-0.130) total time= 0.3s
[CV 5/5; 1/1] START reg_alpha=1, reg_lambda=1........................
[CV 5/5; 1/1] END reg_alpha=1, reg_lambda=1;, score=(train=-0.109, test=-0.136) total time= 0.3s
Best mae: -0.133
Best parameters set found on train set:

{'reg_alpha': 1, 'reg_lambda': 1}

Grid scores on train set:

-0.167 (+/-0.024) for {'reg_alpha': 1e-05, 'reg_lambda': 1e-05}
-0.165 (+/-0.024) for {'reg_alpha': 1e-05, 'reg_lambda': 1}
-0.159 (+/-0.021) for {'reg_alpha': 1e-05, 'reg_lambda': 100}
-0.162 (+/-0.022) for {'reg_alpha': 1, 'reg_lambda': 1e-05}
-0.162 (+/-0.022) for {'reg_alpha': 1, 'reg_lambda': 1}
-0.160 (+/-0.020) for {'reg_alpha': 1, 'reg_lambda': 100}
-0.253 (+/-0.046) for {'reg_alpha': 100, 'reg_lambda': 1e-05}
-0.252 (+/-0.046) for {'reg_alpha': 100, 'reg_lambda': 1}
-0.254 (+/-0.046) for {'reg_alpha': 100, 'reg_lambda': 100}
-0.143 (+/-0.010) for {'reg_alpha': 1, 'reg_lambda': 1}
-0.145 (+/-0.009) for {'reg_alpha': 1, 'reg_lambda': 100}
-0.145 (+/-0.011) for {'reg_alpha': 1e-05, 'reg_lambda': 100}
-0.133 (+/-0.008) for {'reg_alpha': 1, 'reg_lambda': 1}
Elapsed Time: 12.822641849517822

```

Best mae: -0.133 Best parameters set found on train set:

```
{'reg_alpha': 1, 'reg_lambda': 1}
```

```
In [124...]: param_grid = {'n_estimators' : [250, 500, 1000],
}

xgbr = xgb.XGBRegressor(
    seed=randomstate,
    missing=0,
    eval_metric='mae',
    verbosity=1,
    max_depth = 5,
```

```

        eta = .1,
        min_child_weight = 7,
        gamma = 0,
        subsample=1,
        colsample_bytree=.4

    )

best_params = grid_optimizer(xgbr, param_grid, X_train_refined, y_train)

```

Making Search
Running Grid
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3

iter: 0
n_candidates: 3
n_resources: 3490
Fitting 5 folds for each of 3 candidates, totalling 15 fits
[CV 1/5; 1/3] START n_estimators=250.....
[CV 1/5; 1/3] END n_estimators=250;, score=(train=-0.081, test=-0.139) total time= 0.1
s
[CV 2/5; 1/3] START n_estimators=250.....
[CV 2/5; 1/3] END n_estimators=250;, score=(train=-0.080, test=-0.133) total time= 0.1
s
[CV 3/5; 1/3] START n_estimators=250.....
[CV 3/5; 1/3] END n_estimators=250;, score=(train=-0.085, test=-0.128) total time= 0.1
s
[CV 4/5; 1/3] START n_estimators=250.....
[CV 4/5; 1/3] END n_estimators=250;, score=(train=-0.086, test=-0.134) total time= 0.2
s
[CV 5/5; 1/3] START n_estimators=250.....
[CV 5/5; 1/3] END n_estimators=250;, score=(train=-0.080, test=-0.142) total time= 0.2
s
[CV 1/5; 2/3] START n_estimators=500.....
[CV 1/5; 2/3] END n_estimators=500;, score=(train=-0.056, test=-0.140) total time= 0.4
s
[CV 2/5; 2/3] START n_estimators=500.....
[CV 2/5; 2/3] END n_estimators=500;, score=(train=-0.056, test=-0.133) total time= 0.4
s
[CV 3/5; 2/3] START n_estimators=500.....
[CV 3/5; 2/3] END n_estimators=500;, score=(train=-0.058, test=-0.131) total time= 0.4
s
[CV 4/5; 2/3] START n_estimators=500.....
[CV 4/5; 2/3] END n_estimators=500;, score=(train=-0.057, test=-0.136) total time= 0.4
s
[CV 5/5; 2/3] START n_estimators=500.....
[CV 5/5; 2/3] END n_estimators=500;, score=(train=-0.055, test=-0.145) total time= 0.4
s
[CV 1/5; 3/3] START n_estimators=1000.....
[CV 1/5; 3/3] END n_estimators=1000;, score=(train=-0.030, test=-0.142) total time= 0.
8s
[CV 2/5; 3/3] START n_estimators=1000.....
[CV 2/5; 3/3] END n_estimators=1000;, score=(train=-0.029, test=-0.135) total time= 0.
8s
[CV 3/5; 3/3] START n_estimators=1000.....

```

[CV 3/5; 3/3] END n_estimators=1000;, score=(train=-0.032, test=-0.134) total time= 0.
8s
[CV 4/5; 3/3] START n_estimators=1000.............................
[CV 4/5; 3/3] END n_estimators=1000;, score=(train=-0.029, test=-0.139) total time= 0.
8s
[CV 5/5; 3/3] START n_estimators=1000.............................
[CV 5/5; 3/3] END n_estimators=1000;, score=(train=-0.030, test=-0.147) total time= 0.
8s
-----
iter: 1
n_candidates: 1
n_resources: 10470
Fitting 5 folds for each of 1 candidates, totalling 5 fits
[CV 1/5; 1/1] START n_estimators=250.............................
[CV 1/5; 1/1] END n_estimators=250;, score=(train=-0.103, test=-0.138) total time= 0.3
s
[CV 2/5; 1/1] START n_estimators=250.............................
[CV 2/5; 1/1] END n_estimators=250;, score=(train=-0.103, test=-0.136) total time= 0.3
s
[CV 3/5; 1/1] START n_estimators=250.............................
[CV 3/5; 1/1] END n_estimators=250;, score=(train=-0.105, test=-0.128) total time= 0.3
s
[CV 4/5; 1/1] START n_estimators=250.............................
[CV 4/5; 1/1] END n_estimators=250;, score=(train=-0.104, test=-0.129) total time= 0.3
s
[CV 5/5; 1/1] START n_estimators=250.............................
[CV 5/5; 1/1] END n_estimators=250;, score=(train=-0.104, test=-0.136) total time= 0.3
s
Best mae: -0.133
Best parameters set found on train set:

{'n_estimators': 250}

Grid scores on train set:

-0.135 (+/-0.010) for {'n_estimators': 250}
-0.137 (+/-0.010) for {'n_estimators': 500}
-0.139 (+/-0.010) for {'n_estimators': 1000}
-0.133 (+/-0.008) for {'n_estimators': 250}
Elapsed Time: 11.10408091545105

Best mae: -0.133 Best parameters set found on train set:
```

{'n_estimators': 250}

```
In [ ]: xgbr = xgb.XGBRegressor(
            n_estimators=250,
            seed=randomstate,
            missing=0,
            eval_metric='mae',
            verbosity=1,
            max_depth = 10,
            eta = .05,
            min_child_weight = 7,
            gamma = 0,
            subsample=1,
            colsample_bytree=.4
        )
```

Nu SVR

In [107...]

```
param_grid = {'kernel' : ['linear', 'rbf', 'poly'],
              'gamma' : ['scale', 'auto']
             }

nu_svr = NuSVR()

best_params = grid_optimizer(nu_svr, param_grid, X_train_refined, y_train)
```

```
Making Search
Running Grid
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3
-----
iter: 0
n_candidates: 8
n_resources: 3490
Fitting 5 folds for each of 8 candidates, totalling 40 fits
[CV 1/5; 1/8] START gamma=scale, kernel=linear.....
ERROR! Session/line number was not unique in database. History logging moved to new session 3452
[CV 1/5; 1/8] END gamma=scale, kernel=linear;, score=(train=-0.145, test=-0.148) total time= 1.8s
[CV 2/5; 1/8] START gamma=scale, kernel=linear.....
[CV 2/5; 1/8] END gamma=scale, kernel=linear;, score=(train=-0.139, test=-0.143) total time= 1.8s
[CV 3/5; 1/8] START gamma=scale, kernel=linear.....
[CV 3/5; 1/8] END gamma=scale, kernel=linear;, score=(train=-0.144, test=-0.134) total time= 1.8s
[CV 4/5; 1/8] START gamma=scale, kernel=linear.....
[CV 4/5; 1/8] END gamma=scale, kernel=linear;, score=(train=-0.145, test=-0.141) total time= 1.8s
[CV 5/5; 1/8] START gamma=scale, kernel=linear.....
[CV 5/5; 1/8] END gamma=scale, kernel=linear;, score=(train=-0.140, test=-0.155) total time= 1.9s
[CV 1/5; 2/8] START gamma=scale, kernel=rbf.....
[CV 1/5; 2/8] END gamma=scale, kernel=rbf;, score=(train=-0.090, test=-0.143) total time= 0.6s
[CV 2/5; 2/8] START gamma=scale, kernel=rbf.....
[CV 2/5; 2/8] END gamma=scale, kernel=rbf;, score=(train=-0.085, test=-0.142) total time= 0.6s
[CV 3/5; 2/8] START gamma=scale, kernel=rbf.....
[CV 3/5; 2/8] END gamma=scale, kernel=rbf;, score=(train=-0.092, test=-0.134) total time= 0.6s
[CV 4/5; 2/8] START gamma=scale, kernel=rbf.....
[CV 4/5; 2/8] END gamma=scale, kernel=rbf;, score=(train=-0.090, test=-0.145) total time= 0.6s
[CV 5/5; 2/8] START gamma=scale, kernel=rbf.....
[CV 5/5; 2/8] END gamma=scale, kernel=rbf;, score=(train=-0.086, test=-0.152) total time= 0.6s
[CV 1/5; 3/8] START gamma=scale, kernel=poly.....
[CV 1/5; 3/8] END gamma=scale, kernel=poly;, score=(train=-0.091, test=-0.162) total time= 0.9s
[CV 2/5; 3/8] START gamma=scale, kernel=poly.....
[CV 2/5; 3/8] END gamma=scale, kernel=poly;, score=(train=-0.089, test=-0.159) total time
```

