

# Hyperparameter tuning-Copy1

January 8, 2020

## 1 Hyperparameter tuning

The parameters of the following will be tuned: + XGBoost + LightGBM + Random Forest + RNN

```
[1]: import numpy as np
import pandas as pd
from itertools import product
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, make_scorer
from sklearn.ensemble import RandomForestRegressor
import xgboost as xgb
from xgboost import plot_importance
import lightgbm as lgb
import seaborn as sns
from sklearn.model_selection import GridSearchCV
import matplotlib.pyplot as plt
import time
import sys
import gc
import pickle
import warnings
warnings.filterwarnings("ignore")
```

/Users/charlottefettes/opt/anaconda3/lib/python3.7/site-packages/lightgbm/\_\_init\_\_.py:48: UserWarning: Starting from version 2.2.1, the library file in distribution wheels for macOS is built by the Apple Clang (Xcode\_8.3.3) compiler.

This means that in case of installing LightGBM from PyPI via the ``pip install lightgbm`` command, you don't need to install the gcc compiler anymore.

Instead of that, you need to install the OpenMP library, which is required for running LightGBM on the system with the Apple Clang compiler.

You can install the OpenMP library by the following command: ``brew install libomp``.

"You can install the OpenMP library by the following command: ``brew install libomp``.", UserWarning)

```
[2]: df = pd.read_pickle('data_6.pickle.gzde', compression='gzip')

#train-validation split
X_train = df[df.date_block_num < 33].drop(['item_cnt_month', 'date_block_num'],
→axis=1)
Y_train = df[df.date_block_num < 33]['item_cnt_month']
X_valid = df[df.date_block_num == 33].drop(['item_cnt_month', 'date_block_num'],
→axis=1)
Y_valid = df[df.date_block_num == 33]['item_cnt_month']
```

```
[3]: #gridsearchcv function
my_scorer = make_scorer(mean_squared_error, greater_is_better=False)

def algorithm_pipeline(X_train_data, X_test_data, y_train_data, y_test_data,
                      model, param_grid, cv=10, scoring=my_scorer,
                      do_probabilities = False):
    gs = GridSearchCV(
        estimator=model,
        param_grid=param_grid,
        cv=cv,
        n_jobs=-1,
        scoring=scoring,
        #scoring=mean_squared_error,
        verbose=2
    )
    fitted_model = gs.fit(X_train_data, y_train_data)

    pred = fitted_model.predict(X_test_data)

    return fitted_model, pred
```

## 1.1 XGBoost tuning

```
[9]: model = xgb.XGBRegressor()
param_grid = {
    #'max_depth': [6, 7, 8, 9, 10],
    #'min_child_weight': [0, 5, 15, 300],
    'colsample_bytree': [0.6, 0.8, 1.0],
    #'eta': [.3, .2, .1, .05, .01, .005],
    'subsample': [0.5, 0.8, 1.0],
    'seed': [42],
}

model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,
→param_grid, cv=3, scoring=my_scorer)
```

```
# Root Mean Squared Error
print(np.sqrt(-model.best_score_))
print(model.best_params_)
```

Fitting 3 folds for each of 9 candidates, totalling 27 fits

```
[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.
[Parallel(n_jobs=-1)]: Done 10 out of 27 | elapsed: 64.0min remaining:
108.8min
[Parallel(n_jobs=-1)]: Done 24 out of 27 | elapsed: 105.9min remaining:
13.2min
[Parallel(n_jobs=-1)]: Done 27 out of 27 | elapsed: 108.1min finished

[08:53:38] WARNING: src/objective/regression_obj.cu:152: reg:linear is now
deprecated in favor of reg:squarederror.
[08:53:38] WARNING: src/learner.cc:686: Tree method is automatically selected to
be 'approx' for faster speed. To use old behavior (exact greedy algorithm on
single machine), set tree_method to 'exact'.
0.8672279120092348
{'colsample_bytree': 0.6, 'seed': 42, 'subsample': 1.0}
```

```
[10]: model = xgb.XGBRegressor()
      param_grid = {
          'max_depth': [6, 7, 8, 9, 10],
          'min_child_weight': [0, 5, 15, 300],
          'colsample_bytree': [0.6],
          #'eta': [.3, .2, .1, .05, .01, .005],
          'subsample': [1.0],
          'seed': [42],
      }

      model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,
          ↪param_grid, cv=3, scoring=my_scorer)

      # Root Mean Squared Error
      print(np.sqrt(-model.best_score_))
      print(model.best_params_)
```

Fitting 3 folds for each of 20 candidates, totalling 60 fits

```
[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.
[Parallel(n_jobs=-1)]: Done 9 tasks | elapsed: 83.3min
[Parallel(n_jobs=-1)]: Done 60 out of 60 | elapsed: 400.1min remaining:
0.0s
[Parallel(n_jobs=-1)]: Done 60 out of 60 | elapsed: 400.1min finished

[16:16:10] WARNING: src/objective/regression_obj.cu:152: reg:linear is now
deprecated in favor of reg:squarederror.
[16:16:10] WARNING: src/learner.cc:686: Tree method is automatically selected to
```

be 'approx' for faster speed. To use old behavior (exact greedy algorithm on single machine), set tree\_method to 'exact'.  
0.8197703531721671  
{'colsample\_bytree': 0.6, 'max\_depth': 10, 'min\_child\_weight': 300, 'seed': 42, 'subsample': 1.0}

```
[11]: model = xgb.XGBRegressor()
      param_grid = {
          'max_depth': [10],
          'min_child_weight': [300],
          'colsample_bytree': [0.6],
          'eta': [.3, .2, .1, .05, .01, .005, 0.001],
          'subsample': [1.0],
          'seed': [42],
      }

      model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,
          ↪ param_grid, cv=3, scoring=my_scorer)

      xgb_params = model.best_params_

      # Root Mean Squared Error
      print(np.sqrt(-model.best_score_))
      print(xgb_params)
```

Fitting 3 folds for each of 7 candidates, totalling 21 fits

```
[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.
[Parallel(n_jobs=-1)]: Done 12 out of 21 | elapsed: 132.0min remaining:
99.0min
[Parallel(n_jobs=-1)]: Done 21 out of 21 | elapsed: 189.3min finished

[21:22:35] WARNING: src/objective/regression_obj.cu:152: reg:linear is now
deprecated in favor of reg:squarederror.
[21:22:35] WARNING: src/learner.cc:686: Tree method is automatically selected to
be 'approx' for faster speed. To use old behavior (exact greedy algorithm on
single machine), set tree_method to 'exact'.
0.8197703531721671
{'colsample_bytree': 0.6, 'eta': 0.3, 'max_depth': 10, 'min_child_weight': 300,
'seed': 42, 'subsample': 1.0}
```

```
[12]: xgb_model = xgb.XGBRegressor(**xgb_params, n_estimators=1000)
      xgb_model.fit(
          X_train,
          Y_train,
          eval_metric="rmse",
          eval_set=[(X_train, Y_train), (X_valid, Y_valid)],
          verbose=True,
```

```
early_stopping_rounds = 10)
```

```
[06:36:19] WARNING: src/objective/regression_obj.cu:152: reg:linear is now deprecated in favor of reg:squarederror.
```

```
[06:36:19] WARNING: src/learner.cc:686: Tree method is automatically selected to be 'approx' for faster speed. To use old behavior (exact greedy algorithm on single machine), set tree_method to 'exact'.
```

```
[0]      validation_0-rmse:1.13828      validation_1-rmse:1.05933
Multiple eval metrics have been passed: 'validation_1-rmse' will be used for early stopping.
```

```
Will train until validation_1-rmse hasn't improved in 10 rounds.
```

[1]	validation_0-rmse:1.08921	validation_1-rmse:1.01872
[2]	validation_0-rmse:1.05276	validation_1-rmse:0.983901
[3]	validation_0-rmse:1.00803	validation_1-rmse:0.955343
[4]	validation_0-rmse:0.974959	validation_1-rmse:0.928747
[5]	validation_0-rmse:0.952064	validation_1-rmse:0.909383
[6]	validation_0-rmse:0.927388	validation_1-rmse:0.890421
[7]	validation_0-rmse:0.904863	validation_1-rmse:0.874841
[8]	validation_0-rmse:0.888418	validation_1-rmse:0.862744
[9]	validation_0-rmse:0.874235	validation_1-rmse:0.851062
[10]	validation_0-rmse:0.861365	validation_1-rmse:0.841532
[11]	validation_0-rmse:0.851707	validation_1-rmse:0.835277
[12]	validation_0-rmse:0.841647	validation_1-rmse:0.829038
[13]	validation_0-rmse:0.83429	validation_1-rmse:0.824873
[14]	validation_0-rmse:0.829082	validation_1-rmse:0.821635
[15]	validation_0-rmse:0.822915	validation_1-rmse:0.817983
[16]	validation_0-rmse:0.81859	validation_1-rmse:0.814261
[17]	validation_0-rmse:0.813831	validation_1-rmse:0.810436
[18]	validation_0-rmse:0.809799	validation_1-rmse:0.80863
[19]	validation_0-rmse:0.805937	validation_1-rmse:0.806326
[20]	validation_0-rmse:0.802441	validation_1-rmse:0.803555
[21]	validation_0-rmse:0.799964	validation_1-rmse:0.801377
[22]	validation_0-rmse:0.797318	validation_1-rmse:0.799937
[23]	validation_0-rmse:0.795152	validation_1-rmse:0.798485
[24]	validation_0-rmse:0.793651	validation_1-rmse:0.797129
[25]	validation_0-rmse:0.790841	validation_1-rmse:0.794201
[26]	validation_0-rmse:0.788734	validation_1-rmse:0.794248
[27]	validation_0-rmse:0.787581	validation_1-rmse:0.79361
[28]	validation_0-rmse:0.786377	validation_1-rmse:0.792673
[29]	validation_0-rmse:0.785272	validation_1-rmse:0.792109
[30]	validation_0-rmse:0.783794	validation_1-rmse:0.791443
[31]	validation_0-rmse:0.781823	validation_1-rmse:0.790576
[32]	validation_0-rmse:0.780608	validation_1-rmse:0.789251
[33]	validation_0-rmse:0.779831	validation_1-rmse:0.789103
[34]	validation_0-rmse:0.778705	validation_1-rmse:0.787664
[35]	validation_0-rmse:0.777962	validation_1-rmse:0.787445

[36]	validation_0-rmse:0.777368	validation_1-rmse:0.787207
[37]	validation_0-rmse:0.776683	validation_1-rmse:0.787139
[38]	validation_0-rmse:0.775892	validation_1-rmse:0.786683
[39]	validation_0-rmse:0.77515	validation_1-rmse:0.786548
[40]	validation_0-rmse:0.774425	validation_1-rmse:0.786052
[41]	validation_0-rmse:0.773773	validation_1-rmse:0.785659
[42]	validation_0-rmse:0.773111	validation_1-rmse:0.785488
[43]	validation_0-rmse:0.772544	validation_1-rmse:0.784588
[44]	validation_0-rmse:0.772021	validation_1-rmse:0.784316
[45]	validation_0-rmse:0.771446	validation_1-rmse:0.784048
[46]	validation_0-rmse:0.770965	validation_1-rmse:0.783665
[47]	validation_0-rmse:0.770532	validation_1-rmse:0.783561
[48]	validation_0-rmse:0.77014	validation_1-rmse:0.78347
[49]	validation_0-rmse:0.769612	validation_1-rmse:0.783163
[50]	validation_0-rmse:0.769248	validation_1-rmse:0.78301
[51]	validation_0-rmse:0.768605	validation_1-rmse:0.782837
[52]	validation_0-rmse:0.767455	validation_1-rmse:0.782426
[53]	validation_0-rmse:0.766891	validation_1-rmse:0.782199
[54]	validation_0-rmse:0.766404	validation_1-rmse:0.782272
[55]	validation_0-rmse:0.765971	validation_1-rmse:0.78197
[56]	validation_0-rmse:0.765591	validation_1-rmse:0.781733
[57]	validation_0-rmse:0.764697	validation_1-rmse:0.781776
[58]	validation_0-rmse:0.764055	validation_1-rmse:0.781835
[59]	validation_0-rmse:0.763725	validation_1-rmse:0.781704
[60]	validation_0-rmse:0.763456	validation_1-rmse:0.78158
[61]	validation_0-rmse:0.762991	validation_1-rmse:0.781329
[62]	validation_0-rmse:0.762022	validation_1-rmse:0.782038
[63]	validation_0-rmse:0.761015	validation_1-rmse:0.781777
[64]	validation_0-rmse:0.760397	validation_1-rmse:0.78123
[65]	validation_0-rmse:0.759284	validation_1-rmse:0.782079
[66]	validation_0-rmse:0.75894	validation_1-rmse:0.781994
[67]	validation_0-rmse:0.758589	validation_1-rmse:0.781989
[68]	validation_0-rmse:0.758228	validation_1-rmse:0.78174
[69]	validation_0-rmse:0.757891	validation_1-rmse:0.781693
[70]	validation_0-rmse:0.75754	validation_1-rmse:0.781494
[71]	validation_0-rmse:0.757278	validation_1-rmse:0.781451
[72]	validation_0-rmse:0.756965	validation_1-rmse:0.781003
[73]	validation_0-rmse:0.756597	validation_1-rmse:0.78123
[74]	validation_0-rmse:0.756338	validation_1-rmse:0.781217
[75]	validation_0-rmse:0.75599	validation_1-rmse:0.781089
[76]	validation_0-rmse:0.755679	validation_1-rmse:0.781135
[77]	validation_0-rmse:0.755426	validation_1-rmse:0.781034
[78]	validation_0-rmse:0.755069	validation_1-rmse:0.780857
[79]	validation_0-rmse:0.754769	validation_1-rmse:0.780756
[80]	validation_0-rmse:0.754508	validation_1-rmse:0.780688
[81]	validation_0-rmse:0.754222	validation_1-rmse:0.780652
[82]	validation_0-rmse:0.754 validation_1-rmse:0.780614	
[83]	validation_0-rmse:0.753733	validation_1-rmse:0.780472