```
e= 0.9s
[CV 3/5; 3/8] START gamma=scale, kernel=poly...........................
[CV 3/5; 3/8] END gamma=scale, kernel=poly;, score=(train=-0.095, test=-0.149) total tim
e= 1.1s
[CV 4/5; 3/8] START gamma=scale, kernel=poly...........................
[CV 4/5; 3/8] END gamma=scale, kernel=poly;, score=(train=-0.093, test=-0.161) total tim
e= 0.9s
[CV 5/5; 3/8] START gamma=scale, kernel=poly...........................
[CV 5/5; 3/8] END gamma=scale, kernel=poly;, score=(train=-0.089, test=-0.160) total tim
e= 0.9s
[CV 1/5; 4/8] START gamma=scale, kernel=sigmoid...........................
[CV 1/5; 4/8] END gamma=scale, kernel=sigmoid;, score=(train=-8.099, test=-7.248) total
time= 0.2s
[CV 2/5; 4/8] START gamma=scale, kernel=sigmoid...........................
[CV 2/5; 4/8] END gamma=scale, kernel=sigmoid;, score=(train=-7.953, test=-7.907) total
time= 0.2s
[CV 3/5; 4/8] START gamma=scale, kernel=sigmoid...........................
[CV 3/5; 4/8] END gamma=scale, kernel=sigmoid;, score=(train=-7.683, test=-7.612) total
time= 0.2s
[CV 4/5; 4/8] START gamma=scale, kernel=sigmoid...........................
[CV 4/5; 4/8] END gamma=scale, kernel=sigmoid;, score=(train=-7.443, test=-7.114) total
time= 0.2s
[CV 5/5; 4/8] START gamma=scale, kernel=sigmoid...........................
[CV 5/5; 4/8] END gamma=scale, kernel=sigmoid;, score=(train=-7.379, test=-6.941) total
time= 0.2s
[CV 1/5; 5/8] START gamma=auto, kernel=linear...........................
[CV 1/5; 5/8] END gamma=auto, kernel=linear;, score=(train=-0.145, test=-0.148) total ti
me= 1.8s
[CV 2/5; 5/8] START gamma=auto, kernel=linear...........................
[CV 2/5; 5/8] END gamma=auto, kernel=linear;, score=(train=-0.139, test=-0.143) total ti
me= 1.8s
[CV 3/5; 5/8] START gamma=auto, kernel=linear...........................
[CV 3/5; 5/8] END gamma=auto, kernel=linear;, score=(train=-0.144, test=-0.134) total ti
me= 1.8s
[CV 4/5; 5/8] START gamma=auto, kernel=linear...........................
[CV 4/5; 5/8] END gamma=auto, kernel=linear;, score=(train=-0.145, test=-0.141) total ti
me= 1.8s
[CV 5/5; 5/8] START gamma=auto, kernel=linear...........................
[CV 5/5; 5/8] END gamma=auto, kernel=linear;, score=(train=-0.140, test=-0.155) total ti
me= 1.9s
[CV 1/5; 6/8] START gamma=auto, kernel=rbf...........................
[CV 1/5; 6/8] END gamma=auto, kernel=rbf;, score=(train=-0.122, test=-0.139) total time=
0.4s
[CV 2/5; 6/8] START gamma=auto, kernel=rbf...........................
[CV 2/5; 6/8] END gamma=auto, kernel=rbf;, score=(train=-0.118, test=-0.137) total time=
0.4s
[CV 3/5; 6/8] START gamma=auto, kernel=rbf...........................
[CV 3/5; 6/8] END gamma=auto, kernel=rbf;, score=(train=-0.124, test=-0.132) total time=
0.4s
[CV 4/5; 6/8] START gamma=auto, kernel=rbf...........................
[CV 4/5; 6/8] END gamma=auto, kernel=rbf;, score=(train=-0.125, test=-0.139) total time=
0.4s
[CV 5/5; 6/8] START gamma=auto, kernel=rbf...........................
[CV 5/5; 6/8] END gamma=auto, kernel=rbf;, score=(train=-0.119, test=-0.150) total time=
0.4s
[CV 1/5; 7/8] START gamma=auto, kernel=poly...........................
[CV 1/5; 7/8] END gamma=auto, kernel=poly;, score=(train=-0.157, test=-0.173) total time
= 0.2s
[CV 2/5; 7/8] START gamma=auto, kernel=poly...........................
[CV 2/5; 7/8] END gamma=auto, kernel=poly;, score=(train=-0.156, test=-0.178) total time
= 0.2s
```

```
[CV 3/5; 7/8] START gamma=auto, kernel=poly.....  
[CV 3/5; 7/8] END gamma=auto, kernel=poly;, score=(train=-0.159, test=-0.166) total time  
= 0.2s  
[CV 4/5; 7/8] START gamma=auto, kernel=poly.....  
[CV 4/5; 7/8] END gamma=auto, kernel=poly;, score=(train=-0.158, test=-0.174) total time  
= 0.2s  
[CV 5/5; 7/8] START gamma=auto, kernel=poly.....  
[CV 5/5; 7/8] END gamma=auto, kernel=poly;, score=(train=-0.154, test=-0.177) total time  
= 0.2s  
[CV 1/5; 8/8] START gamma=auto, kernel=sigmoid.....  
[CV 1/5; 8/8] END gamma=auto, kernel=sigmoid;, score=(train=-0.941, test=-0.888) total t  
ime= 0.3s  
[CV 2/5; 8/8] START gamma=auto, kernel=sigmoid.....  
[CV 2/5; 8/8] END gamma=auto, kernel=sigmoid;, score=(train=-1.045, test=-1.089) total t  
ime= 0.2s  
[CV 3/5; 8/8] START gamma=auto, kernel=sigmoid.....  
[CV 3/5; 8/8] END gamma=auto, kernel=sigmoid;, score=(train=-1.002, test=-0.918) total t  
ime= 0.3s  
[CV 4/5; 8/8] START gamma=auto, kernel=sigmoid.....  
[CV 4/5; 8/8] END gamma=auto, kernel=sigmoid;, score=(train=-0.857, test=-0.910) total t  
ime= 0.3s  
[CV 5/5; 8/8] START gamma=auto, kernel=sigmoid.....  
[CV 5/5; 8/8] END gamma=auto, kernel=sigmoid;, score=(train=-0.919, test=-0.837) total t  
ime= 0.3s  
-----  
iter: 1  
n_candidates: 3  
n_resources: 10470  
Fitting 5 folds for each of 3 candidates, totalling 15 fits  
[CV 1/5; 1/3] START gamma=auto, kernel=linear.....  
[CV 1/5; 1/3] END gamma=auto, kernel=linear;, score=(train=-0.141, test=-0.149) total ti  
me= 16.8s  
[CV 2/5; 1/3] START gamma=auto, kernel=linear.....  
[CV 2/5; 1/3] END gamma=auto, kernel=linear;, score=(train=-0.142, test=-0.146) total ti  
me= 16.5s  
[CV 3/5; 1/3] START gamma=auto, kernel=linear.....  
[CV 3/5; 1/3] END gamma=auto, kernel=linear;, score=(train=-0.144, test=-0.136) total ti  
me= 17.1s  
[CV 4/5; 1/3] START gamma=auto, kernel=linear.....  
[CV 4/5; 1/3] END gamma=auto, kernel=linear;, score=(train=-0.144, test=-0.137) total ti  
me= 16.1s  
[CV 5/5; 1/3] START gamma=auto, kernel=linear.....  
[CV 5/5; 1/3] END gamma=auto, kernel=linear;, score=(train=-0.141, test=-0.148) total ti  
me= 16.9s  
[CV 1/5; 2/3] START gamma=scale, kernel=rbf.....  
[CV 1/5; 2/3] END gamma=scale, kernel=rbf;, score=(train=-0.097, test=-0.137) total time  
= 5.8s  
[CV 2/5; 2/3] START gamma=scale, kernel=rbf.....  
[CV 2/5; 2/3] END gamma=scale, kernel=rbf;, score=(train=-0.097, test=-0.137) total time  
= 5.9s  
[CV 3/5; 2/3] START gamma=scale, kernel=rbf.....  
[CV 3/5; 2/3] END gamma=scale, kernel=rbf;, score=(train=-0.099, test=-0.127) total time  
= 5.8s  
[CV 4/5; 2/3] START gamma=scale, kernel=rbf.....  
[CV 4/5; 2/3] END gamma=scale, kernel=rbf;, score=(train=-0.098, test=-0.130) total time  
= 5.8s  
[CV 5/5; 2/3] START gamma=scale, kernel=rbf.....  
[CV 5/5; 2/3] END gamma=scale, kernel=rbf;, score=(train=-0.096, test=-0.138) total time  
= 5.9s  
[CV 1/5; 3/3] START gamma=auto, kernel=rbf.....  
[CV 1/5; 3/3] END gamma=auto, kernel=rbf;, score=(train=-0.120, test=-0.137) total time=
```

```
4.3s
[CV 2/5; 3/3] START gamma=auto, kernel=rbf...........................
[CV 2/5; 3/3] END gamma=auto, kernel=rbf;, score=(train=-0.120, test=-0.135) total time=
4.2s
[CV 3/5; 3/3] START gamma=auto, kernel=rbf...........................
[CV 3/5; 3/3] END gamma=auto, kernel=rbf;, score=(train=-0.122, test=-0.127) total time=
4.2s
[CV 4/5; 3/3] START gamma=auto, kernel=rbf...........................
[CV 4/5; 3/3] END gamma=auto, kernel=rbf;, score=(train=-0.122, test=-0.129) total time=
4.3s
[CV 5/5; 3/3] START gamma=auto, kernel=rbf...........................
[CV 5/5; 3/3] END gamma=auto, kernel=rbf;, score=(train=-0.120, test=-0.136) total time=
4.3s
Best mae: -0.133
Best parameters set found on train set:
```

```
{'gamma': 'auto', 'kernel': 'rbf'}
```

Grid scores on train set:

```
-0.144 (+/-0.014) for {'gamma': 'scale', 'kernel': 'linear'}
-0.143 (+/-0.011) for {'gamma': 'scale', 'kernel': 'rbf'}
-0.158 (+/-0.009) for {'gamma': 'scale', 'kernel': 'poly'}
-7.364 (+/-0.699) for {'gamma': 'scale', 'kernel': 'sigmoid'}
-0.144 (+/-0.014) for {'gamma': 'auto', 'kernel': 'linear'}
-0.139 (+/-0.011) for {'gamma': 'auto', 'kernel': 'rbf'}
-0.174 (+/-0.009) for {'gamma': 'auto', 'kernel': 'poly'}
-0.928 (+/-0.170) for {'gamma': 'auto', 'kernel': 'sigmoid'}
-0.143 (+/-0.011) for {'gamma': 'auto', 'kernel': 'linear'}
-0.134 (+/-0.009) for {'gamma': 'scale', 'kernel': 'rbf'}
-0.133 (+/-0.008) for {'gamma': 'auto', 'kernel': 'rbf'}
Elapsed Time: 232.62686157226562
```

Best mae: -0.133 Best parameters set found on train set:

```
{'gamma': 'auto', 'kernel': 'rbf'}
```

```
In [112...]: param_grid = {'C': [.1, 1, 10]}
nu_svr = NuSVR(gamma='auto', kernel='rbf')
best_params = grid_optimizer(nu_svr, param_grid, X_train_refined, y_train)
```

```
Making Search
Running Grid
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3
-----
iter: 0
n_candidates: 3
n_resources: 3490
Fitting 5 folds for each of 3 candidates, totalling 15 fits
[CV 1/5; 1/3] START C=0.1...........................
[CV 1/5; 1/3] END ..C=0.1;, score=(train=-0.151, test=-0.177) total time= 0.3s
```

```

[CV 2/5; 1/3] START C=0.1.....  

[CV 2/5; 1/3] END ..C=0.1;, score=(train=-0.154, test=-0.167) total time= 0.3s  

[CV 3/5; 1/3] START C=0.1.....  

[CV 3/5; 1/3] END ..C=0.1;, score=(train=-0.155, test=-0.159) total time= 0.3s  

[CV 4/5; 1/3] START C=0.1.....  

[CV 4/5; 1/3] END ..C=0.1;, score=(train=-0.151, test=-0.156) total time= 0.3s  

[CV 5/5; 1/3] START C=0.1.....  

[CV 5/5; 1/3] END ..C=0.1;, score=(train=-0.152, test=-0.154) total time= 0.3s  

[CV 1/5; 2/3] START C=1.....  

[CV 1/5; 2/3] END ....C=1;, score=(train=-0.118, test=-0.157) total time= 0.4s  

[CV 2/5; 2/3] START C=1.....  

[CV 2/5; 2/3] END ....C=1;, score=(train=-0.121, test=-0.149) total time= 0.4s  

[CV 3/5; 2/3] START C=1.....  

[CV 3/5; 2/3] END ....C=1;, score=(train=-0.123, test=-0.140) total time= 0.4s  

[CV 4/5; 2/3] START C=1.....  

[CV 4/5; 2/3] END ....C=1;, score=(train=-0.120, test=-0.136) total time= 0.4s  

[CV 5/5; 2/3] START C=1.....  

[CV 5/5; 2/3] END ....C=1;, score=(train=-0.120, test=-0.133) total time= 0.4s  

[CV 1/5; 3/3] START C=10.....  

[CV 1/5; 3/3] END ...C=10;, score=(train=-0.083, test=-0.158) total time= 1.4s  

[CV 2/5; 3/3] START C=10.....  

[CV 2/5; 3/3] END ...C=10;, score=(train=-0.085, test=-0.158) total time= 1.4s  

[CV 3/5; 3/3] START C=10.....  

[CV 3/5; 3/3] END ...C=10;, score=(train=-0.085, test=-0.144) total time= 1.4s  

[CV 4/5; 3/3] START C=10.....  

[CV 4/5; 3/3] END ...C=10;, score=(train=-0.085, test=-0.141) total time= 1.5s  

[CV 5/5; 3/3] START C=10.....  

[CV 5/5; 3/3] END ...C=10;, score=(train=-0.083, test=-0.136) total time= 1.5s
-----
iter: 1
n_candidates: 1
n_resources: 10470
Fitting 5 folds for each of 1 candidates, totalling 5 fits
[CV 1/5; 1/1] START C=1.....  

[CV 1/5; 1/1] END ....C=1;, score=(train=-0.120, test=-0.137) total time= 4.4s  

[CV 2/5; 1/1] START C=1.....  

[CV 2/5; 1/1] END ....C=1;, score=(train=-0.120, test=-0.135) total time= 4.3s  

[CV 3/5; 1/1] START C=1.....  

[CV 3/5; 1/1] END ....C=1;, score=(train=-0.122, test=-0.127) total time= 4.3s  

[CV 4/5; 1/1] START C=1.....  

[CV 4/5; 1/1] END ....C=1;, score=(train=-0.122, test=-0.129) total time= 4.2s  

[CV 5/5; 1/1] START C=1.....  

[CV 5/5; 1/1] END ....C=1;, score=(train=-0.120, test=-0.136) total time= 4.2s
Best mae: -0.133
Best parameters set found on train set:

```

{'C': 1}

Grid scores on train set:

```

-0.163 (+/-0.017) for {'C': 0.1}
-0.143 (+/-0.018) for {'C': 1}
-0.147 (+/-0.018) for {'C': 10}
-0.133 (+/-0.008) for {'C': 1}
Elapsed Time: 66.24719667434692

```

Best mae: -0.133 Best parameters set found on train set:

{'C': 1}

In []:

```
nu_svr = NuSVR(gamma='auto', kernel='rbf')
```

Gradient Boosted

In [108...]

```
param_grid = {"max_depth": [5, 10, 15],
              'learning_rate': [.1, .3],
              }

gradient_boost = GradientBoostingRegressor(
    n_estimators=250,
    random_state=randomstate,
)

best_params = grid_optimizer(gradient_boost, param_grid, X_train_refined, y_train)
```

```
Making Search
Running Grid
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3
-----
iter: 0
n_candidates: 6
n_resources: 3490
Fitting 5 folds for each of 6 candidates, totalling 30 fits
[CV 1/5; 1/6] START learning_rate=0.1, max_depth=5.....
[CV 1/5; 1/6] END learning_rate=0.1, max_depth=5;, score=(train=-0.060, test=-0.148) total time= 2.2s
[CV 2/5; 1/6] START learning_rate=0.1, max_depth=5.....
[CV 2/5; 1/6] END learning_rate=0.1, max_depth=5;, score=(train=-0.062, test=-0.150) total time= 2.2s
[CV 3/5; 1/6] START learning_rate=0.1, max_depth=5.....
[CV 3/5; 1/6] END learning_rate=0.1, max_depth=5;, score=(train=-0.061, test=-0.148) total time= 2.2s
[CV 4/5; 1/6] START learning_rate=0.1, max_depth=5.....
[CV 4/5; 1/6] END learning_rate=0.1, max_depth=5;, score=(train=-0.063, test=-0.139) total time= 2.2s
[CV 5/5; 1/6] START learning_rate=0.1, max_depth=5.....
[CV 5/5; 1/6] END learning_rate=0.1, max_depth=5;, score=(train=-0.061, test=-0.139) total time= 2.2s
[CV 1/5; 2/6] START learning_rate=0.1, max_depth=10.....
[CV 1/5; 2/6] END learning_rate=0.1, max_depth=10;, score=(train=-0.001, test=-0.157) total time= 4.2s
[CV 2/5; 2/6] START learning_rate=0.1, max_depth=10.....
[CV 2/5; 2/6] END learning_rate=0.1, max_depth=10;, score=(train=-0.001, test=-0.155) total time= 4.3s
[CV 3/5; 2/6] START learning_rate=0.1, max_depth=10.....
[CV 3/5; 2/6] END learning_rate=0.1, max_depth=10;, score=(train=-0.001, test=-0.155) total time= 4.3s
[CV 4/5; 2/6] START learning_rate=0.1, max_depth=10.....
[CV 4/5; 2/6] END learning_rate=0.1, max_depth=10;, score=(train=-0.001, test=-0.153) total time= 4.3s
[CV 5/5; 2/6] START learning_rate=0.1, max_depth=10.....
[CV 5/5; 2/6] END learning_rate=0.1, max_depth=10;, score=(train=-0.001, test=-0.154) total time= 4.3s
```