[84]	validation_0-rmse:0.753091	validation_1-rmse:0.780075
[85]	validation_0-rmse:0.752193	validation_1-rmse:0.779321
[86]	validation_0-rmse:0.751771	validation_1-rmse:0.779112
[87]	validation_0-rmse:0.751453	validation_1-rmse:0.779095
[88]	validation_0-rmse:0.749842	validation_1-rmse:0.779397
[89]	validation_0-rmse:0.749571	validation_1-rmse:0.779261
[90]	validation_0-rmse:0.749253	validation_1-rmse:0.779422
[91]	validation_0-rmse:0.749021	validation_1-rmse:0.779348
[92]	validation_0-rmse:0.748826	validation_1-rmse:0.779267
[93]	validation_0-rmse:0.748645	validation_1-rmse:0.779131
[94]	validation_0-rmse:0.748452	validation_1-rmse:0.77902
[95]	validation_0-rmse:0.748164	validation_1-rmse:0.778934
[96]	validation_0-rmse:0.747988	validation_1-rmse:0.778904
[97]	validation_0-rmse:0.747628	validation_1-rmse:0.778814
[98]	validation_0-rmse:0.747419	validation_1-rmse:0.77883
[99]	validation_0-rmse:0.747064	validation_1-rmse:0.779051
[100]	validation_0-rmse:0.746688	validation_1-rmse:0.778568
[101]	validation_0-rmse:0.746525	validation_1-rmse:0.778498
[102]	validation_0-rmse:0.746386	validation_1-rmse:0.778464
[103]	validation_0-rmse:0.746016	validation_1-rmse:0.778256
[104]	validation_0-rmse:0.745719	validation_1-rmse:0.777967
[105]	validation_0-rmse:0.745475	validation_1-rmse:0.777904
[106]	validation_0-rmse:0.745183	validation_1-rmse:0.777853
[107]	validation_0-rmse:0.744965	validation_1-rmse:0.777963
[108]	validation_0-rmse:0.744658	validation_1-rmse:0.777885
[109]	validation_0-rmse:0.744193	validation_1-rmse:0.777669
[110]	validation_0-rmse:0.743847	validation_1-rmse:0.777718
[111]	validation_0-rmse:0.743699	validation_1-rmse:0.777614
[112]	validation_0-rmse:0.743514	validation_1-rmse:0.777621
[113]	validation_0-rmse:0.743283	validation_1-rmse:0.777529
[114]	validation_0-rmse:0.743045	validation_1-rmse:0.777479
[115]	validation_0-rmse:0.742829	validation_1-rmse:0.777457
[116]	validation_0-rmse:0.742549	validation_1-rmse:0.777475
[117]	validation_0-rmse:0.742367	validation_1-rmse:0.777527
[118]	validation_0-rmse:0.742053	validation_1-rmse:0.777487
[119]	validation_0-rmse:0.741869	validation_1-rmse:0.777407
[120]	validation_0-rmse:0.741638	validation_1-rmse:0.777334
[121]	validation_0-rmse:0.74121	validation_1-rmse:0.776941
[122]	validation_0-rmse:0.74027	validation_1-rmse:0.777994
[123]	validation_0-rmse:0.740043	validation_1-rmse:0.777982
[124]	validation_0-rmse:0.739893	validation_1-rmse:0.778073
[125]	validation_0-rmse:0.739655	validation_1-rmse:0.77809
[126]	validation_0-rmse:0.739439	validation_1-rmse:0.777931
[127]	validation_0-rmse:0.739252	validation_1-rmse:0.777917
[128]	validation_0-rmse:0.739026	validation_1-rmse:0.777926
[129]	validation_0-rmse:0.738807	validation_1-rmse:0.777593
[130]	validation_0-rmse:0.738382	validation_1-rmse:0.777612
[131]	validation_0-rmse:0.738091	validation_1-rmse:0.777914

Stopping. Best iteration:

[121] validation\_0-rmse:0.74121 validation\_1-rmse:0.776941

```
[12]: XGBRegressor(base_score=0.5, booster='gbtree', colsample_bylevel=1,
                  colsample_bynode=1, colsample_bytree=0.6, eta=0.3, gamma=0,
                  importance_type='gain', learning_rate=0.1, max_delta_step=0,
                  max_depth=10, min_child_weight=300, missing=None,
                  n_estimators=1000, n_jobs=1, nthread=None, objective='reg:linear',
                  random_state=0, reg_alpha=0, reg_lambda=1, scale_pos_weight=1,
                  seed=42, silent=None, subsample=1.0, verbosity=1)
```

```
[13]: xgb_params['n_estimators'] = 125
      xgb_params
```

```
[13]: {'colsample_bytree': 0.6,
      'eta': 0.3,
      'max_depth': 10,
      'min_child_weight': 300,
      'seed': 42,
      'subsample': 1.0,
      'n_estimators': 125}
```

```
[14]: # Save untrained model to file

      Pkl_Filename = "XBG_Params.pkl"

      with open(Pkl_Filename, 'wb') as file:
          pickle.dump(xgb_params, file)
```

## 1.2 LightGBM

```
[15]: model = lgb.LGBMRegressor()
      param_grid = {
          #'max_depth': [-1, 5, 6, 7, 8],
          #'num_leaves': [30, 80, 100, 128, 200],
          'bagging_fraction': [0.2, 0.5, 0.8, 1.0],
          'feature_fraction': [0.2, 0.5, 0.8, 1.0],
          #'min_data_in_leaf': [0, 5, 15, 300],
          #'learning_rate': [0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08]
          'seed': [42],
      }

      model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,
                                      param_grid, cv=3)

      print(np.sqrt(-model.best_score_))
```



```
print(model.best_params_)
```

Fitting 3 folds for each of 16 candidates, totalling 48 fits

```
[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.  
[Parallel(n_jobs=-1)]: Done   9 tasks      | elapsed:   4.3min  
[Parallel(n_jobs=-1)]: Done  42 out of  48 | elapsed: 10.9min remaining:  1.6min  
[Parallel(n_jobs=-1)]: Done  48 out of  48 | elapsed: 11.7min finished
```

0.8239681837266936

{'bagging\_fraction': 0.2, 'feature\_fraction': 0.8, 'seed': 42}

```
[16]: model = lgb.LGBMRegressor()  
      param_grid = {  
          'max_depth': [-1, 6, 7, 8, 9, 10],  
          'num_leaves': [31, 80, 100, 128, 200, 300],  
          'bagging_fraction': [0.2],  
          'feature_fraction': [0.8],  
          #'min_data_in_leaf': [0, 5, 15, 300],  
          #'learning_rate': [0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08]  
          'seed': [42],  
      }  
  
      model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,  
                                      param_grid, cv=3)  
  
      print(np.sqrt(-model.best_score_))  
      print(model.best_params_)
```

Fitting 3 folds for each of 36 candidates, totalling 108 fits

```
[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.  
[Parallel(n_jobs=-1)]: Done   9 tasks      | elapsed:   6.4min  
[Parallel(n_jobs=-1)]: Done 108 out of 108 | elapsed: 36.0min finished
```

0.8171918670759332

{'bagging\_fraction': 0.2, 'feature\_fraction': 0.8, 'max\_depth': -1,  
'num\_leaves': 128, 'seed': 42}

```
[17]: model = lgb.LGBMRegressor()  
      param_grid = {  
          'max_depth': [-1],  
          'num_leaves': [128],  
          'bagging_fraction': [0.2],  
          'feature_fraction': [0.8],  
          'min_data_in_leaf': [0, 5, 15, 20, 300],  
          #'learning_rate': [0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08]  
          'seed': [42],  
      }  
  
      model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,  
                                      param_grid, cv=3)
```

```

model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,
                                param_grid, cv=3)

print(np.sqrt(-model.best_score_))
print(model.best_params_)

```

Fitting 3 folds for each of 5 candidates, totalling 15 fits

```

[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.
[Parallel(n_jobs=-1)]: Done   8 out of  15 | elapsed:   6.6min remaining:   5.8min
[Parallel(n_jobs=-1)]: Done  15 out of  15 | elapsed:   6.9min finished

```

0.8145338077464104

```

{'bagging_fraction': 0.2, 'feature_fraction': 0.8, 'max_depth': -1,
 'min_data_in_leaf': 300, 'num_leaves': 128, 'seed': 42}

```

```

[18]: model = lgb.LGBMRegressor()
      param_grid = {
          'max_depth': [-1],
          'num_leaves': [128],
          'bagging_fraction': [0.2],
          'feature_fraction': [0.8],
          'min_data_in_leaf': [300],
          'learning_rate': [0.001, 0.005, 0.01, 0.05, 0.1, 0.5],
          'seed': [42],
      }

      model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,
                                      param_grid, cv=3)

      print(np.sqrt(-model.best_score_))
      print(model.best_params_)

```

Fitting 3 folds for each of 6 candidates, totalling 18 fits

```

[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.
[Parallel(n_jobs=-1)]: Done   7 out of  18 | elapsed:   8.4min remaining: 13.2min
[Parallel(n_jobs=-1)]: Done  18 out of  18 | elapsed: 10.2min finished

```

0.8136538257965431

```

{'bagging_fraction': 0.2, 'feature_fraction': 0.8, 'learning_rate': 0.05,
 'max_depth': -1, 'min_data_in_leaf': 300, 'num_leaves': 128, 'seed': 42}

```

```

[21]: lgb_params = model.best_params_

      lgb_model = lgb.LGBMRegressor(**lgb_params, n_estimators=1000)
      lgb_model.fit(
          X_train,

```

```

Y_train,
eval_metric="rmse",
eval_set=[(X_train, Y_train), (X_valid, Y_valid)],
verbose=True,
early_stopping_rounds = 10)