```
[CV 1/5; 3/6] START learning_rate=0.1, max_depth=15.....  
[CV 1/5; 3/6] END learning_rate=0.1, max_depth=15;, score=(train=-0.000, test=-0.189) total time= 5.3s  
[CV 2/5; 3/6] START learning_rate=0.1, max_depth=15.....  
[CV 2/5; 3/6] END learning_rate=0.1, max_depth=15;, score=(train=-0.000, test=-0.171) total time= 5.1s  
[CV 3/5; 3/6] START learning_rate=0.1, max_depth=15.....  
[CV 3/5; 3/6] END learning_rate=0.1, max_depth=15;, score=(train=-0.000, test=-0.179) total time= 5.4s  
[CV 4/5; 3/6] START learning_rate=0.1, max_depth=15.....  
[CV 4/5; 3/6] END learning_rate=0.1, max_depth=15;, score=(train=-0.000, test=-0.178) total time= 5.0s  
[CV 5/5; 3/6] START learning_rate=0.1, max_depth=15.....  
[CV 5/5; 3/6] END learning_rate=0.1, max_depth=15;, score=(train=-0.000, test=-0.183) total time= 5.4s  
[CV 1/5; 4/6] START learning_rate=0.3, max_depth=5.....  
[CV 1/5; 4/6] END learning_rate=0.3, max_depth=5;, score=(train=-0.019, test=-0.158) total time= 2.2s  
[CV 2/5; 4/6] START learning_rate=0.3, max_depth=5.....  
[CV 2/5; 4/6] END learning_rate=0.3, max_depth=5;, score=(train=-0.019, test=-0.158) total time= 2.2s  
[CV 3/5; 4/6] START learning_rate=0.3, max_depth=5.....  
[CV 3/5; 4/6] END learning_rate=0.3, max_depth=5;, score=(train=-0.019, test=-0.154) total time= 2.2s  
[CV 4/5; 4/6] START learning_rate=0.3, max_depth=5.....  
[CV 4/5; 4/6] END learning_rate=0.3, max_depth=5;, score=(train=-0.019, test=-0.151) total time= 2.2s  
[CV 5/5; 4/6] START learning_rate=0.3, max_depth=5.....  
[CV 5/5; 4/6] END learning_rate=0.3, max_depth=5;, score=(train=-0.020, test=-0.149) total time= 2.2s  
[CV 1/5; 5/6] START learning_rate=0.3, max_depth=10.....  
[CV 1/5; 5/6] END learning_rate=0.3, max_depth=10;, score=(train=-0.000, test=-0.162) total time= 4.3s  
[CV 2/5; 5/6] START learning_rate=0.3, max_depth=10.....  
[CV 2/5; 5/6] END learning_rate=0.3, max_depth=10;, score=(train=-0.000, test=-0.161) total time= 4.4s  
[CV 3/5; 5/6] START learning_rate=0.3, max_depth=10.....  
[CV 3/5; 5/6] END learning_rate=0.3, max_depth=10;, score=(train=-0.000, test=-0.159) total time= 4.3s  
[CV 4/5; 5/6] START learning_rate=0.3, max_depth=10.....  
[CV 4/5; 5/6] END learning_rate=0.3, max_depth=10;, score=(train=-0.000, test=-0.157) total time= 4.4s  
[CV 5/5; 5/6] START learning_rate=0.3, max_depth=10.....  
[CV 5/5; 5/6] END learning_rate=0.3, max_depth=10;, score=(train=-0.000, test=-0.159) total time= 4.3s  
[CV 1/5; 6/6] START learning_rate=0.3, max_depth=15.....  
[CV 1/5; 6/6] END learning_rate=0.3, max_depth=15;, score=(train=-0.000, test=-0.191) total time= 1.5s  
[CV 2/5; 6/6] START learning_rate=0.3, max_depth=15.....  
[CV 2/5; 6/6] END learning_rate=0.3, max_depth=15;, score=(train=-0.000, test=-0.173) total time= 1.5s  
[CV 3/5; 6/6] START learning_rate=0.3, max_depth=15.....  
[CV 3/5; 6/6] END learning_rate=0.3, max_depth=15;, score=(train=-0.000, test=-0.179) total time= 1.6s  
[CV 4/5; 6/6] START learning_rate=0.3, max_depth=15.....  
[CV 4/5; 6/6] END learning_rate=0.3, max_depth=15;, score=(train=-0.000, test=-0.181) total time= 1.6s  
[CV 5/5; 6/6] START learning_rate=0.3, max_depth=15.....  
[CV 5/5; 6/6] END learning_rate=0.3, max_depth=15;, score=(train=-0.000, test=-0.188) total time= 1.7s  
-----
```

```

iter: 1
n_candidates: 2
n_resources: 10470
Fitting 5 folds for each of 2 candidates, totalling 10 fits
[CV 1/5; 1/2] START learning_rate=0.3, max_depth=5...........................
[CV 1/5; 1/2] END learning_rate=0.3, max_depth=5;, score=(train=-0.055, test=-0.147) total time= 6.5s
[CV 2/5; 1/2] START learning_rate=0.3, max_depth=5...........................
[CV 2/5; 1/2] END learning_rate=0.3, max_depth=5;, score=(train=-0.055, test=-0.145) total time= 6.5s
[CV 3/5; 1/2] START learning_rate=0.3, max_depth=5...........................
[CV 3/5; 1/2] END learning_rate=0.3, max_depth=5;, score=(train=-0.058, test=-0.137) total time= 6.4s
[CV 4/5; 1/2] START learning_rate=0.3, max_depth=5...........................
[CV 4/5; 1/2] END learning_rate=0.3, max_depth=5;, score=(train=-0.058, test=-0.137) total time= 6.5s
[CV 5/5; 1/2] START learning_rate=0.3, max_depth=5...........................
[CV 5/5; 1/2] END learning_rate=0.3, max_depth=5;, score=(train=-0.055, test=-0.142) total time= 6.5s
[CV 1/5; 2/2] START learning_rate=0.1, max_depth=5...........................
[CV 1/5; 2/2] END learning_rate=0.1, max_depth=5;, score=(train=-0.093, test=-0.139) total time= 6.5s
[CV 2/5; 2/2] START learning_rate=0.1, max_depth=5...........................
[CV 2/5; 2/2] END learning_rate=0.1, max_depth=5;, score=(train=-0.093, test=-0.138) total time= 6.4s
[CV 3/5; 2/2] START learning_rate=0.1, max_depth=5...........................
[CV 3/5; 2/2] END learning_rate=0.1, max_depth=5;, score=(train=-0.094, test=-0.128) total time= 6.5s
[CV 4/5; 2/2] START learning_rate=0.1, max_depth=5...........................
[CV 4/5; 2/2] END learning_rate=0.1, max_depth=5;, score=(train=-0.095, test=-0.129) total time= 6.5s
[CV 5/5; 2/2] START learning_rate=0.1, max_depth=5...........................
[CV 5/5; 2/2] END learning_rate=0.1, max_depth=5;, score=(train=-0.093, test=-0.136) total time= 6.5s
Best mae: -0.134
Best parameters set found on train set:

{'learning_rate': 0.1, 'max_depth': 5}

```

Grid scores on train set:

```

-0.145 (+/-0.009) for {'learning_rate': 0.1, 'max_depth': 5}
-0.155 (+/-0.003) for {'learning_rate': 0.1, 'max_depth': 10}
-0.180 (+/-0.012) for {'learning_rate': 0.1, 'max_depth': 15}
-0.154 (+/-0.007) for {'learning_rate': 0.3, 'max_depth': 5}
-0.160 (+/-0.003) for {'learning_rate': 0.3, 'max_depth': 10}
-0.182 (+/-0.013) for {'learning_rate': 0.3, 'max_depth': 15}
-0.142 (+/-0.008) for {'learning_rate': 0.3, 'max_depth': 5}
-0.134 (+/-0.009) for {'learning_rate': 0.1, 'max_depth': 5}
Elapsed Time: 176.93936491012573

```

Best mae: -0.134 Best parameters set found on train set:

```
{'learning_rate': 0.1, 'max_depth': 5}
```

In [113]:

```

param_grid = {"max_depth": [3, 5, 7],
              'learning_rate': [.15, .3],
              }

gradient_boost = GradientBoostingRegressor(

```

```

        n_estimators=500,
        random_state=randomstate,
    )

best_params = grid_optimizer(gradient_boost, param_grid, X_train_refined, y_train)

```

Making Search
Running Grid
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3

iter: 0
n_candidates: 6
n_resources: 3490
Fitting 5 folds for each of 6 candidates, totalling 30 fits
[CV 1/5; 1/6] START learning_rate=0.15, max_depth=3.....
[CV 1/5; 1/6] END learning_rate=0.15, max_depth=3;, score=(train=-0.075, test=-0.151) to
tal time= 2.7s
[CV 2/5; 1/6] START learning_rate=0.15, max_depth=3.....
[CV 2/5; 1/6] END learning_rate=0.15, max_depth=3;, score=(train=-0.076, test=-0.144) to
tal time= 2.7s
[CV 3/5; 1/6] START learning_rate=0.15, max_depth=3.....
[CV 3/5; 1/6] END learning_rate=0.15, max_depth=3;, score=(train=-0.077, test=-0.139) to
tal time= 2.7s
[CV 4/5; 1/6] START learning_rate=0.15, max_depth=3.....
[CV 4/5; 1/6] END learning_rate=0.15, max_depth=3;, score=(train=-0.077, test=-0.148) to
tal time= 2.7s
[CV 5/5; 1/6] START learning_rate=0.15, max_depth=3.....
[CV 5/5; 1/6] END learning_rate=0.15, max_depth=3;, score=(train=-0.075, test=-0.155) to
tal time= 2.7s
[CV 1/5; 2/6] START learning_rate=0.15, max_depth=5.....
[CV 1/5; 2/6] END learning_rate=0.15, max_depth=5;, score=(train=-0.019, test=-0.156) to
tal time= 4.5s
[CV 2/5; 2/6] START learning_rate=0.15, max_depth=5.....
[CV 2/5; 2/6] END learning_rate=0.15, max_depth=5;, score=(train=-0.020, test=-0.146) to
tal time= 4.5s
[CV 3/5; 2/6] START learning_rate=0.15, max_depth=5.....
[CV 3/5; 2/6] END learning_rate=0.15, max_depth=5;, score=(train=-0.018, test=-0.148) to
tal time= 4.5s
[CV 4/5; 2/6] START learning_rate=0.15, max_depth=5.....
[CV 4/5; 2/6] END learning_rate=0.15, max_depth=5;, score=(train=-0.020, test=-0.153) to
tal time= 4.4s
[CV 5/5; 2/6] START learning_rate=0.15, max_depth=5.....
[CV 5/5; 2/6] END learning_rate=0.15, max_depth=5;, score=(train=-0.018, test=-0.153) to
tal time= 4.4s
[CV 1/5; 3/6] START learning_rate=0.15, max_depth=7.....
[CV 1/5; 3/6] END learning_rate=0.15, max_depth=7;, score=(train=-0.001, test=-0.160) to
tal time= 6.2s
[CV 2/5; 3/6] START learning_rate=0.15, max_depth=7.....
[CV 2/5; 3/6] END learning_rate=0.15, max_depth=7;, score=(train=-0.001, test=-0.147) to
tal time= 6.3s
[CV 3/5; 3/6] START learning_rate=0.15, max_depth=7.....
[CV 3/5; 3/6] END learning_rate=0.15, max_depth=7;, score=(train=-0.001, test=-0.147) to
tal time= 6.3s
[CV 4/5; 3/6] START learning_rate=0.15, max_depth=7.....
[CV 4/5; 3/6] END learning_rate=0.15, max_depth=7;, score=(train=-0.002, test=-0.147) to

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tal time= 6.2s
[CV 5/5; 3/6] START learning_rate=0.15, max_depth=7...........................
[CV 5/5; 3/6] END learning_rate=0.15, max_depth=7;, score=(train=-0.001, test=-0.158) to
tal time= 6.2s
[CV 1/5; 4/6] START learning_rate=0.3, max_depth=3...........................
[CV 1/5; 4/6] END learning_rate=0.3, max_depth=3;, score=(train=-0.049, test=-0.162) tot
al time= 2.7s
[CV 2/5; 4/6] START learning_rate=0.3, max_depth=3...........................
[CV 2/5; 4/6] END learning_rate=0.3, max_depth=3;, score=(train=-0.051, test=-0.151) tot
al time= 2.7s
[CV 3/5; 4/6] START learning_rate=0.3, max_depth=3...........................
[CV 3/5; 4/6] END learning_rate=0.3, max_depth=3;, score=(train=-0.050, test=-0.146) tot
al time= 2.7s
[CV 4/5; 4/6] START learning_rate=0.3, max_depth=3...........................
[CV 4/5; 4/6] END learning_rate=0.3, max_depth=3;, score=(train=-0.051, test=-0.155) tot
al time= 2.7s
[CV 5/5; 4/6] START learning_rate=0.3, max_depth=3...........................
[CV 5/5; 4/6] END learning_rate=0.3, max_depth=3;, score=(train=-0.050, test=-0.158) tot
al time= 2.7s
[CV 1/5; 5/6] START learning_rate=0.3, max_depth=5...........................
[CV 1/5; 5/6] END learning_rate=0.3, max_depth=5;, score=(train=-0.004, test=-0.164) tot
al time= 4.5s
[CV 2/5; 5/6] START learning_rate=0.3, max_depth=5...........................
[CV 2/5; 5/6] END learning_rate=0.3, max_depth=5;, score=(train=-0.004, test=-0.151) tot
al time= 4.5s
[CV 3/5; 5/6] START learning_rate=0.3, max_depth=5...........................
[CV 3/5; 5/6] END learning_rate=0.3, max_depth=5;, score=(train=-0.004, test=-0.153) tot
al time= 4.5s
[CV 4/5; 5/6] START learning_rate=0.3, max_depth=5...........................
[CV 4/5; 5/6] END learning_rate=0.3, max_depth=5;, score=(train=-0.004, test=-0.154) tot
al time= 4.5s
[CV 5/5; 5/6] START learning_rate=0.3, max_depth=5...........................
[CV 5/5; 5/6] END learning_rate=0.3, max_depth=5;, score=(train=-0.004, test=-0.165) tot
al time= 4.5s
[CV 1/5; 6/6] START learning_rate=0.3, max_depth=7...........................
[CV 1/5; 6/6] END learning_rate=0.3, max_depth=7;, score=(train=-0.000, test=-0.168) tot
al time= 6.2s
[CV 2/5; 6/6] START learning_rate=0.3, max_depth=7...........................
[CV 2/5; 6/6] END learning_rate=0.3, max_depth=7;, score=(train=-0.000, test=-0.153) tot
al time= 6.2s
[CV 3/5; 6/6] START learning_rate=0.3, max_depth=7...........................
[CV 3/5; 6/6] END learning_rate=0.3, max_depth=7;, score=(train=-0.000, test=-0.151) tot
al time= 6.2s
[CV 4/5; 6/6] START learning_rate=0.3, max_depth=7...........................
[CV 4/5; 6/6] END learning_rate=0.3, max_depth=7;, score=(train=-0.000, test=-0.152) tot
al time= 6.2s
[CV 5/5; 6/6] START learning_rate=0.3, max_depth=7...........................
[CV 5/5; 6/6] END learning_rate=0.3, max_depth=7;, score=(train=-0.000, test=-0.162) tot
al time= 6.2s
-----
iter: 1
n_candidates: 2
n_resources: 10470
Fitting 5 folds for each of 2 candidates, totalling 10 fits
[CV 1/5; 1/2] START learning_rate=0.15, max_depth=5...........................
[CV 1/5; 1/2] END learning_rate=0.15, max_depth=5;, score=(train=-0.055, test=-0.141) to
tal time= 13.1s
[CV 2/5; 1/2] START learning_rate=0.15, max_depth=5...........................
[CV 2/5; 1/2] END learning_rate=0.15, max_depth=5;, score=(train=-0.055, test=-0.140) to
tal time= 13.0s
[CV 3/5; 1/2] START learning_rate=0.15, max_depth=5...........................
```

```

[CV 3/5; 1/2] END learning_rate=0.15, max_depth=5;, score=(train=-0.058, test=-0.130) total time= 13.1s
[CV 4/5; 1/2] START learning_rate=0.15, max_depth=5...........................
[CV 4/5; 1/2] END learning_rate=0.15, max_depth=5;, score=(train=-0.057, test=-0.136) total time= 13.1s
[CV 5/5; 1/2] START learning_rate=0.15, max_depth=5...........................
[CV 5/5; 1/2] END learning_rate=0.15, max_depth=5;, score=(train=-0.056, test=-0.137) total time= 13.1s
[CV 1/5; 2/2] START learning_rate=0.15, max_depth=3...........................
[CV 1/5; 2/2] END learning_rate=0.15, max_depth=3;, score=(train=-0.103, test=-0.141) total time= 7.9s
[CV 2/5; 2/2] START learning_rate=0.15, max_depth=3...........................
[CV 2/5; 2/2] END learning_rate=0.15, max_depth=3;, score=(train=-0.104, test=-0.138) total time= 8.0s
[CV 3/5; 2/2] START learning_rate=0.15, max_depth=3...........................
[CV 3/5; 2/2] END learning_rate=0.15, max_depth=3;, score=(train=-0.106, test=-0.127) total time= 8.0s
[CV 4/5; 2/2] START learning_rate=0.15, max_depth=3...........................
[CV 4/5; 2/2] END learning_rate=0.15, max_depth=3;, score=(train=-0.105, test=-0.130) total time= 7.9s
[CV 5/5; 2/2] START learning_rate=0.15, max_depth=3...........................
[CV 5/5; 2/2] END learning_rate=0.15, max_depth=3;, score=(train=-0.105, test=-0.137) total time= 7.9s
Best mae: -0.134
Best parameters set found on train set:

```

```
{'learning_rate': 0.15, 'max_depth': 3}
```

Grid scores on train set:

```

-0.147 (+/-0.011) for {'learning_rate': 0.15, 'max_depth': 3}
-0.151 (+/-0.008) for {'learning_rate': 0.15, 'max_depth': 5}
-0.152 (+/-0.012) for {'learning_rate': 0.15, 'max_depth': 7}
-0.155 (+/-0.011) for {'learning_rate': 0.3, 'max_depth': 3}
-0.157 (+/-0.011) for {'learning_rate': 0.3, 'max_depth': 5}
-0.157 (+/-0.013) for {'learning_rate': 0.3, 'max_depth': 7}
-0.137 (+/-0.008) for {'learning_rate': 0.15, 'max_depth': 5}
-0.134 (+/-0.011) for {'learning_rate': 0.15, 'max_depth': 3}
Elapsed Time: 254.49522614479065

```

Best mae: -0.134 Best parameters set found on train set:

```
{'learning_rate': 0.15, 'max_depth': 3}
```

In [116...]

```

param_grid = {"min_impurity_decrease" : [0, .5],
              'max_features': ['auto', 'sqrt', 'log2'],
              "max_depth": [5, 10, 15],
              }

gradient_boost = GradientBoostingRegressor(
    n_estimators=250,
    random_state=randomstate,
    max_depth = 3,
    learning_rate=.15,
)

best_params = grid_optimizer(gradient_boost, param_grid, X_train_refined, y_train)

```

Making Search
Running Grid

```
n_iterations: 3
n_required_iterations: 3
n_possible_iterations: 3
min_resources_: 1163
max_resources_: 10471
aggressive_elimination: False
factor: 3
-----
iter: 0
n_candidates: 18
n_resources: 1163
Fitting 5 folds for each of 18 candidates, totalling 90 fits
[CV 1/5; 1/18] START max_depth=5, max_features=auto, min_impurity_decrease=0....
[CV 1/5; 1/18] END max_depth=5, max_features=auto, min_impurity_decrease=0;; score=(train=-0.011, test=-0.170) total time= 0.7s
[CV 2/5; 1/18] START max_depth=5, max_features=auto, min_impurity_decrease=0....
[CV 2/5; 1/18] END max_depth=5, max_features=auto, min_impurity_decrease=0;; score=(train=-0.012, test=-0.155) total time= 0.7s
[CV 3/5; 1/18] START max_depth=5, max_features=auto, min_impurity_decrease=0....
[CV 3/5; 1/18] END max_depth=5, max_features=auto, min_impurity_decrease=0;; score=(train=-0.013, test=-0.144) total time= 0.7s
[CV 4/5; 1/18] START max_depth=5, max_features=auto, min_impurity_decrease=0....
[CV 4/5; 1/18] END max_depth=5, max_features=auto, min_impurity_decrease=0;; score=(train=-0.010, test=-0.161) total time= 0.7s
[CV 5/5; 1/18] START max_depth=5, max_features=auto, min_impurity_decrease=0....
[CV 5/5; 1/18] END max_depth=5, max_features=auto, min_impurity_decrease=0;; score=(train=-0.011, test=-0.148) total time= 0.7s
[CV 1/5; 2/18] START max_depth=5, max_features=auto, min_impurity_decrease=0.5...
[CV 1/5; 2/18] END max_depth=5, max_features=auto, min_impurity_decrease=0.5;; score=(train=-0.138, test=-0.180) total time= 0.1s
[CV 2/5; 2/18] START max_depth=5, max_features=auto, min_impurity_decrease=0.5..
[CV 2/5; 2/18] END max_depth=5, max_features=auto, min_impurity_decrease=0.5;; score=(train=-0.130, test=-0.179) total time= 0.1s
[CV 3/5; 2/18] START max_depth=5, max_features=auto, min_impurity_decrease=0.5..
[CV 3/5; 2/18] END max_depth=5, max_features=auto, min_impurity_decrease=0.5;; score=(train=-0.137, test=-0.171) total time= 0.1s
[CV 4/5; 2/18] START max_depth=5, max_features=auto, min_impurity_decrease=0.5..
[CV 4/5; 2/18] END max_depth=5, max_features=auto, min_impurity_decrease=0.5;; score=(train=-0.130, test=-0.174) total time= 0.1s
[CV 5/5; 2/18] START max_depth=5, max_features=auto, min_impurity_decrease=0.5..
[CV 5/5; 2/18] END max_depth=5, max_features=auto, min_impurity_decrease=0.5;; score=(train=-0.128, test=-0.162) total time= 0.1s
[CV 1/5; 3/18] START max_depth=5, max_features=sqrt, min_impurity_decrease=0....
[CV 1/5; 3/18] END max_depth=5, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.023, test=-0.171) total time= 0.0s
[CV 2/5; 3/18] START max_depth=5, max_features=sqrt, min_impurity_decrease=0....
[CV 2/5; 3/18] END max_depth=5, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.021, test=-0.153) total time= 0.0s
[CV 3/5; 3/18] START max_depth=5, max_features=sqrt, min_impurity_decrease=0....
[CV 3/5; 3/18] END max_depth=5, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.022, test=-0.150) total time= 0.0s
[CV 4/5; 3/18] START max_depth=5, max_features=sqrt, min_impurity_decrease=0....
[CV 4/5; 3/18] END max_depth=5, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.021, test=-0.155) total time= 0.0s
[CV 5/5; 3/18] START max_depth=5, max_features=sqrt, min_impurity_decrease=0....
[CV 5/5; 3/18] END max_depth=5, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.021, test=-0.164) total time= 0.0s
[CV 1/5; 4/18] START max_depth=5, max_features=sqrt, min_impurity_decrease=0.5..
[CV 1/5; 4/18] END max_depth=5, max_features=sqrt, min_impurity_decrease=0.5;; score=(train=-0.146, test=-0.182) total time= 0.0s
[CV 2/5; 4/18] START max_depth=5, max_features=sqrt, min_impurity_decrease=0.5..
```