```

```

[1]      training's rmse: 1.17279      training's l2: 1.37542  valid_1's rmse:
1.05825 valid_1's l2: 1.1199
Training until validation scores don't improve for 10 rounds
[2]      training's rmse: 1.14385      training's l2: 1.3084  valid_1's rmse:
1.03669 valid_1's l2: 1.07472
[3]      training's rmse: 1.11635      training's l2: 1.24624  valid_1's rmse:
1.01711 valid_1's l2: 1.0345
[4]      training's rmse: 1.09265      training's l2: 1.19388  valid_1's rmse:
0.999659      valid_1's l2: 0.999317
[5]      training's rmse: 1.06912      training's l2: 1.14302  valid_1's rmse:
0.984868      valid_1's l2: 0.969965
[6]      training's rmse: 1.04686      training's l2: 1.09592  valid_1's rmse:
0.970344      valid_1's l2: 0.941568
[7]      training's rmse: 1.0262 training's l2: 1.05308  valid_1's rmse: 0.956946
valid_1's l2: 0.915745
[8]      training's rmse: 1.00717      training's l2: 1.01439  valid_1's rmse:
0.945431      valid_1's l2: 0.893839
[9]      training's rmse: 0.989685      training's l2: 0.979476 valid_1's rmse:
0.932951      valid_1's l2: 0.870398
[10]     training's rmse: 0.973499      training's l2: 0.9477   valid_1's rmse:
0.923587      valid_1's l2: 0.853013
[11]     training's rmse: 0.95837      training's l2: 0.918472 valid_1's rmse:
0.913958      valid_1's l2: 0.835318
[12]     training's rmse: 0.944076      training's l2: 0.891279 valid_1's rmse:
0.904508      valid_1's l2: 0.818135
[13]     training's rmse: 0.9312 training's l2: 0.867133 valid_1's rmse: 0.896919
valid_1's l2: 0.804464
[14]     training's rmse: 0.919291      training's l2: 0.845096 valid_1's rmse:
0.888747      valid_1's l2: 0.789872
[15]     training's rmse: 0.908321      training's l2: 0.825047 valid_1's rmse:
0.881168      valid_1's l2: 0.776458
[16]     training's rmse: 0.898032      training's l2: 0.806461 valid_1's rmse:
0.874526      valid_1's l2: 0.764796
[17]     training's rmse: 0.88861      training's l2: 0.789628 valid_1's rmse:
0.868117      valid_1's l2: 0.753627
[18]     training's rmse: 0.879842      training's l2: 0.774121 valid_1's rmse:
0.862975      valid_1's l2: 0.744726
[19]     training's rmse: 0.87224      training's l2: 0.760803 valid_1's rmse:
0.858115      valid_1's l2: 0.736362
[20]     training's rmse: 0.86466      training's l2: 0.747636 valid_1's rmse:
0.853124      valid_1's l2: 0.727821

```

[21]	training's rmse: 0.858258	training's l2: 0.736608	valid_1's rmse:
	0.849497	valid_1's l2: 0.721646	
[22]	training's rmse: 0.851566	training's l2: 0.725164	valid_1's rmse:
	0.84618	valid_1's l2: 0.716021	
[23]	training's rmse: 0.845729	training's l2: 0.715258	valid_1's rmse:
	0.842398	valid_1's l2: 0.709635	
[24]	training's rmse: 0.840011	training's l2: 0.705618	valid_1's rmse:
	0.838604	valid_1's l2: 0.703257	
[25]	training's rmse: 0.834328	training's l2: 0.696103	valid_1's rmse:
	0.835245	valid_1's l2: 0.697634	
[26]	training's rmse: 0.829321	training's l2: 0.687774	valid_1's rmse:
	0.832944	valid_1's l2: 0.693796	
[27]	training's rmse: 0.824998	training's l2: 0.680622	valid_1's rmse:
	0.830662	valid_1's l2: 0.689999	
[28]	training's rmse: 0.820823	training's l2: 0.67375	valid_1's rmse:
	0.82784	valid_1's l2: 0.68532	
[29]	training's rmse: 0.816702	training's l2: 0.667003	valid_1's rmse:
	0.825908	valid_1's l2: 0.682124	
[30]	training's rmse: 0.813121	training's l2: 0.661166	valid_1's rmse:
	0.82379	valid_1's l2: 0.678629	
[31]	training's rmse: 0.810245	training's l2: 0.656498	valid_1's rmse:
	0.821501	valid_1's l2: 0.674864	
[32]	training's rmse: 0.80665	training's l2: 0.650685	valid_1's rmse:
	0.819222	valid_1's l2: 0.671125	
[33]	training's rmse: 0.80385	training's l2: 0.646175	valid_1's rmse:
	0.817337	valid_1's l2: 0.66804	
[34]	training's rmse: 0.800908	training's l2: 0.641454	valid_1's rmse:
	0.815745	valid_1's l2: 0.665439	
[35]	training's rmse: 0.798138	training's l2: 0.637025	valid_1's rmse:
	0.814438	valid_1's l2: 0.663309	
[36]	training's rmse: 0.795602	training's l2: 0.632983	valid_1's rmse:
	0.813195	valid_1's l2: 0.661286	
[37]	training's rmse: 0.793151	training's l2: 0.629089	valid_1's rmse:
	0.811889	valid_1's l2: 0.659163	
[38]	training's rmse: 0.79119	training's l2: 0.625982	valid_1's rmse:
	0.811357	valid_1's l2: 0.658301	
[39]	training's rmse: 0.788922	training's l2: 0.622398	valid_1's rmse:
	0.810145	valid_1's l2: 0.656335	
[40]	training's rmse: 0.78691	training's l2: 0.619227	valid_1's rmse:
	0.809849	valid_1's l2: 0.655856	
[41]	training's rmse: 0.785045	training's l2: 0.616295	valid_1's rmse:
	0.80852	valid_1's l2: 0.653705	
[42]	training's rmse: 0.783383	training's l2: 0.613689	valid_1's rmse:
	0.80729	valid_1's l2: 0.651718	
[43]	training's rmse: 0.781927	training's l2: 0.611409	valid_1's rmse:
	0.806691	valid_1's l2: 0.65075	
[44]	training's rmse: 0.780563	training's l2: 0.609279	valid_1's rmse:
	0.805892	valid_1's l2: 0.649462	

[45]	training's rmse: 0.779065	training's 12: 0.606942	valid_1's rmse:
	0.805087	valid_1's 12: 0.648166	
[46]	training's rmse: 0.777498	training's 12: 0.604502	valid_1's rmse:
	0.804112	valid_1's 12: 0.646596	
[47]	training's rmse: 0.776047	training's 12: 0.602249	valid_1's rmse:
	0.804474	valid_1's 12: 0.647178	
[48]	training's rmse: 0.774747	training's 12: 0.600233	valid_1's rmse:
	0.803849	valid_1's 12: 0.646173	
[49]	training's rmse: 0.773767	training's 12: 0.598716	valid_1's rmse:
	0.803309	valid_1's 12: 0.645305	
[50]	training's rmse: 0.77254	training's 12: 0.596818	valid_1's rmse:
	0.802328	valid_1's 12: 0.64373	
[51]	training's rmse: 0.771447	training's 12: 0.59513	valid_1's rmse:
	0.801555	valid_1's 12: 0.64249	
[52]	training's rmse: 0.770393	training's 12: 0.593506	valid_1's rmse:
	0.800773	valid_1's 12: 0.641238	
[53]	training's rmse: 0.769088	training's 12: 0.591497	valid_1's rmse:
	0.800849	valid_1's 12: 0.641359	
[54]	training's rmse: 0.768075	training's 12: 0.58994	valid_1's rmse:
	0.800296	valid_1's 12: 0.640474	
[55]	training's rmse: 0.767206	training's 12: 0.588604	valid_1's rmse:
	0.800121	valid_1's 12: 0.640193	
[56]	training's rmse: 0.76634	training's 12: 0.587277	valid_1's rmse:
	0.799613	valid_1's 12: 0.639381	
[57]	training's rmse: 0.765457	training's 12: 0.585924	valid_1's rmse:
	0.798839	valid_1's 12: 0.638144	
[58]	training's rmse: 0.764677	training's 12: 0.584732	valid_1's rmse:
	0.798258	valid_1's 12: 0.637216	
[59]	training's rmse: 0.763798	training's 12: 0.583388	valid_1's rmse:
	0.797365	valid_1's 12: 0.635791	
[60]	training's rmse: 0.76301	training's 12: 0.582185	valid_1's rmse:
	0.797008	valid_1's 12: 0.635222	
[61]	training's rmse: 0.762274	training's 12: 0.581061	valid_1's rmse:
	0.796944	valid_1's 12: 0.635119	
[62]	training's rmse: 0.761536	training's 12: 0.579937	valid_1's rmse:
	0.796562	valid_1's 12: 0.63451	
[63]	training's rmse: 0.760818	training's 12: 0.578844	valid_1's rmse:
	0.796047	valid_1's 12: 0.633691	
[64]	training's rmse: 0.760029	training's 12: 0.577643	valid_1's rmse:
	0.795703	valid_1's 12: 0.633143	
[65]	training's rmse: 0.759351	training's 12: 0.576614	valid_1's rmse:
	0.79518	valid_1's 12: 0.632311	
[66]	training's rmse: 0.758658	training's 12: 0.575562	valid_1's rmse:
	0.79457	valid_1's 12: 0.631341	
[67]	training's rmse: 0.75805	training's 12: 0.57464	valid_1's rmse:
	0.794191	valid_1's 12: 0.63074	
[68]	training's rmse: 0.757333	training's 12: 0.573553	valid_1's rmse:
	0.793528	valid_1's 12: 0.629686	

[69]	training's rmse: 0.756709	training's 12: 0.572608	valid_1's rmse:
	0.793194 valid_1's 12: 0.629157		
[70]	training's rmse: 0.756128	training's 12: 0.571729	valid_1's rmse:
	0.792772 valid_1's 12: 0.628488		
[71]	training's rmse: 0.755628	training's 12: 0.570974	valid_1's rmse:
	0.792358 valid_1's 12: 0.627832		
[72]	training's rmse: 0.75505	training's 12: 0.5701	valid_1's rmse:
	0.791651 valid_1's 12: 0.626712		
[73]	training's rmse: 0.754407	training's 12: 0.569131	valid_1's rmse:
	0.791696 valid_1's 12: 0.626783		
[74]	training's rmse: 0.753897	training's 12: 0.56836	valid_1's rmse:
	0.791304 valid_1's 12: 0.626162		
[75]	training's rmse: 0.753324	training's 12: 0.567497	valid_1's rmse:
	0.791006 valid_1's 12: 0.62569		
[76]	training's rmse: 0.752826	training's 12: 0.566746	valid_1's rmse:
	0.790752 valid_1's 12: 0.625289		
[77]	training's rmse: 0.752349	training's 12: 0.566029	valid_1's rmse:
	0.790462 valid_1's 12: 0.62483		
[78]	training's rmse: 0.751869	training's 12: 0.565308	valid_1's rmse:
	0.790163 valid_1's 12: 0.624358		
[79]	training's rmse: 0.751376	training's 12: 0.564566	valid_1's rmse:
	0.790153 valid_1's 12: 0.624342		
[80]	training's rmse: 0.750919	training's 12: 0.563879	valid_1's rmse:
	0.789983 valid_1's 12: 0.624074		
[81]	training's rmse: 0.750444	training's 12: 0.563167	valid_1's rmse:
	0.789608 valid_1's 12: 0.623481		
[82]	training's rmse: 0.750018	training's 12: 0.562528	valid_1's rmse:
	0.789483 valid_1's 12: 0.623284		
[83]	training's rmse: 0.749532	training's 12: 0.561798	valid_1's rmse:
	0.788915 valid_1's 12: 0.622386		
[84]	training's rmse: 0.748967	training's 12: 0.560952	valid_1's rmse:
	0.788504 valid_1's 12: 0.621738		
[85]	training's rmse: 0.748538	training's 12: 0.56031	valid_1's rmse:
	0.788251 valid_1's 12: 0.621339		
[86]	training's rmse: 0.748117	training's 12: 0.559679	valid_1's rmse:
	0.788086 valid_1's 12: 0.62108		
[87]	training's rmse: 0.747634	training's 12: 0.558957	valid_1's rmse:
	0.787836 valid_1's 12: 0.620686		
[88]	training's rmse: 0.747235	training's 12: 0.55836	valid_1's rmse:
	0.787213 valid_1's 12: 0.619705		
[89]	training's rmse: 0.74683	training's 12: 0.557755	valid_1's rmse:
	0.787096 valid_1's 12: 0.61952		
[90]	training's rmse: 0.74604	training's 12: 0.556576	valid_1's rmse:
	0.787816 valid_1's 12: 0.620654		
[91]	training's rmse: 0.745581	training's 12: 0.555891	valid_1's rmse:
	0.78753 valid_1's 12: 0.620203		
[92]	training's rmse: 0.745217	training's 12: 0.555349	valid_1's rmse:
	0.787299 valid_1's 12: 0.61984		