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[CV 3/5; 16/18] END max_depth=15, max_features=sqrt, min_impurity_decrease=0.5;; score=(train=-0.145, test=-0.180) total time= 0.0s
[CV 4/5; 16/18] START max_depth=15, max_features=sqrt, min_impurity_decrease=0.5
[CV 4/5; 16/18] END max_depth=15, max_features=sqrt, min_impurity_decrease=0.5;; score=(train=-0.138, test=-0.171) total time= 0.0s
[CV 5/5; 16/18] START max_depth=15, max_features=sqrt, min_impurity_decrease=0.5
[CV 5/5; 16/18] END max_depth=15, max_features=sqrt, min_impurity_decrease=0.5;; score=(train=-0.138, test=-0.165) total time= 0.0s
[CV 1/5; 17/18] START max_depth=15, max_features=log2, min_impurity_decrease=0..
[CV 1/5; 17/18] END max_depth=15, max_features=log2, min_impurity_decrease=0;; score=(train=-0.000, test=-0.180) total time= 0.1s
[CV 2/5; 17/18] START max_depth=15, max_features=log2, min_impurity_decrease=0..
[CV 2/5; 17/18] END max_depth=15, max_features=log2, min_impurity_decrease=0;; score=(train=-0.000, test=-0.168) total time= 0.1s
[CV 3/5; 17/18] START max_depth=15, max_features=log2, min_impurity_decrease=0..
[CV 3/5; 17/18] END max_depth=15, max_features=log2, min_impurity_decrease=0;; score=(train=-0.000, test=-0.165) total time= 0.1s
[CV 4/5; 17/18] START max_depth=15, max_features=log2, min_impurity_decrease=0..
[CV 4/5; 17/18] END max_depth=15, max_features=log2, min_impurity_decrease=0;; score=(train=-0.000, test=-0.158) total time= 0.1s
[CV 5/5; 17/18] START max_depth=15, max_features=log2, min_impurity_decrease=0..
[CV 5/5; 17/18] END max_depth=15, max_features=log2, min_impurity_decrease=0;; score=(train=-0.000, test=-0.170) total time= 0.1s
[CV 1/5; 18/18] START max_depth=15, max_features=log2, min_impurity_decrease=0.5
[CV 1/5; 18/18] END max_depth=15, max_features=log2, min_impurity_decrease=0.5;; score=(train=-0.149, test=-0.179) total time= 0.0s
[CV 2/5; 18/18] START max_depth=15, max_features=log2, min_impurity_decrease=0.5
[CV 2/5; 18/18] END max_depth=15, max_features=log2, min_impurity_decrease=0.5;; score=(train=-0.138, test=-0.172) total time= 0.0s
[CV 3/5; 18/18] START max_depth=15, max_features=log2, min_impurity_decrease=0.5
[CV 3/5; 18/18] END max_depth=15, max_features=log2, min_impurity_decrease=0.5;; score=(train=-0.147, test=-0.176) total time= 0.0s
[CV 4/5; 18/18] START max_depth=15, max_features=log2, min_impurity_decrease=0.5
[CV 4/5; 18/18] END max_depth=15, max_features=log2, min_impurity_decrease=0.5;; score=(train=-0.141, test=-0.172) total time= 0.0s
[CV 5/5; 18/18] START max_depth=15, max_features=log2, min_impurity_decrease=0.5
[CV 5/5; 18/18] END max_depth=15, max_features=log2, min_impurity_decrease=0.5;; score=(train=-0.143, test=-0.172) total time= 0.0s
-----
iter: 1
n_candidates: 6
n_resources: 3489
Fitting 5 folds for each of 6 candidates, totalling 30 fits
[CV 1/5; 1/6] START max_depth=15, max_features=sqrt, min_impurity_decrease=0.....
[CV 1/5; 1/6] END max_depth=15, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.000, test=-0.166) total time= 0.8s
[CV 2/5; 1/6] START max_depth=15, max_features=sqrt, min_impurity_decrease=0.....
[CV 2/5; 1/6] END max_depth=15, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.000, test=-0.161) total time= 0.8s
[CV 3/5; 1/6] START max_depth=15, max_features=sqrt, min_impurity_decrease=0.....
[CV 3/5; 1/6] END max_depth=15, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.000, test=-0.155) total time= 0.8s
[CV 4/5; 1/6] START max_depth=15, max_features=sqrt, min_impurity_decrease=0.....
[CV 4/5; 1/6] END max_depth=15, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.000, test=-0.154) total time= 0.8s
[CV 5/5; 1/6] START max_depth=15, max_features=sqrt, min_impurity_decrease=0.....
[CV 5/5; 1/6] END max_depth=15, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.000, test=-0.163) total time= 0.8s
[CV 1/5; 2/6] START max_depth=10, max_features=sqrt, min_impurity_decrease=0.....
[CV 1/5; 2/6] END max_depth=10, max_features=sqrt, min_impurity_decrease=0;; score=(train=-0.000, test=-0.158) total time= 0.6s
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[CV 2/5; 6/6] END max_depth=5, max_features='auto', min_impurity_decrease=0;, score=(train
=-0.042, test=-0.150) total time= 2.2s
[CV 3/5; 6/6] START max_depth=5, max_features='auto', min_impurity_decrease=0.....
[CV 3/5; 6/6] END max_depth=5, max_features='auto', min_impurity_decrease=0;, score=(train
=-0.047, test=-0.138) total time= 2.2s
[CV 4/5; 6/6] START max_depth=5, max_features='auto', min_impurity_decrease=0.....
[CV 4/5; 6/6] END max_depth=5, max_features='auto', min_impurity_decrease=0;, score=(train
=-0.047, test=-0.148) total time= 2.2s
[CV 5/5; 6/6] START max_depth=5, max_features='auto', min_impurity_decrease=0.....
[CV 5/5; 6/6] END max_depth=5, max_features='auto', min_impurity_decrease=0;, score=(train
=-0.044, test=-0.150) total time= 2.2s
-----
iter: 2
n_candidates: 2
n_resources: 10467
Fitting 5 folds for each of 2 candidates, totalling 10 fits
[CV 1/5; 1/2] START max_depth=5, max_features='log2', min_impurity_decrease=0.....
[CV 1/5; 1/2] END max_depth=5, max_features='log2', min_impurity_decrease=0;, score=(train
=-0.099, test=-0.140) total time= 0.6s
[CV 2/5; 1/2] START max_depth=5, max_features='log2', min_impurity_decrease=0.....
[CV 2/5; 1/2] END max_depth=5, max_features='log2', min_impurity_decrease=0;, score=(train
=-0.099, test=-0.139) total time= 0.6s
[CV 3/5; 1/2] START max_depth=5, max_features='log2', min_impurity_decrease=0.....
[CV 3/5; 1/2] END max_depth=5, max_features='log2', min_impurity_decrease=0;, score=(train
=-0.101, test=-0.129) total time= 0.6s
[CV 4/5; 1/2] START max_depth=5, max_features='log2', min_impurity_decrease=0.....
[CV 4/5; 1/2] END max_depth=5, max_features='log2', min_impurity_decrease=0;, score=(train
=-0.101, test=-0.132) total time= 0.6s
[CV 5/5; 1/2] START max_depth=5, max_features='log2', min_impurity_decrease=0.....
[CV 5/5; 1/2] END max_depth=5, max_features='log2', min_impurity_decrease=0;, score=(train
=-0.099, test=-0.139) total time= 0.6s
[CV 1/5; 2/2] START max_depth=5, max_features='auto', min_impurity_decrease=0.....
[CV 1/5; 2/2] END max_depth=5, max_features='auto', min_impurity_decrease=0;, score=(train
=-0.081, test=-0.140) total time= 6.4s
[CV 2/5; 2/2] START max_depth=5, max_features='auto', min_impurity_decrease=0.....
[CV 2/5; 2/2] END max_depth=5, max_features='auto', min_impurity_decrease=0;, score=(train
=-0.081, test=-0.139) total time= 6.6s
[CV 3/5; 2/2] START max_depth=5, max_features='auto', min_impurity_decrease=0.....
[CV 3/5; 2/2] END max_depth=5, max_features='auto', min_impurity_decrease=0;, score=(train
=-0.083, test=-0.129) total time= 6.5s
[CV 4/5; 2/2] START max_depth=5, max_features='auto', min_impurity_decrease=0.....
[CV 4/5; 2/2] END max_depth=5, max_features='auto', min_impurity_decrease=0;, score=(train
=-0.082, test=-0.132) total time= 6.4s
[CV 5/5; 2/2] START max_depth=5, max_features='auto', min_impurity_decrease=0.....
[CV 5/5; 2/2] END max_depth=5, max_features='auto', min_impurity_decrease=0;, score=(train
=-0.080, test=-0.136) total time= 6.5s
Best mae: -0.135
Best parameters set found on train set:
```