[93]	training's rmse: 0.74484	training's 12: 0.554787	valid_1's rmse:
0.787131	valid_1's 12: 0.619575		
[94]	training's rmse: 0.744482	training's 12: 0.554253	valid_1's rmse:
0.787055	valid_1's 12: 0.619455		
[95]	training's rmse: 0.744111	training's 12: 0.553701	valid_1's rmse:
0.787029	valid_1's 12: 0.619415		
[96]	training's rmse: 0.74367	training's 12: 0.553045	valid_1's rmse:
0.786731	valid_1's 12: 0.618946		
[97]	training's rmse: 0.743298	training's 12: 0.552492	valid_1's rmse:
0.786539	valid_1's 12: 0.618644		
[98]	training's rmse: 0.742918	training's 12: 0.551927	valid_1's rmse:
0.786222	valid_1's 12: 0.618146		
[99]	training's rmse: 0.742592	training's 12: 0.551443	valid_1's rmse:
0.786011	valid_1's 12: 0.617813		
[100]	training's rmse: 0.742246	training's 12: 0.550929	valid_1's rmse:
0.785796	valid_1's 12: 0.617475		
[101]	training's rmse: 0.741044	training's 12: 0.549147	valid_1's rmse:
0.786213	valid_1's 12: 0.61813		
[102]	training's rmse: 0.740722	training's 12: 0.548668	valid_1's rmse:
0.786095	valid_1's 12: 0.617946		
[103]	training's rmse: 0.740371	training's 12: 0.54815	valid_1's rmse:
0.78591	valid_1's 12: 0.617654		
[104]	training's rmse: 0.739938	training's 12: 0.547508	valid_1's rmse:
0.78587	valid_1's 12: 0.617592		
[105]	training's rmse: 0.739059	training's 12: 0.546209	valid_1's rmse:
0.785806	valid_1's 12: 0.61749		
[106]	training's rmse: 0.738786	training's 12: 0.545805	valid_1's rmse:
0.785736	valid_1's 12: 0.617381		
[107]	training's rmse: 0.738475	training's 12: 0.545345	valid_1's rmse:
0.78565	valid_1's 12: 0.617245		
[108]	training's rmse: 0.738125	training's 12: 0.544829	valid_1's rmse:
0.785596	valid_1's 12: 0.617161		
[109]	training's rmse: 0.737769	training's 12: 0.544303	valid_1's rmse:
0.785447	valid_1's 12: 0.616927		
[110]	training's rmse: 0.73746	training's 12: 0.543848	valid_1's rmse:
0.78538	valid_1's 12: 0.616822		
[111]	training's rmse: 0.737054	training's 12: 0.543248	valid_1's rmse:
0.785276	valid_1's 12: 0.616658		
[112]	training's rmse: 0.736749	training's 12: 0.542798	valid_1's rmse:
0.785206	valid_1's 12: 0.616548		
[113]	training's rmse: 0.736428	training's 12: 0.542326	valid_1's rmse:
0.785056	valid_1's 12: 0.616313		
[114]	training's rmse: 0.736134	training's 12: 0.541894	valid_1's rmse:
0.784966	valid_1's 12: 0.616172		
[115]	training's rmse: 0.735682	training's 12: 0.541228	valid_1's rmse:
0.785275	valid_1's 12: 0.616656		
[116]	training's rmse: 0.735378	training's 12: 0.540781	valid_1's rmse:
0.785003	valid_1's 12: 0.616229		

[117]	training's rmse: 0.735061	training's l2: 0.540314	valid_1's rmse:
	0.784824	valid_1's l2: 0.615948	
[118]	training's rmse: 0.734761	training's l2: 0.539874	valid_1's rmse:
	0.784724	valid_1's l2: 0.615792	
[119]	training's rmse: 0.734474	training's l2: 0.539451	valid_1's rmse:
	0.784713	valid_1's l2: 0.615775	
[120]	training's rmse: 0.734193	training's l2: 0.539039	valid_1's rmse:
	0.784566	valid_1's l2: 0.615544	
[121]	training's rmse: 0.733941	training's l2: 0.538669	valid_1's rmse:
	0.784555	valid_1's l2: 0.615527	
[122]	training's rmse: 0.733598	training's l2: 0.538166	valid_1's rmse:
	0.784287	valid_1's l2: 0.615107	
[123]	training's rmse: 0.733359	training's l2: 0.537815	valid_1's rmse:
	0.784244	valid_1's l2: 0.615039	
[124]	training's rmse: 0.733118	training's l2: 0.537462	valid_1's rmse:
	0.784183	valid_1's l2: 0.614942	
[125]	training's rmse: 0.732853	training's l2: 0.537074	valid_1's rmse:
	0.784127	valid_1's l2: 0.614855	
[126]	training's rmse: 0.732632	training's l2: 0.53675	valid_1's rmse:
	0.784037	valid_1's l2: 0.614714	
[127]	training's rmse: 0.732193	training's l2: 0.536107	valid_1's rmse:
	0.784181	valid_1's l2: 0.61494	
[128]	training's rmse: 0.731957	training's l2: 0.535761	valid_1's rmse:
	0.78414	valid_1's l2: 0.614875	
[129]	training's rmse: 0.731715	training's l2: 0.535407	valid_1's rmse:
	0.784143	valid_1's l2: 0.614881	
[130]	training's rmse: 0.731482	training's l2: 0.535066	valid_1's rmse:
	0.784049	valid_1's l2: 0.614734	
[131]	training's rmse: 0.731184	training's l2: 0.53463	valid_1's rmse:
	0.783919	valid_1's l2: 0.614529	
[132]	training's rmse: 0.730956	training's l2: 0.534297	valid_1's rmse:
	0.783862	valid_1's l2: 0.61444	
[133]	training's rmse: 0.730739	training's l2: 0.533979	valid_1's rmse:
	0.783918	valid_1's l2: 0.614528	
[134]	training's rmse: 0.730479	training's l2: 0.5336	valid_1's rmse:
	0.783843	valid_1's l2: 0.61441	
[135]	training's rmse: 0.730269	training's l2: 0.533293	valid_1's rmse:
	0.783881	valid_1's l2: 0.61447	
[136]	training's rmse: 0.729974	training's l2: 0.532862	valid_1's rmse:
	0.783771	valid_1's l2: 0.614297	
[137]	training's rmse: 0.729712	training's l2: 0.532479	valid_1's rmse:
	0.783565	valid_1's l2: 0.613974	
[138]	training's rmse: 0.729484	training's l2: 0.532147	valid_1's rmse:
	0.783497	valid_1's l2: 0.613868	
[139]	training's rmse: 0.729266	training's l2: 0.531829	valid_1's rmse:
	0.783448	valid_1's l2: 0.613792	
[140]	training's rmse: 0.728969	training's l2: 0.531396	valid_1's rmse:
	0.783214	valid_1's l2: 0.613424	



[141]	training's rmse: 0.728709	training's l2: 0.531017	valid_1's rmse:
	0.783049	valid_1's l2: 0.613166	
[142]	training's rmse: 0.728416	training's l2: 0.53059	valid_1's rmse:
	0.782955	valid_1's l2: 0.613019	
[143]	training's rmse: 0.728147	training's l2: 0.530199	valid_1's rmse:
	0.782895	valid_1's l2: 0.612925	
[144]	training's rmse: 0.727935	training's l2: 0.529889	valid_1's rmse:
	0.782862	valid_1's l2: 0.612873	
[145]	training's rmse: 0.727595	training's l2: 0.529394	valid_1's rmse:
	0.782725	valid_1's l2: 0.612659	
[146]	training's rmse: 0.72734	training's l2: 0.529023	valid_1's rmse:
	0.782679	valid_1's l2: 0.612587	
[147]	training's rmse: 0.727098	training's l2: 0.528671	valid_1's rmse:
	0.782619	valid_1's l2: 0.612493	
[148]	training's rmse: 0.726891	training's l2: 0.52837	valid_1's rmse:
	0.782498	valid_1's l2: 0.612302	
[149]	training's rmse: 0.726655	training's l2: 0.528027	valid_1's rmse:
	0.782419	valid_1's l2: 0.61218	
[150]	training's rmse: 0.72644	training's l2: 0.527715	valid_1's rmse:
	0.782357	valid_1's l2: 0.612083	
[151]	training's rmse: 0.726237	training's l2: 0.527419	valid_1's rmse:
	0.782273	valid_1's l2: 0.611951	
[152]	training's rmse: 0.726038	training's l2: 0.527131	valid_1's rmse:
	0.782229	valid_1's l2: 0.611882	
[153]	training's rmse: 0.725859	training's l2: 0.526872	valid_1's rmse:
	0.782289	valid_1's l2: 0.611976	
[154]	training's rmse: 0.725628	training's l2: 0.526536	valid_1's rmse:
	0.782277	valid_1's l2: 0.611958	
[155]	training's rmse: 0.725423	training's l2: 0.526238	valid_1's rmse:
	0.782215	valid_1's l2: 0.61186	
[156]	training's rmse: 0.72523	training's l2: 0.525959	valid_1's rmse:
	0.782089	valid_1's l2: 0.611663	
[157]	training's rmse: 0.725053	training's l2: 0.525702	valid_1's rmse:
	0.782051	valid_1's l2: 0.611604	
[158]	training's rmse: 0.724794	training's l2: 0.525327	valid_1's rmse:
	0.782028	valid_1's l2: 0.611567	
[159]	training's rmse: 0.724583	training's l2: 0.52502	valid_1's rmse:
	0.781878	valid_1's l2: 0.611333	
[160]	training's rmse: 0.724353	training's l2: 0.524688	valid_1's rmse:
	0.781912	valid_1's l2: 0.611386	
[161]	training's rmse: 0.724149	training's l2: 0.524392	valid_1's rmse:
	0.781807	valid_1's l2: 0.611222	
[162]	training's rmse: 0.723938	training's l2: 0.524086	valid_1's rmse:
	0.781772	valid_1's l2: 0.611167	
[163]	training's rmse: 0.723743	training's l2: 0.523804	valid_1's rmse:
	0.781564	valid_1's l2: 0.610842	
[164]	training's rmse: 0.723301	training's l2: 0.523164	valid_1's rmse:
	0.781783	valid_1's l2: 0.611185	

[165]	training's rmse: 0.723122	training's l2: 0.522906	valid_1's rmse:
	0.781679	valid_1's l2: 0.611023	
[166]	training's rmse: 0.722873	training's l2: 0.522546	valid_1's rmse:
	0.781666	valid_1's l2: 0.611001	
[167]	training's rmse: 0.72263	training's l2: 0.522195	valid_1's rmse:
	0.781568	valid_1's l2: 0.610848	
[168]	training's rmse: 0.722471	training's l2: 0.521964	valid_1's rmse:
	0.78156	valid_1's l2: 0.610836	
[169]	training's rmse: 0.722238	training's l2: 0.521628	valid_1's rmse:
	0.781543	valid_1's l2: 0.61081	
[170]	training's rmse: 0.722025	training's l2: 0.52132	valid_1's rmse:
	0.781444	valid_1's l2: 0.610655	
[171]	training's rmse: 0.721845	training's l2: 0.521061	valid_1's rmse:
	0.781373	valid_1's l2: 0.610544	
[172]	training's rmse: 0.72156	training's l2: 0.520649	valid_1's rmse:
	0.781178	valid_1's l2: 0.61024	
[173]	training's rmse: 0.721345	training's l2: 0.520339	valid_1's rmse:
	0.781021	valid_1's l2: 0.609993	
[174]	training's rmse: 0.72108	training's l2: 0.519957	valid_1's rmse:
	0.780959	valid_1's l2: 0.609896	
[175]	training's rmse: 0.720926	training's l2: 0.519734	valid_1's rmse:
	0.780923	valid_1's l2: 0.609841	
[176]	training's rmse: 0.720714	training's l2: 0.519429	valid_1's rmse:
	0.780832	valid_1's l2: 0.609699	
[177]	training's rmse: 0.720533	training's l2: 0.519167	valid_1's rmse:
	0.780776	valid_1's l2: 0.609612	
[178]	training's rmse: 0.720165	training's l2: 0.518638	valid_1's rmse:
	0.780782	valid_1's l2: 0.60962	
[179]	training's rmse: 0.72	training's l2: 0.518399	valid_1's rmse: 0.780758
		valid_1's l2: 0.609583	
[180]	training's rmse: 0.719735	training's l2: 0.518019	valid_1's rmse:
	0.780712	valid_1's l2: 0.609511	
[181]	training's rmse: 0.719544	training's l2: 0.517743	valid_1's rmse:
	0.780695	valid_1's l2: 0.609485	
[182]	training's rmse: 0.719355	training's l2: 0.517471	valid_1's rmse:
	0.780739	valid_1's l2: 0.609553	
[183]	training's rmse: 0.719182	training's l2: 0.517222	valid_1's rmse:
	0.780684	valid_1's l2: 0.609467	
[184]	training's rmse: 0.71902	training's l2: 0.516989	valid_1's rmse:
	0.780499	valid_1's l2: 0.609179	
[185]	training's rmse: 0.718862	training's l2: 0.516763	valid_1's rmse:
	0.780449	valid_1's l2: 0.609101	
[186]	training's rmse: 0.718669	training's l2: 0.516485	valid_1's rmse:
	0.780477	valid_1's l2: 0.609145	
[187]	training's rmse: 0.718535	training's l2: 0.516292	valid_1's rmse:
	0.780461	valid_1's l2: 0.60912	
[188]	training's rmse: 0.718319	training's l2: 0.515982	valid_1's rmse:
	0.780443	valid_1's l2: 0.609091	

```

[189] training's rmse: 0.718147 training's l2: 0.515735 valid_1's rmse:
0.780499 valid_1's l2: 0.609179
[190] training's rmse: 0.717945 training's l2: 0.515445 valid_1's rmse:
0.780535 valid_1's l2: 0.609234
[191] training's rmse: 0.717766 training's l2: 0.515188 valid_1's rmse:
0.780543 valid_1's l2: 0.609247
[192] training's rmse: 0.717563 training's l2: 0.514897 valid_1's rmse:
0.780407 valid_1's l2: 0.609035
[193] training's rmse: 0.717406 training's l2: 0.514671 valid_1's rmse:
0.780332 valid_1's l2: 0.608918
[194] training's rmse: 0.71725 training's l2: 0.514448 valid_1's rmse:
0.780263 valid_1's l2: 0.608811
[195] training's rmse: 0.717102 training's l2: 0.514235 valid_1's rmse:
0.780205 valid_1's l2: 0.608721
[196] training's rmse: 0.716948 training's l2: 0.514014 valid_1's rmse:
0.780127 valid_1's l2: 0.608598
[197] training's rmse: 0.716794 training's l2: 0.513794 valid_1's rmse:
0.78004 valid_1's l2: 0.608462
[198] training's rmse: 0.716629 training's l2: 0.513557 valid_1's rmse:
0.780132 valid_1's l2: 0.608606
[199] training's rmse: 0.716482 training's l2: 0.513347 valid_1's rmse:
0.780146 valid_1's l2: 0.608628
[200] training's rmse: 0.716345 training's l2: 0.513151 valid_1's rmse:
0.780156 valid_1's l2: 0.608643
[201] training's rmse: 0.716205 training's l2: 0.51295 valid_1's rmse:
0.780088 valid_1's l2: 0.608537
[202] training's rmse: 0.716048 training's l2: 0.512724 valid_1's rmse:
0.7801 valid_1's l2: 0.608556
[203] training's rmse: 0.715572 training's l2: 0.512043 valid_1's rmse:
0.780674 valid_1's l2: 0.609453
[204] training's rmse: 0.715408 training's l2: 0.511808 valid_1's rmse:
0.780661 valid_1's l2: 0.609432
[205] training's rmse: 0.715226 training's l2: 0.511548 valid_1's rmse:
0.78061 valid_1's l2: 0.609352
[206] training's rmse: 0.715059 training's l2: 0.511309 valid_1's rmse:
0.780518 valid_1's l2: 0.609209
[207] training's rmse: 0.714905 training's l2: 0.511089 valid_1's rmse:
0.780506 valid_1's l2: 0.60919
Early stopping, best iteration is:
[197] training's rmse: 0.716794 training's l2: 0.513794 valid_1's rmse:
0.78004 valid_1's l2: 0.608462