```
{'max_depth': 5, 'max_features': 'auto', 'min_impurity_decrease': 0}
```

Grid scores on train set:

```
-0.156 (+/-0.019) for {'max_depth': 5, 'max_features': 'auto', 'min_impurity_decrease':
0}
-0.173 (+/-0.013) for {'max_depth': 5, 'max_features': 'auto', 'min_impurity_decrease':
0.5}
-0.159 (+/-0.016) for {'max_depth': 5, 'max_features': 'sqrt', 'min_impurity_decrease':
0}
-0.174 (+/-0.013) for {'max_depth': 5, 'max_features': 'sqrt', 'min_impurity_decrease':
0.5}
```

```
-0.158 (+/-0.013) for {'max_depth': 5, 'max_features': 'log2', 'min_impurity_decrease': 0}
-0.171 (+/-0.008) for {'max_depth': 5, 'max_features': 'log2', 'min_impurity_decrease': 0.5}
-0.176 (+/-0.019) for {'max_depth': 10, 'max_features': 'auto', 'min_impurity_decrease': 0}
-0.175 (+/-0.010) for {'max_depth': 10, 'max_features': 'auto', 'min_impurity_decrease': 0.5}
-0.166 (+/-0.014) for {'max_depth': 10, 'max_features': 'sqrt', 'min_impurity_decrease': 0}
-0.177 (+/-0.011) for {'max_depth': 10, 'max_features': 'sqrt', 'min_impurity_decrease': 0.5}
-0.165 (+/-0.015) for {'max_depth': 10, 'max_features': 'log2', 'min_impurity_decrease': 0}
-0.175 (+/-0.010) for {'max_depth': 10, 'max_features': 'log2', 'min_impurity_decrease': 0.5}
-0.213 (+/-0.024) for {'max_depth': 15, 'max_features': 'auto', 'min_impurity_decrease': 0}
-0.175 (+/-0.010) for {'max_depth': 15, 'max_features': 'auto', 'min_impurity_decrease': 0.5}
-0.168 (+/-0.009) for {'max_depth': 15, 'max_features': 'sqrt', 'min_impurity_decrease': 0}
-0.172 (+/-0.010) for {'max_depth': 15, 'max_features': 'sqrt', 'min_impurity_decrease': 0.5}
-0.168 (+/-0.014) for {'max_depth': 15, 'max_features': 'log2', 'min_impurity_decrease': 0}
-0.174 (+/-0.006) for {'max_depth': 15, 'max_features': 'log2', 'min_impurity_decrease': 0.5}
-0.160 (+/-0.009) for {'max_depth': 15, 'max_features': 'sqrt', 'min_impurity_decrease': 0}
-0.152 (+/-0.008) for {'max_depth': 10, 'max_features': 'sqrt', 'min_impurity_decrease': 0}
-0.154 (+/-0.012) for {'max_depth': 10, 'max_features': 'log2', 'min_impurity_decrease': 0}
-0.149 (+/-0.011) for {'max_depth': 5, 'max_features': 'sqrt', 'min_impurity_decrease': 0}
-0.149 (+/-0.013) for {'max_depth': 5, 'max_features': 'log2', 'min_impurity_decrease': 0}
-0.149 (+/-0.012) for {'max_depth': 5, 'max_features': 'auto', 'min_impurity_decrease': 0}
-0.136 (+/-0.009) for {'max_depth': 5, 'max_features': 'log2', 'min_impurity_decrease': 0}
-0.135 (+/-0.008) for {'max_depth': 5, 'max_features': 'auto', 'min_impurity_decrease': 0}
Elapsed Time: 98.29430317878723
```

Best mae: -0.135 Best parameters set found on train set:

```
{'max_depth': 5, 'max_features': 'auto', 'min_impurity_decrease': 0}
```

In [118]:

```
param_grid = {'subsample' : [.3, .7, 1],
              'loss': ['lad', 'ls']
            }

gradient_boost = GradientBoostingRegressor(
    n_estimators=250,
    random_state=randomstate,
    max_depth = 5,
    learning_rate=.15,
    max_features='auto',
```

```

        min_impurity_decrease=0,
    )

best_params = grid_optimizer(gradient_boost, param_grid, X_train_refined, y_train)

```

Making Search
Running Grid
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3

iter: 0
n_candidates: 6
n_resources: 3490
Fitting 5 folds for each of 6 candidates, totalling 30 fits
[CV 1/5; 1/6] START loss=lad, subsample=0.3.....
[CV 1/5; 1/6] END loss=lad, subsample=0.3;, score=(train=-0.080, test=-0.149) total time
= 1.5s
[CV 2/5; 1/6] START loss=lad, subsample=0.3.....
[CV 2/5; 1/6] END loss=lad, subsample=0.3;, score=(train=-0.082, test=-0.154) total time
= 1.5s
[CV 3/5; 1/6] START loss=lad, subsample=0.3.....
[CV 3/5; 1/6] END loss=lad, subsample=0.3;, score=(train=-0.078, test=-0.136) total time
= 1.5s
[CV 4/5; 1/6] START loss=lad, subsample=0.3.....
[CV 4/5; 1/6] END loss=lad, subsample=0.3;, score=(train=-0.082, test=-0.149) total time
= 1.5s
[CV 5/5; 1/6] START loss=lad, subsample=0.3.....
[CV 5/5; 1/6] END loss=lad, subsample=0.3;, score=(train=-0.080, test=-0.157) total time
= 1.5s
[CV 1/5; 2/6] START loss=lad, subsample=0.7.....
[CV 1/5; 2/6] END loss=lad, subsample=0.7;, score=(train=-0.074, test=-0.143) total time
= 2.4s
[CV 2/5; 2/6] START loss=lad, subsample=0.7.....
[CV 2/5; 2/6] END loss=lad, subsample=0.7;, score=(train=-0.078, test=-0.148) total time
= 2.4s
[CV 3/5; 2/6] START loss=lad, subsample=0.7.....
[CV 3/5; 2/6] END loss=lad, subsample=0.7;, score=(train=-0.073, test=-0.137) total time
= 2.4s
[CV 4/5; 2/6] START loss=lad, subsample=0.7.....
[CV 4/5; 2/6] END loss=lad, subsample=0.7;, score=(train=-0.075, test=-0.142) total time
= 2.4s
[CV 5/5; 2/6] START loss=lad, subsample=0.7.....
[CV 5/5; 2/6] END loss=lad, subsample=0.7;, score=(train=-0.075, test=-0.152) total time
= 2.4s
[CV 1/5; 3/6] START loss=lad, subsample=1.....
[CV 1/5; 3/6] END loss=lad, subsample=1;, score=(train=-0.085, test=-0.141) total time=2.9s
[CV 2/5; 3/6] START loss=lad, subsample=1.....
[CV 2/5; 3/6] END loss=lad, subsample=1;, score=(train=-0.086, test=-0.145) total time=2.9s
[CV 3/5; 3/6] START loss=lad, subsample=1.....
[CV 3/5; 3/6] END loss=lad, subsample=1;, score=(train=-0.081, test=-0.134) total time=2.9s
[CV 4/5; 3/6] START loss=lad, subsample=1.....
[CV 4/5; 3/6] END loss=lad, subsample=1;, score=(train=-0.088, test=-0.141) total time=2.8s

```

[CV 5/5; 3/6] START loss=lad, subsample=1.........................
[CV 5/5; 3/6] END loss=lad, subsample=1;, score=(train=-0.083, test=-0.152) total time=
3.0s
[CV 1/5; 4/6] START loss=ls, subsample=0.3.........................
[CV 1/5; 4/6] END loss=ls, subsample=0.3;, score=(train=-0.066, test=-0.156) total time=
0.7s
[CV 2/5; 4/6] START loss=ls, subsample=0.3.........................
[CV 2/5; 4/6] END loss=ls, subsample=0.3;, score=(train=-0.065, test=-0.162) total time=
0.7s
[CV 3/5; 4/6] START loss=ls, subsample=0.3.........................
[CV 3/5; 4/6] END loss=ls, subsample=0.3;, score=(train=-0.065, test=-0.156) total time=
0.7s
[CV 4/5; 4/6] START loss=ls, subsample=0.3.........................
[CV 4/5; 4/6] END loss=ls, subsample=0.3;, score=(train=-0.070, test=-0.162) total time=
0.7s
[CV 5/5; 4/6] START loss=ls, subsample=0.3.........................
[CV 5/5; 4/6] END loss=ls, subsample=0.3;, score=(train=-0.066, test=-0.162) total time=
0.7s
[CV 1/5; 5/6] START loss=ls, subsample=0.7.........................
[CV 1/5; 5/6] END loss=ls, subsample=0.7;, score=(train=-0.042, test=-0.152) total time=
1.6s
[CV 2/5; 5/6] START loss=ls, subsample=0.7.........................
[CV 2/5; 5/6] END loss=ls, subsample=0.7;, score=(train=-0.045, test=-0.152) total time=
1.6s
[CV 3/5; 5/6] START loss=ls, subsample=0.7.........................
[CV 3/5; 5/6] END loss=ls, subsample=0.7;, score=(train=-0.042, test=-0.140) total time=
1.6s
[CV 4/5; 5/6] START loss=ls, subsample=0.7.........................
[CV 4/5; 5/6] END loss=ls, subsample=0.7;, score=(train=-0.044, test=-0.147) total time=
1.6s
[CV 5/5; 5/6] START loss=ls, subsample=0.7.........................
[CV 5/5; 5/6] END loss=ls, subsample=0.7;, score=(train=-0.045, test=-0.152) total time=
1.6s
[CV 1/5; 6/6] START loss=ls, subsample=1.........................
[CV 1/5; 6/6] END loss=ls, subsample=1;, score=(train=-0.047, test=-0.148) total time=
2.2s
[CV 2/5; 6/6] START loss=ls, subsample=1.........................
[CV 2/5; 6/6] END loss=ls, subsample=1;, score=(train=-0.048, test=-0.151) total time=
2.2s
[CV 3/5; 6/6] START loss=ls, subsample=1.........................
[CV 3/5; 6/6] END loss=ls, subsample=1;, score=(train=-0.044, test=-0.138) total time=
2.2s
[CV 4/5; 6/6] START loss=ls, subsample=1.........................
[CV 4/5; 6/6] END loss=ls, subsample=1;, score=(train=-0.046, test=-0.142) total time=
2.2s
[CV 5/5; 6/6] START loss=ls, subsample=1.........................
[CV 5/5; 6/6] END loss=ls, subsample=1;, score=(train=-0.045, test=-0.150) total time=
2.2s
-----
iter: 1
n_candidates: 2
n_resources: 10470
Fitting 5 folds for each of 2 candidates, totalling 10 fits
[CV 1/5; 1/2] START loss=lad, subsample=0.7.........................
[CV 1/5; 1/2] END loss=lad, subsample=0.7;, score=(train=-0.094, test=-0.134) total time
= 5.8s
[CV 2/5; 1/2] START loss=lad, subsample=0.7.........................
[CV 2/5; 1/2] END loss=lad, subsample=0.7;, score=(train=-0.096, test=-0.134) total time
= 5.8s
[CV 3/5; 1/2] START loss=lad, subsample=0.7.........................
[CV 3/5; 1/2] END loss=lad, subsample=0.7;, score=(train=-0.096, test=-0.124) total time

```

```

= 5.8s
[CV 4/5; 1/2] START loss=lad, subsample=0.7...........................
[CV 4/5; 1/2] END loss=lad, subsample=0.7;, score=(train=-0.096, test=-0.125) total time
= 5.8s
[CV 5/5; 1/2] START loss=lad, subsample=0.7...........................
[CV 5/5; 1/2] END loss=lad, subsample=0.7;, score=(train=-0.096, test=-0.134) total time
= 5.8s
[CV 1/5; 2/2] START loss=lad, subsample=1...........................
[CV 1/5; 2/2] END loss=lad, subsample=1;, score=(train=-0.100, test=-0.137) total time=
7.4s
[CV 2/5; 2/2] START loss=lad, subsample=1...........................
[CV 2/5; 2/2] END loss=lad, subsample=1;, score=(train=-0.100, test=-0.135) total time=
7.5s
[CV 3/5; 2/2] START loss=lad, subsample=1...........................
[CV 3/5; 2/2] END loss=lad, subsample=1;, score=(train=-0.102, test=-0.124) total time=
7.5s
[CV 4/5; 2/2] START loss=lad, subsample=1...........................
[CV 4/5; 2/2] END loss=lad, subsample=1;, score=(train=-0.100, test=-0.125) total time=
7.5s
[CV 5/5; 2/2] START loss=lad, subsample=1...........................
[CV 5/5; 2/2] END loss=lad, subsample=1;, score=(train=-0.103, test=-0.136) total time=
7.4s
Best mae: -0.130
Best parameters set found on train set:
```

{'loss': 'lad', 'subsample': 0.7}

Grid scores on train set:

```

-0.149 (+/-0.015) for {'loss': 'lad', 'subsample': 0.3}
-0.144 (+/-0.010) for {'loss': 'lad', 'subsample': 0.7}
-0.143 (+/-0.012) for {'loss': 'lad', 'subsample': 1}
-0.159 (+/-0.006) for {'loss': 'ls', 'subsample': 0.3}
-0.149 (+/-0.009) for {'loss': 'ls', 'subsample': 0.7}
-0.146 (+/-0.010) for {'loss': 'ls', 'subsample': 1}
-0.130 (+/-0.009) for {'loss': 'lad', 'subsample': 0.7}
-0.131 (+/-0.011) for {'loss': 'lad', 'subsample': 1}
Elapsed Time: 134.46317315101624
```

Best mae: -0.130 Best parameters set found on train set:

{'loss': 'lad', 'subsample': 0.7}

```
In [121...]: param_grid = {'n_estimators' : [500,1000,5000]
}

gradient_boost = GradientBoostingRegressor(
    random_state=randomstate,
    max_depth = 5,
    learning_rate=.15,
    max_features='auto',
    min_impurity_decrease=0,
    loss='lad',
    subsample=.7,
)

best_params = grid_optimizer(gradient_boost, param_grid, X_train_refined, y_train)
```

Making Search
Running Grid

```
n_iterations: 2
n_required_iterations: 2
n_possible_iterations: 2
min_resources_: 3490
max_resources_: 10471
aggressive_elimination: False
factor: 3
-----
iter: 0
n_candidates: 3
n_resources: 3490
Fitting 5 folds for each of 3 candidates, totalling 15 fits
[CV 1/5; 1/3] START n_estimators=500...........................
[CV 1/5; 1/3] END n_estimators=500;, score=(train=-0.061, test=-0.154) total time= 4.9
s
[CV 2/5; 1/3] START n_estimators=500...........................
[CV 2/5; 1/3] END n_estimators=500;, score=(train=-0.061, test=-0.145) total time= 4.9
s
[CV 3/5; 1/3] START n_estimators=500...........................
[CV 3/5; 1/3] END n_estimators=500;, score=(train=-0.059, test=-0.139) total time= 4.9
s
[CV 4/5; 1/3] START n_estimators=500...........................
[CV 4/5; 1/3] END n_estimators=500;, score=(train=-0.062, test=-0.145) total time= 4.8
s
[CV 5/5; 1/3] START n_estimators=500...........................
[CV 5/5; 1/3] END n_estimators=500;, score=(train=-0.059, test=-0.140) total time= 5.0
s
[CV 1/5; 2/3] START n_estimators=1000...........................
[CV 1/5; 2/3] END n_estimators=1000;, score=(train=-0.048, test=-0.155) total time= 9.
8s
[CV 2/5; 2/3] START n_estimators=1000...........................
[CV 2/5; 2/3] END n_estimators=1000;, score=(train=-0.048, test=-0.145) total time= 9.
8s
[CV 3/5; 2/3] START n_estimators=1000...........................
[CV 3/5; 2/3] END n_estimators=1000;, score=(train=-0.046, test=-0.140) total time= 9.
9s
[CV 4/5; 2/3] START n_estimators=1000...........................
[CV 4/5; 2/3] END n_estimators=1000;, score=(train=-0.048, test=-0.146) total time= 9.
8s
[CV 5/5; 2/3] START n_estimators=1000...........................
[CV 5/5; 2/3] END n_estimators=1000;, score=(train=-0.045, test=-0.140) total time= 9.
8s
[CV 1/5; 3/3] START n_estimators=5000...........................
[CV 1/5; 3/3] END n_estimators=5000;, score=(train=-0.024, test=-0.159) total time= 48.
6s
[CV 2/5; 3/3] START n_estimators=5000...........................
[CV 2/5; 3/3] END n_estimators=5000;, score=(train=-0.026, test=-0.147) total time= 48.
8s
[CV 3/5; 3/3] START n_estimators=5000...........................
[CV 3/5; 3/3] END n_estimators=5000;, score=(train=-0.024, test=-0.144) total time= 49.
0s
[CV 4/5; 3/3] START n_estimators=5000...........................
[CV 4/5; 3/3] END n_estimators=5000;, score=(train=-0.023, test=-0.148) total time= 49.
2s
[CV 5/5; 3/3] START n_estimators=5000...........................
[CV 5/5; 3/3] END n_estimators=5000;, score=(train=-0.022, test=-0.145) total time= 49.
7s
-----
iter: 1
n_candidates: 1
n_resources: 10470
```

```

Fitting 5 folds for each of 1 candidates, totalling 5 fits
[CV 1/5; 1/1] START n_estimators=500...........................
[CV 1/5; 1/1] END n_estimators=500;, score=(train=-0.083, test=-0.135) total time= 11.6
s
[CV 2/5; 1/1] START n_estimators=500...........................
[CV 2/5; 1/1] END n_estimators=500;, score=(train=-0.086, test=-0.135) total time= 11.4
s
[CV 3/5; 1/1] START n_estimators=500...........................
[CV 3/5; 1/1] END n_estimators=500;, score=(train=-0.085, test=-0.124) total time= 11.5
s
[CV 4/5; 1/1] START n_estimators=500...........................
[CV 4/5; 1/1] END n_estimators=500;, score=(train=-0.084, test=-0.128) total time= 11.7
s
[CV 5/5; 1/1] START n_estimators=500...........................
[CV 5/5; 1/1] END n_estimators=500;, score=(train=-0.082, test=-0.135) total time= 11.7
s
Best mae: -0.131
Best parameters set found on train set:

{'n_estimators': 500}

Grid scores on train set:

-0.145 (+/-0.010) for {'n_estimators': 500}
-0.145 (+/-0.011) for {'n_estimators': 1000}
-0.149 (+/-0.011) for {'n_estimators': 5000}
-0.131 (+/-0.009) for {'n_estimators': 500}
Elapsed Time: 394.51143503189087

Best mae: -0.131 Best parameters set found on train set:
```

{'n_estimators': 500}

```
In [ ]: gradient_boost = GradientBoostingRegressor(
            n_estimators=500,
            random_state=randomstate,
            max_depth = 5,
            learning_rate=.15,
            max_features='auto',
            min_impurity_decrease=0,
            loss='lad',
            subsample=.7,
        )
```

Resources

<https://machinelearningmastery.com/snapshot-ensemble-deep-learning-neural-network/>

<https://arxiv.org/abs/1704.00109>

<https://machinelearningmastery.com/stacking-ensemble-for-deep-learning-neural-networks/>

[https://www.pyimagesearch.com/2019/01/21/regression-with-keras/?
_ga=2.96326428.1656616260.1633398874-339321111.1633398874](https://www.pyimagesearch.com/2019/01/21/regression-with-keras/?_ga=2.96326428.1656616260.1633398874-339321111.1633398874)

[https://www.pyimagesearch.com/2021/05/31/hyperparameter-tuning-for-deep-learning-with-scikit-
learn-keras-and-tensorflow/](https://www.pyimagesearch.com/2021/05/31/hyperparameter-tuning-for-deep-learning-with-scikit-learn-keras-and-tensorflow/)

<https://rosenfelder.ai/keras-regression-efficient-net/>

<https://nlp.stanford.edu/projects/glove/>