```

```

[21]: LGBMRegressor(bagging_fraction=0.2, boosting_type='gbdt', class_weight=None,
                    colsample_bytree=1.0, feature_fraction=0.8,
                    importance_type='split', learning_rate=0.05, max_depth=-1,
                    min_child_samples=20, min_child_weight=0.001,
                    min_data_in_leaf=300, min_split_gain=0.0, n_estimators=1000,

```

```
n_jobs=-1, num_leaves=128, objective=None, random_state=None,
reg_alpha=0.0, reg_lambda=0.0, seed=42, silent=True,
subsample=1.0, subsample_for_bin=200000, subsample_freq=0)
```

```
[25]: lgb_params['n_estimators'] = 1000
```

```
[26]: #try with categorical features named
```

```
cat_features = ['cat_subtype_id', 'cat_type_id', 'city_id', 'item_category_id',
               'item_id', 'item_subtype_id', 'item_type_id', 'shop_id', 'shop_type_id']

lgb_model = lgb.LGBMRegressor(**lgb_params)
lgb_model.fit(
    X_train,
    Y_train,
    categorical_feature=cat_features,
    eval_metric="rmse",
    eval_set=[(X_train, Y_train), (X_valid, Y_valid)],
    verbose=True,
    early_stopping_rounds = 10)
```

```
[1]      training's rmse: 1.17933      training's l2: 1.39083  valid_1's rmse:
1.06395 valid_1's l2: 1.13199
Training until validation scores don't improve for 10 rounds
[2]      training's rmse: 1.15218      training's l2: 1.32753  valid_1's rmse:
1.04644 valid_1's l2: 1.09503
[3]      training's rmse: 1.12708      training's l2: 1.2703   valid_1's rmse:
1.03007 valid_1's l2: 1.06104
[4]      training's rmse: 1.1038 training's l2: 1.21837  valid_1's rmse: 1.01491
valid_1's l2: 1.03004
[5]      training's rmse: 1.084  training's l2: 1.17506  valid_1's rmse: 1.00078
valid_1's l2: 1.00156
[6]      training's rmse: 1.06404      training's l2: 1.13218  valid_1's rmse:
0.988011      valid_1's l2: 0.976166
[7]      training's rmse: 1.04711      training's l2: 1.09644  valid_1's rmse:
0.975566      valid_1's l2: 0.951729
[8]      training's rmse: 1.02999      training's l2: 1.06088  valid_1's rmse:
0.964773      valid_1's l2: 0.930787
[9]      training's rmse: 1.01417      training's l2: 1.02854  valid_1's rmse:
0.954959      valid_1's l2: 0.911946
[10]     training's rmse: 1.00098      training's l2: 1.00196  valid_1's rmse:
0.945593      valid_1's l2: 0.894146
[11]     training's rmse: 0.987479      training's l2: 0.975116 valid_1's rmse:
0.936917      valid_1's l2: 0.877813
[12]     training's rmse: 0.975016      training's l2: 0.950656 valid_1's rmse:
0.929094      valid_1's l2: 0.863216
[13]     training's rmse: 0.963534      training's l2: 0.928399 valid_1's rmse:
```

0.921702	valid_1's l2: 0.849535	
[14] training's rmse: 0.953068		training's l2: 0.908338 valid_1's rmse:
0.915054	valid_1's l2: 0.837325	
[15] training's rmse: 0.943494		training's l2: 0.89018 valid_1's rmse:
0.908853	valid_1's l2: 0.826013	
[16] training's rmse: 0.934413		training's l2: 0.873127 valid_1's rmse:
0.902851	valid_1's l2: 0.815139	
[17] training's rmse: 0.926314		training's l2: 0.858059 valid_1's rmse:
0.897671	valid_1's l2: 0.805813	
[18] training's rmse: 0.919654		training's l2: 0.845763 valid_1's rmse:
0.892923	valid_1's l2: 0.797312	
[19] training's rmse: 0.912556		training's l2: 0.832759 valid_1's rmse:
0.888227	valid_1's l2: 0.788947	
[20] training's rmse: 0.906049		training's l2: 0.820924 valid_1's rmse:
0.883922	valid_1's l2: 0.781319	
[21] training's rmse: 0.899944		training's l2: 0.809898 valid_1's rmse:
0.879994	valid_1's l2: 0.77439	
[22] training's rmse: 0.894415		training's l2: 0.799978 valid_1's rmse:
0.876315	valid_1's l2: 0.767928	
[23] training's rmse: 0.889283		training's l2: 0.790824 valid_1's rmse:
0.873046	valid_1's l2: 0.762209	
[24] training's rmse: 0.884607		training's l2: 0.782529 valid_1's rmse:
0.870058	valid_1's l2: 0.757002	
[25] training's rmse: 0.880324		training's l2: 0.77497 valid_1's rmse:
0.867077	valid_1's l2: 0.751822	
[26] training's rmse: 0.876351		training's l2: 0.767992 valid_1's rmse:
0.864226	valid_1's l2: 0.746886	
[27] training's rmse: 0.87274		training's l2: 0.761676 valid_1's rmse:
0.861768	valid_1's l2: 0.742643	
[28] training's rmse: 0.869317		training's l2: 0.755712 valid_1's rmse:
0.85937	valid_1's l2: 0.738516	
[29] training's rmse: 0.866128		training's l2: 0.750177 valid_1's rmse:
0.857516	valid_1's l2: 0.735333	
[30] training's rmse: 0.863577		training's l2: 0.745766 valid_1's rmse:
0.85588	valid_1's l2: 0.732531	
[31] training's rmse: 0.860861		training's l2: 0.741082 valid_1's rmse:
0.853961	valid_1's l2: 0.72925	
[32] training's rmse: 0.858308		training's l2: 0.736693 valid_1's rmse:
0.852319	valid_1's l2: 0.726448	
[33] training's rmse: 0.855942		training's l2: 0.732636 valid_1's rmse:
0.850816	valid_1's l2: 0.723888	
[34] training's rmse: 0.853716		training's l2: 0.72883 valid_1's rmse:
0.848985	valid_1's l2: 0.720776	
[35] training's rmse: 0.851436		training's l2: 0.724943 valid_1's rmse:
0.847746	valid_1's l2: 0.718674	
[36] training's rmse: 0.849759		training's l2: 0.72209 valid_1's rmse:
0.846702	valid_1's l2: 0.716905	
[37] training's rmse: 0.84781		training's l2: 0.718781 valid_1's rmse:

0.84561	valid_1's l2: 0.715056	
[38]	training's rmse: 0.846055	training's l2: 0.715809 valid_1's rmse:
0.844413	valid_1's l2: 0.713033	
[39]	training's rmse: 0.84441	training's l2: 0.713028 valid_1's rmse:
0.84331	valid_1's l2: 0.711172	
[40]	training's rmse: 0.842756	training's l2: 0.710238 valid_1's rmse:
0.842237	valid_1's l2: 0.709364	
[41]	training's rmse: 0.841236	training's l2: 0.707679 valid_1's rmse:
0.841179	valid_1's l2: 0.707582	
[42]	training's rmse: 0.839914	training's l2: 0.705456 valid_1's rmse:
0.840136	valid_1's l2: 0.705829	
[43]	training's rmse: 0.838577	training's l2: 0.703211 valid_1's rmse:
0.839161	valid_1's l2: 0.704191	
[44]	training's rmse: 0.837371	training's l2: 0.70119 valid_1's rmse:
0.838364	valid_1's l2: 0.702854	
[45]	training's rmse: 0.836247	training's l2: 0.699309 valid_1's rmse:
0.837447	valid_1's l2: 0.701317	
[46]	training's rmse: 0.835066	training's l2: 0.697335 valid_1's rmse:
0.836589	valid_1's l2: 0.699881	
[47]	training's rmse: 0.833909	training's l2: 0.695404 valid_1's rmse:
0.835975	valid_1's l2: 0.698855	
[48]	training's rmse: 0.832847	training's l2: 0.693634 valid_1's rmse:
0.835218	valid_1's l2: 0.697588	
[49]	training's rmse: 0.832108	training's l2: 0.692403 valid_1's rmse:
0.834683	valid_1's l2: 0.696695	
[50]	training's rmse: 0.831142	training's l2: 0.690797 valid_1's rmse:
0.834128	valid_1's l2: 0.69577	
[51]	training's rmse: 0.83044	training's l2: 0.689631 valid_1's rmse:
0.833811	valid_1's l2: 0.695241	
[52]	training's rmse: 0.829777	training's l2: 0.68853 valid_1's rmse:
0.83334	valid_1's l2: 0.694456	
[53]	training's rmse: 0.829045	training's l2: 0.687315 valid_1's rmse:
0.832967	valid_1's l2: 0.693834	
[54]	training's rmse: 0.828195	training's l2: 0.685907 valid_1's rmse:
0.832355	valid_1's l2: 0.692815	
[55]	training's rmse: 0.82762	training's l2: 0.684954 valid_1's rmse:
0.832114	valid_1's l2: 0.692414	
[56]	training's rmse: 0.826842	training's l2: 0.683667 valid_1's rmse:
0.831581	valid_1's l2: 0.691526	
[57]	training's rmse: 0.826134	training's l2: 0.682497 valid_1's rmse:
0.831098	valid_1's l2: 0.690725	
[58]	training's rmse: 0.825436	training's l2: 0.681345 valid_1's rmse:
0.830702	valid_1's l2: 0.690065	
[59]	training's rmse: 0.824695	training's l2: 0.680122 valid_1's rmse:
0.830249	valid_1's l2: 0.689314	
[60]	training's rmse: 0.823984	training's l2: 0.67895 valid_1's rmse:
0.829775	valid_1's l2: 0.688526	
[61]	training's rmse: 0.823376	training's l2: 0.677948 valid_1's rmse:

0.829429	valid_1's l2: 0.687953	
[62]	training's rmse: 0.822729	training's l2: 0.676884 valid_1's rmse:
0.829208	valid_1's l2: 0.687586	
[63]	training's rmse: 0.822139	training's l2: 0.675912 valid_1's rmse:
0.828976	valid_1's l2: 0.687201	
[64]	training's rmse: 0.821689	training's l2: 0.675172 valid_1's rmse:
0.828837	valid_1's l2: 0.68697	
[65]	training's rmse: 0.821104	training's l2: 0.674212 valid_1's rmse:
0.828541	valid_1's l2: 0.68648	
[66]	training's rmse: 0.820577	training's l2: 0.673347 valid_1's rmse:
0.828407	valid_1's l2: 0.686258	
[67]	training's rmse: 0.820079	training's l2: 0.672529 valid_1's rmse:
0.828073	valid_1's l2: 0.685705	
[68]	training's rmse: 0.819553	training's l2: 0.671667 valid_1's rmse:
0.827808	valid_1's l2: 0.685266	
[69]	training's rmse: 0.819059	training's l2: 0.670857 valid_1's rmse:
0.827362	valid_1's l2: 0.684528	
[70]	training's rmse: 0.818554	training's l2: 0.670031 valid_1's rmse:
0.826853	valid_1's l2: 0.683685	
[71]	training's rmse: 0.81813	training's l2: 0.669336 valid_1's rmse:
0.826647	valid_1's l2: 0.683346	
[72]	training's rmse: 0.817592	training's l2: 0.668456 valid_1's rmse:
0.826409	valid_1's l2: 0.682952	
[73]	training's rmse: 0.817108	training's l2: 0.667665 valid_1's rmse:
0.825925	valid_1's l2: 0.682151	
[74]	training's rmse: 0.816669	training's l2: 0.666948 valid_1's rmse:
0.825469	valid_1's l2: 0.6814	
[75]	training's rmse: 0.816198	training's l2: 0.666179 valid_1's rmse:
0.825231	valid_1's l2: 0.681007	
[76]	training's rmse: 0.815773	training's l2: 0.665485 valid_1's rmse:
0.824999	valid_1's l2: 0.680624	
[77]	training's rmse: 0.815372	training's l2: 0.664832 valid_1's rmse:
0.824659	valid_1's l2: 0.680062	
[78]	training's rmse: 0.815018	training's l2: 0.664254 valid_1's rmse:
0.824525	valid_1's l2: 0.679841	
[79]	training's rmse: 0.814624	training's l2: 0.663613 valid_1's rmse:
0.82428	valid_1's l2: 0.679438	
[80]	training's rmse: 0.814251	training's l2: 0.663005 valid_1's rmse:
0.82418	valid_1's l2: 0.679273	
[81]	training's rmse: 0.813867	training's l2: 0.66238 valid_1's rmse:
0.82393	valid_1's l2: 0.678861	
[82]	training's rmse: 0.813504	training's l2: 0.661789 valid_1's rmse:
0.823723	valid_1's l2: 0.67852	
[83]	training's rmse: 0.813139	training's l2: 0.661195 valid_1's rmse:
0.823484	valid_1's l2: 0.678125	
[84]	training's rmse: 0.812802	training's l2: 0.660648 valid_1's rmse:
0.823452	valid_1's l2: 0.678073	
[85]	training's rmse: 0.812457	training's l2: 0.660087 valid_1's rmse:

0.82334	valid_1's l2: 0.677889	
[86]	training's rmse: 0.81209	training's l2: 0.65949 valid_1's rmse:
0.822969	valid_1's l2: 0.677278	
[87]	training's rmse: 0.811798	training's l2: 0.659016 valid_1's rmse:
0.82287	valid_1's l2: 0.677116	
[88]	training's rmse: 0.811438	training's l2: 0.658432 valid_1's rmse:
0.822552	valid_1's l2: 0.676592	
[89]	training's rmse: 0.811109	training's l2: 0.657898 valid_1's rmse:
0.822564	valid_1's l2: 0.676612	
[90]	training's rmse: 0.81074	training's l2: 0.6573 valid_1's rmse:
0.822137	valid_1's l2: 0.675909	
[91]	training's rmse: 0.810436	training's l2: 0.656807 valid_1's rmse:
0.821953	valid_1's l2: 0.675607	
[92]	training's rmse: 0.810097	training's l2: 0.656256 valid_1's rmse:
0.821853	valid_1's l2: 0.675442	
[93]	training's rmse: 0.809855	training's l2: 0.655865 valid_1's rmse:
0.821772	valid_1's l2: 0.675309	
[94]	training's rmse: 0.809574	training's l2: 0.655409 valid_1's rmse:
0.82166	valid_1's l2: 0.675125	
[95]	training's rmse: 0.809308	training's l2: 0.65498 valid_1's rmse:
0.821586	valid_1's l2: 0.675003	
[96]	training's rmse: 0.809011	training's l2: 0.654499 valid_1's rmse:
0.821354	valid_1's l2: 0.674622	
[97]	training's rmse: 0.808738	training's l2: 0.654058 valid_1's rmse:
0.821171	valid_1's l2: 0.674321	
[98]	training's rmse: 0.808445	training's l2: 0.653583 valid_1's rmse:
0.821088	valid_1's l2: 0.674186	
[99]	training's rmse: 0.80813	training's l2: 0.653074 valid_1's rmse:
0.821075	valid_1's l2: 0.674163	
[100]	training's rmse: 0.807866	training's l2: 0.652647 valid_1's rmse:
0.820991	valid_1's l2: 0.674026	
[101]	training's rmse: 0.807581	training's l2: 0.652187 valid_1's rmse:
0.820995	valid_1's l2: 0.674033	
[102]	training's rmse: 0.807318	training's l2: 0.651762 valid_1's rmse:
0.820956	valid_1's l2: 0.673969	
[103]	training's rmse: 0.807031	training's l2: 0.651299 valid_1's rmse:
0.820971	valid_1's l2: 0.673993	
[104]	training's rmse: 0.806736	training's l2: 0.650823 valid_1's rmse:
0.82089	valid_1's l2: 0.673861	
[105]	training's rmse: 0.806487	training's l2: 0.650421 valid_1's rmse:
0.820777	valid_1's l2: 0.673675	
[106]	training's rmse: 0.806226	training's l2: 0.650001 valid_1's rmse:
0.820547	valid_1's l2: 0.673297	
[107]	training's rmse: 0.805976	training's l2: 0.649597 valid_1's rmse:
0.820637	valid_1's l2: 0.673445	
[108]	training's rmse: 0.805745	training's l2: 0.649226 valid_1's rmse:
0.820565	valid_1's l2: 0.673327	
[109]	training's rmse: 0.805489	training's l2: 0.648812 valid_1's rmse:



0.820453	valid_1's l2: 0.673144	
[110]	training's rmse: 0.805268	training's l2: 0.648457 valid_1's rmse:
0.820419	valid_1's l2: 0.673087	
[111]	training's rmse: 0.805052	training's l2: 0.648109 valid_1's rmse:
0.820273	valid_1's l2: 0.672847	
[112]	training's rmse: 0.804783	training's l2: 0.647676 valid_1's rmse:
0.820212	valid_1's l2: 0.672748	
[113]	training's rmse: 0.804551	training's l2: 0.647302 valid_1's rmse:
0.820068	valid_1's l2: 0.672512	
[114]	training's rmse: 0.804321	training's l2: 0.646932 valid_1's rmse:
0.819963	valid_1's l2: 0.672339	
[115]	training's rmse: 0.804073	training's l2: 0.646533 valid_1's rmse:
0.819962	valid_1's l2: 0.672338	
[116]	training's rmse: 0.803842	training's l2: 0.646162 valid_1's rmse:
0.819986	valid_1's l2: 0.672378	
[117]	training's rmse: 0.803597	training's l2: 0.645768 valid_1's rmse:
0.820003	valid_1's l2: 0.672404	
[118]	training's rmse: 0.803378	training's l2: 0.645416 valid_1's rmse:
0.820028	valid_1's l2: 0.672446	
[119]	training's rmse: 0.803133	training's l2: 0.645023 valid_1's rmse:
0.81979	valid_1's l2: 0.672056	
[120]	training's rmse: 0.802921	training's l2: 0.644682 valid_1's rmse:
0.819702	valid_1's l2: 0.671912	
[121]	training's rmse: 0.802687	training's l2: 0.644307 valid_1's rmse:
0.819645	valid_1's l2: 0.671818	
[122]	training's rmse: 0.802414	training's l2: 0.643867 valid_1's rmse:
0.819437	valid_1's l2: 0.671476	
[123]	training's rmse: 0.80217	training's l2: 0.643476 valid_1's rmse:
0.819345	valid_1's l2: 0.671327	
[124]	training's rmse: 0.801952	training's l2: 0.643127 valid_1's rmse:
0.819261	valid_1's l2: 0.671189	
[125]	training's rmse: 0.801762	training's l2: 0.642822 valid_1's rmse:
0.819008	valid_1's l2: 0.670773	
[126]	training's rmse: 0.801552	training's l2: 0.642485 valid_1's rmse:
0.818981	valid_1's l2: 0.67073	
[127]	training's rmse: 0.801367	training's l2: 0.642189 valid_1's rmse:
0.818921	valid_1's l2: 0.670632	
[128]	training's rmse: 0.801134	training's l2: 0.641816 valid_1's rmse:
0.818895	valid_1's l2: 0.670589	
[129]	training's rmse: 0.800921	training's l2: 0.641474 valid_1's rmse:
0.818794	valid_1's l2: 0.670424	
[130]	training's rmse: 0.800709	training's l2: 0.641135 valid_1's rmse:
0.818791	valid_1's l2: 0.670419	
[131]	training's rmse: 0.800515	training's l2: 0.640824 valid_1's rmse:
0.81876	valid_1's l2: 0.670368	
[132]	training's rmse: 0.800301	training's l2: 0.640482 valid_1's rmse:
0.818702	valid_1's l2: 0.670274	
[133]	training's rmse: 0.800115	training's l2: 0.640183 valid_1's rmse:

0.818587	valid_1's l2: 0.670084	
[134]	training's rmse: 0.799884	training's l2: 0.639814 valid_1's rmse:
0.818675	valid_1's l2: 0.670229	
[135]	training's rmse: 0.799669	training's l2: 0.639471 valid_1's rmse:
0.818581	valid_1's l2: 0.670074	
[136]	training's rmse: 0.799481	training's l2: 0.639169 valid_1's rmse:
0.818521	valid_1's l2: 0.669977	
[137]	training's rmse: 0.79929	training's l2: 0.638864 valid_1's rmse:
0.818485	valid_1's l2: 0.669918	
[138]	training's rmse: 0.799104	training's l2: 0.638568 valid_1's rmse:
0.818368	valid_1's l2: 0.669727	
[139]	training's rmse: 0.798884	training's l2: 0.638215 valid_1's rmse:
0.818427	valid_1's l2: 0.669823	
[140]	training's rmse: 0.79873	training's l2: 0.63797 valid_1's rmse:
0.818378	valid_1's l2: 0.669743	
[141]	training's rmse: 0.798545	training's l2: 0.637674 valid_1's rmse:
0.818363	valid_1's l2: 0.669718	
[142]	training's rmse: 0.798349	training's l2: 0.637361 valid_1's rmse:
0.818376	valid_1's l2: 0.66974	
[143]	training's rmse: 0.798143	training's l2: 0.637032 valid_1's rmse:
0.818381	valid_1's l2: 0.669748	
[144]	training's rmse: 0.797961	training's l2: 0.636742 valid_1's rmse:
0.818362	valid_1's l2: 0.669716	
[145]	training's rmse: 0.797791	training's l2: 0.636471 valid_1's rmse:
0.818275	valid_1's l2: 0.669573	
[146]	training's rmse: 0.797597	training's l2: 0.636161 valid_1's rmse:
0.818215	valid_1's l2: 0.669475	
[147]	training's rmse: 0.797427	training's l2: 0.635889 valid_1's rmse:
0.818195	valid_1's l2: 0.669443	
[148]	training's rmse: 0.797258	training's l2: 0.63562 valid_1's rmse:
0.818102	valid_1's l2: 0.669291	
[149]	training's rmse: 0.79711	training's l2: 0.635384 valid_1's rmse:
0.818039	valid_1's l2: 0.669188	
[150]	training's rmse: 0.796899	training's l2: 0.635048 valid_1's rmse:
0.817851	valid_1's l2: 0.66888	
[151]	training's rmse: 0.796741	training's l2: 0.634796 valid_1's rmse:
0.817814	valid_1's l2: 0.668819	
[152]	training's rmse: 0.796589	training's l2: 0.634554 valid_1's rmse:
0.817699	valid_1's l2: 0.668631	
[153]	training's rmse: 0.796421	training's l2: 0.634286 valid_1's rmse:
0.817641	valid_1's l2: 0.668537	
[154]	training's rmse: 0.796249	training's l2: 0.634012 valid_1's rmse:
0.817613	valid_1's l2: 0.668492	
[155]	training's rmse: 0.796093	training's l2: 0.633764 valid_1's rmse:
0.817661	valid_1's l2: 0.66857	
[156]	training's rmse: 0.795932	training's l2: 0.633508 valid_1's rmse:
0.817558	valid_1's l2: 0.668402	
[157]	training's rmse: 0.795774	training's l2: 0.633257 valid_1's rmse:

0.817508	valid_1's l2: 0.668319	
[158]	training's rmse: 0.795589	training's l2: 0.632963 valid_1's rmse:
0.817445	valid_1's l2: 0.668217	
[159]	training's rmse: 0.795414	training's l2: 0.632683 valid_1's rmse:
0.817392	valid_1's l2: 0.66813	
[160]	training's rmse: 0.795253	training's l2: 0.632428 valid_1's rmse:
0.817353	valid_1's l2: 0.668066	
[161]	training's rmse: 0.795087	training's l2: 0.632163 valid_1's rmse:
0.817307	valid_1's l2: 0.667991	
[162]	training's rmse: 0.794938	training's l2: 0.631927 valid_1's rmse:
0.817293	valid_1's l2: 0.667968	
[163]	training's rmse: 0.794775	training's l2: 0.631667 valid_1's rmse:
0.817156	valid_1's l2: 0.667745	
[164]	training's rmse: 0.794581	training's l2: 0.631359 valid_1's rmse:
0.817119	valid_1's l2: 0.667684	
[165]	training's rmse: 0.794442	training's l2: 0.631138 valid_1's rmse:
0.817163	valid_1's l2: 0.667755	
[166]	training's rmse: 0.794286	training's l2: 0.63089 valid_1's rmse:
0.817044	valid_1's l2: 0.667561	
[167]	training's rmse: 0.794135	training's l2: 0.630651 valid_1's rmse:
0.817093	valid_1's l2: 0.667641	
[168]	training's rmse: 0.79398	training's l2: 0.630404 valid_1's rmse:
0.817084	valid_1's l2: 0.667626	
[169]	training's rmse: 0.793788	training's l2: 0.6301 valid_1's rmse:
0.817105	valid_1's l2: 0.667661	
[170]	training's rmse: 0.793617	training's l2: 0.629828 valid_1's rmse:
0.817084	valid_1's l2: 0.667626	
[171]	training's rmse: 0.793479	training's l2: 0.629609 valid_1's rmse:
0.817056	valid_1's l2: 0.667581	
[172]	training's rmse: 0.793325	training's l2: 0.629364 valid_1's rmse:
0.816816	valid_1's l2: 0.667188	
[173]	training's rmse: 0.793185	training's l2: 0.629143 valid_1's rmse:
0.816826	valid_1's l2: 0.667205	
[174]	training's rmse: 0.793053	training's l2: 0.628934 valid_1's rmse:
0.816916	valid_1's l2: 0.667352	
[175]	training's rmse: 0.792888	training's l2: 0.628671 valid_1's rmse:
0.816775	valid_1's l2: 0.667122	
[176]	training's rmse: 0.792714	training's l2: 0.628395 valid_1's rmse:
0.816716	valid_1's l2: 0.667025	
[177]	training's rmse: 0.792544	training's l2: 0.628126 valid_1's rmse:
0.816669	valid_1's l2: 0.666948	
[178]	training's rmse: 0.792402	training's l2: 0.627901 valid_1's rmse:
0.816686	valid_1's l2: 0.666976	
[179]	training's rmse: 0.79225	training's l2: 0.62766 valid_1's rmse:
0.816647	valid_1's l2: 0.666912	
[180]	training's rmse: 0.792077	training's l2: 0.627385 valid_1's rmse:
0.816682	valid_1's l2: 0.66697	
[181]	training's rmse: 0.791923	training's l2: 0.627142 valid_1's rmse:

0.816553	valid_1's l2: 0.666759	
[182]	training's rmse: 0.791796	training's l2: 0.626941 valid_1's rmse:
0.816498	valid_1's l2: 0.666669	
[183]	training's rmse: 0.791617	training's l2: 0.626657 valid_1's rmse:
0.816318	valid_1's l2: 0.666375	
[184]	training's rmse: 0.791462	training's l2: 0.626412 valid_1's rmse:
0.816342	valid_1's l2: 0.666414	
[185]	training's rmse: 0.791291	training's l2: 0.626141 valid_1's rmse:
0.816203	valid_1's l2: 0.666187	
[186]	training's rmse: 0.791164	training's l2: 0.62594 valid_1's rmse:
0.816187	valid_1's l2: 0.666162	
[187]	training's rmse: 0.791006	training's l2: 0.625691 valid_1's rmse:
0.816049	valid_1's l2: 0.665936	
[188]	training's rmse: 0.790881	training's l2: 0.625492 valid_1's rmse:
0.815965	valid_1's l2: 0.665799	
[189]	training's rmse: 0.790725	training's l2: 0.625246 valid_1's rmse:
0.815922	valid_1's l2: 0.665729	
[190]	training's rmse: 0.790601	training's l2: 0.625049 valid_1's rmse:
0.815913	valid_1's l2: 0.665714	
[191]	training's rmse: 0.79045	training's l2: 0.624811 valid_1's rmse:
0.815891	valid_1's l2: 0.665678	
[192]	training's rmse: 0.790266	training's l2: 0.62452 valid_1's rmse:
0.815928	valid_1's l2: 0.665738	
[193]	training's rmse: 0.790122	training's l2: 0.624292 valid_1's rmse:
0.81594	valid_1's l2: 0.665758	
[194]	training's rmse: 0.789994	training's l2: 0.62409 valid_1's rmse:
0.815938	valid_1's l2: 0.665755	
[195]	training's rmse: 0.789829	training's l2: 0.623829 valid_1's rmse:
0.815983	valid_1's l2: 0.665828	
[196]	training's rmse: 0.789694	training's l2: 0.623617 valid_1's rmse:
0.815919	valid_1's l2: 0.665723	
[197]	training's rmse: 0.78956	training's l2: 0.623404 valid_1's rmse:
0.815917	valid_1's l2: 0.665721	
[198]	training's rmse: 0.789425	training's l2: 0.623191 valid_1's rmse:
0.815831	valid_1's l2: 0.66558	
[199]	training's rmse: 0.789286	training's l2: 0.622972 valid_1's rmse:
0.815798	valid_1's l2: 0.665526	
[200]	training's rmse: 0.789129	training's l2: 0.622724 valid_1's rmse:
0.815783	valid_1's l2: 0.665502	
[201]	training's rmse: 0.788998	training's l2: 0.622517 valid_1's rmse:
0.815725	valid_1's l2: 0.665408	
[202]	training's rmse: 0.788878	training's l2: 0.622328 valid_1's rmse:
0.815767	valid_1's l2: 0.665477	
[203]	training's rmse: 0.788754	training's l2: 0.622133 valid_1's rmse:
0.815683	valid_1's l2: 0.665338	
[204]	training's rmse: 0.788603	training's l2: 0.621894 valid_1's rmse:
0.81567	valid_1's l2: 0.665318	
[205]	training's rmse: 0.788474	training's l2: 0.621691 valid_1's rmse:

0.815561	valid_1's l2: 0.66514	
[206]	training's rmse: 0.788358	training's l2: 0.621508 valid_1's rmse:
0.815603	valid_1's l2: 0.665209	
[207]	training's rmse: 0.78823	training's l2: 0.621306 valid_1's rmse:
0.815483	valid_1's l2: 0.665012	
[208]	training's rmse: 0.788106	training's l2: 0.62111 valid_1's rmse:
0.815494	valid_1's l2: 0.66503	
[209]	training's rmse: 0.787974	training's l2: 0.620903 valid_1's rmse:
0.815389	valid_1's l2: 0.664859	
[210]	training's rmse: 0.787857	training's l2: 0.620719 valid_1's rmse:
0.815421	valid_1's l2: 0.664911	
[211]	training's rmse: 0.787728	training's l2: 0.620515 valid_1's rmse:
0.815414	valid_1's l2: 0.6649	
[212]	training's rmse: 0.787614	training's l2: 0.620336 valid_1's rmse:
0.815374	valid_1's l2: 0.664835	
[213]	training's rmse: 0.787498	training's l2: 0.620153 valid_1's rmse:
0.815357	valid_1's l2: 0.664807	
[214]	training's rmse: 0.787356	training's l2: 0.619929 valid_1's rmse:
0.815156	valid_1's l2: 0.664479	
[215]	training's rmse: 0.787201	training's l2: 0.619686 valid_1's rmse:
0.81485	valid_1's l2: 0.663981	
[216]	training's rmse: 0.787066	training's l2: 0.619473 valid_1's rmse:
0.814835	valid_1's l2: 0.663956	
[217]	training's rmse: 0.786957	training's l2: 0.619301 valid_1's rmse:
0.814781	valid_1's l2: 0.663868	
[218]	training's rmse: 0.786861	training's l2: 0.61915 valid_1's rmse:
0.814776	valid_1's l2: 0.66386	
[219]	training's rmse: 0.786765	training's l2: 0.618999 valid_1's rmse:
0.81474	valid_1's l2: 0.663801	
[220]	training's rmse: 0.786652	training's l2: 0.618822 valid_1's rmse:
0.814687	valid_1's l2: 0.663715	
[221]	training's rmse: 0.786542	training's l2: 0.618649 valid_1's rmse:
0.814649	valid_1's l2: 0.663653	
[222]	training's rmse: 0.786437	training's l2: 0.618483 valid_1's rmse:
0.814556	valid_1's l2: 0.663501	
[223]	training's rmse: 0.786325	training's l2: 0.618308 valid_1's rmse:
0.814512	valid_1's l2: 0.66343	
[224]	training's rmse: 0.786229	training's l2: 0.618156 valid_1's rmse:
0.81451	valid_1's l2: 0.663427	
[225]	training's rmse: 0.786104	training's l2: 0.61796 valid_1's rmse:
0.814502	valid_1's l2: 0.663413	
[226]	training's rmse: 0.785986	training's l2: 0.617774 valid_1's rmse:
0.814428	valid_1's l2: 0.663292	
[227]	training's rmse: 0.785879	training's l2: 0.617606 valid_1's rmse:
0.814363	valid_1's l2: 0.663187	
[228]	training's rmse: 0.785728	training's l2: 0.617369 valid_1's rmse:
0.814396	valid_1's l2: 0.663241	
[229]	training's rmse: 0.785619	training's l2: 0.617198 valid_1's rmse:

0.814358	valid_1's l2: 0.663178	
[230]	training's rmse: 0.78552	training's l2: 0.617042 valid_1's rmse:
0.814335	valid_1's l2: 0.663142	
[231]	training's rmse: 0.785394	training's l2: 0.616843 valid_1's rmse:
0.814302	valid_1's l2: 0.663088	
[232]	training's rmse: 0.785277	training's l2: 0.616659 valid_1's rmse:
0.814219	valid_1's l2: 0.662952	
[233]	training's rmse: 0.785149	training's l2: 0.61646 valid_1's rmse:
0.814244	valid_1's l2: 0.662993	
[234]	training's rmse: 0.785021	training's l2: 0.616258 valid_1's rmse:
0.814241	valid_1's l2: 0.662988	
[235]	training's rmse: 0.784924	training's l2: 0.616106 valid_1's rmse:
0.814225	valid_1's l2: 0.662963	
[236]	training's rmse: 0.78481	training's l2: 0.615926 valid_1's rmse:
0.81428	valid_1's l2: 0.663052	
[237]	training's rmse: 0.784683	training's l2: 0.615727 valid_1's rmse:
0.814268	valid_1's l2: 0.663033	
[238]	training's rmse: 0.784578	training's l2: 0.615563 valid_1's rmse:
0.814217	valid_1's l2: 0.66295	
[239]	training's rmse: 0.784466	training's l2: 0.615387 valid_1's rmse:
0.814217	valid_1's l2: 0.662949	
[240]	training's rmse: 0.784338	training's l2: 0.615187 valid_1's rmse:
0.814239	valid_1's l2: 0.662986	
[241]	training's rmse: 0.78423	training's l2: 0.615017 valid_1's rmse:
0.814209	valid_1's l2: 0.662937	
[242]	training's rmse: 0.78413	training's l2: 0.61486 valid_1's rmse:
0.814166	valid_1's l2: 0.662866	
[243]	training's rmse: 0.784034	training's l2: 0.614709 valid_1's rmse:
0.814141	valid_1's l2: 0.662826	
[244]	training's rmse: 0.783934	training's l2: 0.614553 valid_1's rmse:
0.814059	valid_1's l2: 0.662692	
[245]	training's rmse: 0.783843	training's l2: 0.61441 valid_1's rmse:
0.814019	valid_1's l2: 0.662627	
[246]	training's rmse: 0.783724	training's l2: 0.614223 valid_1's rmse:
0.81393	valid_1's l2: 0.662482	
[247]	training's rmse: 0.783621	training's l2: 0.614062 valid_1's rmse:
0.813859	valid_1's l2: 0.662367	
[248]	training's rmse: 0.78352	training's l2: 0.613904 valid_1's rmse:
0.81382	valid_1's l2: 0.662303	
[249]	training's rmse: 0.78341	training's l2: 0.613731 valid_1's rmse:
0.813847	valid_1's l2: 0.662347	
[250]	training's rmse: 0.783316	training's l2: 0.613583 valid_1's rmse:
0.813838	valid_1's l2: 0.662332	
[251]	training's rmse: 0.783217	training's l2: 0.613429 valid_1's rmse:
0.813863	valid_1's l2: 0.662373	
[252]	training's rmse: 0.783125	training's l2: 0.613284 valid_1's rmse:
0.813822	valid_1's l2: 0.662305	
[253]	training's rmse: 0.783036	training's l2: 0.613145 valid_1's rmse:

0.8138	valid_1's l2: 0.66227		
[254]	training's rmse: 0.782918	training's l2: 0.61296	valid_1's rmse:
0.813765	valid_1's l2: 0.662213		
[255]	training's rmse: 0.782819	training's l2: 0.612806	valid_1's rmse:
0.813731	valid_1's l2: 0.662158		
[256]	training's rmse: 0.782721	training's l2: 0.612652	valid_1's rmse:
0.813806	valid_1's l2: 0.662281		
[257]	training's rmse: 0.782629	training's l2: 0.612508	valid_1's rmse:
0.813836	valid_1's l2: 0.662329		
[258]	training's rmse: 0.782528	training's l2: 0.612349	valid_1's rmse:
0.813828	valid_1's l2: 0.662316		
[259]	training's rmse: 0.782418	training's l2: 0.612178	valid_1's rmse:
0.813783	valid_1's l2: 0.662243		
[260]	training's rmse: 0.782326	training's l2: 0.612034	valid_1's rmse:
0.813758	valid_1's l2: 0.662202		
[261]	training's rmse: 0.782218	training's l2: 0.611865	valid_1's rmse:
0.813742	valid_1's l2: 0.662177		
[262]	training's rmse: 0.782123	training's l2: 0.611716	valid_1's rmse:
0.813674	valid_1's l2: 0.662065		
[263]	training's rmse: 0.782035	training's l2: 0.611578	valid_1's rmse:
0.813651	valid_1's l2: 0.662028		
[264]	training's rmse: 0.78194	training's l2: 0.61143	valid_1's rmse:
0.813603	valid_1's l2: 0.66195		
[265]	training's rmse: 0.78184	training's l2: 0.611274	valid_1's rmse:
0.813598	valid_1's l2: 0.661942		
[266]	training's rmse: 0.781738	training's l2: 0.611114	valid_1's rmse:
0.813601	valid_1's l2: 0.661947		
[267]	training's rmse: 0.781648	training's l2: 0.610974	valid_1's rmse:
0.813583	valid_1's l2: 0.661917		
[268]	training's rmse: 0.781544	training's l2: 0.610812	valid_1's rmse:
0.813626	valid_1's l2: 0.661988		
[269]	training's rmse: 0.781451	training's l2: 0.610666	valid_1's rmse:
0.813689	valid_1's l2: 0.66209		
[270]	training's rmse: 0.781363	training's l2: 0.610528	valid_1's rmse:
0.813717	valid_1's l2: 0.662136		
[271]	training's rmse: 0.781275	training's l2: 0.610391	valid_1's rmse:
0.813667	valid_1's l2: 0.662055		
[272]	training's rmse: 0.781157	training's l2: 0.610206	valid_1's rmse:
0.813591	valid_1's l2: 0.66193		
[273]	training's rmse: 0.781059	training's l2: 0.610053	valid_1's rmse:
0.813553	valid_1's l2: 0.661868		
[274]	training's rmse: 0.780979	training's l2: 0.609927	valid_1's rmse:
0.813532	valid_1's l2: 0.661834		
[275]	training's rmse: 0.780877	training's l2: 0.609769	valid_1's rmse:
0.813402	valid_1's l2: 0.661623		
[276]	training's rmse: 0.780781	training's l2: 0.609618	valid_1's rmse:
0.813395	valid_1's l2: 0.661612		
[277]	training's rmse: 0.780668	training's l2: 0.609442	valid_1's rmse:

0.813369	valid_1's l2: 0.661569	
[278]	training's rmse: 0.780543	training's l2: 0.609247 valid_1's rmse:
0.813305	valid_1's l2: 0.661466	
[279]	training's rmse: 0.780444	training's l2: 0.609093 valid_1's rmse:
0.813309	valid_1's l2: 0.661471	
[280]	training's rmse: 0.780346	training's l2: 0.60894 valid_1's rmse:
0.813282	valid_1's l2: 0.661428	
[281]	training's rmse: 0.780233	training's l2: 0.608763 valid_1's rmse:
0.813177	valid_1's l2: 0.661257	
[282]	training's rmse: 0.78015	training's l2: 0.608635 valid_1's rmse:
0.813153	valid_1's l2: 0.661218	
[283]	training's rmse: 0.780067	training's l2: 0.608505 valid_1's rmse:
0.81314	valid_1's l2: 0.661197	
[284]	training's rmse: 0.779971	training's l2: 0.608355 valid_1's rmse:
0.813097	valid_1's l2: 0.661127	
[285]	training's rmse: 0.779888	training's l2: 0.608225 valid_1's rmse:
0.813103	valid_1's l2: 0.661137	
[286]	training's rmse: 0.779784	training's l2: 0.608063 valid_1's rmse:
0.813102	valid_1's l2: 0.661135	
[287]	training's rmse: 0.779707	training's l2: 0.607943 valid_1's rmse:
0.813095	valid_1's l2: 0.661123	
[288]	training's rmse: 0.779602	training's l2: 0.60778 valid_1's rmse:
0.813072	valid_1's l2: 0.661087	
[289]	training's rmse: 0.779518	training's l2: 0.607648 valid_1's rmse:
0.813069	valid_1's l2: 0.661081	
[290]	training's rmse: 0.779418	training's l2: 0.607492 valid_1's rmse:
0.813018	valid_1's l2: 0.660999	
[291]	training's rmse: 0.779335	training's l2: 0.607363 valid_1's rmse:
0.812918	valid_1's l2: 0.660836	
[292]	training's rmse: 0.779248	training's l2: 0.607228 valid_1's rmse:
0.812911	valid_1's l2: 0.660824	
[293]	training's rmse: 0.779179	training's l2: 0.60712 valid_1's rmse:
0.812891	valid_1's l2: 0.660793	
[294]	training's rmse: 0.779091	training's l2: 0.606982 valid_1's rmse:
0.81289	valid_1's l2: 0.660789	
[295]	training's rmse: 0.779006	training's l2: 0.60685 valid_1's rmse:
0.812853	valid_1's l2: 0.660731	
[296]	training's rmse: 0.778922	training's l2: 0.606719 valid_1's rmse:
0.812813	valid_1's l2: 0.660665	
[297]	training's rmse: 0.778823	training's l2: 0.606566 valid_1's rmse:
0.812858	valid_1's l2: 0.660738	
[298]	training's rmse: 0.778746	training's l2: 0.606446 valid_1's rmse:
0.812832	valid_1's l2: 0.660695	
[299]	training's rmse: 0.778669	training's l2: 0.606325 valid_1's rmse:
0.812879	valid_1's l2: 0.660772	
[300]	training's rmse: 0.77858	training's l2: 0.606187 valid_1's rmse:
0.81286	valid_1's l2: 0.660742	
[301]	training's rmse: 0.778502	training's l2: 0.606065 valid_1's rmse:



0.81284 valid\_1's l2: 0.660709  
[302] training's rmse: 0.778418 training's l2: 0.605935 valid\_1's rmse:  
0.812815 valid\_1's l2: 0.660669  
[303] training's rmse: 0.778343 training's l2: 0.605818 valid\_1's rmse:  
0.812769 valid\_1's l2: 0.660593  
[304] training's rmse: 0.778252 training's l2: 0.605675 valid\_1's rmse:  
0.812796 valid\_1's l2: 0.660638  
[305] training's rmse: 0.77814 training's l2: 0.605502 valid\_1's rmse:  
0.812723 valid\_1's l2: 0.660518  
[306] training's rmse: 0.778058 training's l2: 0.605374 valid\_1's rmse:  
0.812717 valid\_1's l2: 0.66051  
[307] training's rmse: 0.777978 training's l2: 0.60525 valid\_1's rmse:  
0.812709 valid\_1's l2: 0.660496  
[308] training's rmse: 0.7779 training's l2: 0.605129 valid\_1's rmse: 0.812711  
valid\_1's l2: 0.660499  
[309] training's rmse: 0.77782 training's l2: 0.605004 valid\_1's rmse:  
0.812716 valid\_1's l2: 0.660507  
[310] training's rmse: 0.777744 training's l2: 0.604885 valid\_1's rmse:  
0.812643 valid\_1's l2: 0.660389  
[311] training's rmse: 0.777662 training's l2: 0.604759 valid\_1's rmse:  
0.812608 valid\_1's l2: 0.660332  
[312] training's rmse: 0.777581 training's l2: 0.604632 valid\_1's rmse:  
0.812614 valid\_1's l2: 0.660342  
[313] training's rmse: 0.777463 training's l2: 0.604449 valid\_1's rmse:  
0.812598 valid\_1's l2: 0.660316  
[314] training's rmse: 0.77739 training's l2: 0.604336 valid\_1's rmse:  
0.812564 valid\_1's l2: 0.66026  
[315] training's rmse: 0.777292 training's l2: 0.604182 valid\_1's rmse:  
0.812497 valid\_1's l2: 0.660151  
[316] training's rmse: 0.777193 training's l2: 0.604028 valid\_1's rmse:  
0.812428 valid\_1's l2: 0.660039  
[317] training's rmse: 0.777088 training's l2: 0.603866 valid\_1's rmse:  
0.812305 valid\_1's l2: 0.65984  
[318] training's rmse: 0.777005 training's l2: 0.603736 valid\_1's rmse:  
0.812261 valid\_1's l2: 0.659768  
[319] training's rmse: 0.77694 training's l2: 0.603635 valid\_1's rmse:  
0.812246 valid\_1's l2: 0.659743  
[320] training's rmse: 0.776865 training's l2: 0.603519 valid\_1's rmse:  
0.81221 valid\_1's l2: 0.659686  
[321] training's rmse: 0.776785 training's l2: 0.603396 valid\_1's rmse:  
0.812206 valid\_1's l2: 0.659678  
[322] training's rmse: 0.776714 training's l2: 0.603285 valid\_1's rmse:  
0.81217 valid\_1's l2: 0.659621  
[323] training's rmse: 0.776634 training's l2: 0.60316 valid\_1's rmse:  
0.812168 valid\_1's l2: 0.659616  
[324] training's rmse: 0.776527 training's l2: 0.602994 valid\_1's rmse:  
0.812216 valid\_1's l2: 0.659694  
[325] training's rmse: 0.776453 training's l2: 0.602879 valid\_1's rmse:

0.812235	valid_1's l2: 0.659725	
[326]	training's rmse: 0.77636	training's l2: 0.602735 valid_1's rmse:
0.812096	valid_1's l2: 0.6595	
[327]	training's rmse: 0.776281	training's l2: 0.602612 valid_1's rmse:
0.812066	valid_1's l2: 0.659451	
[328]	training's rmse: 0.776187	training's l2: 0.602466 valid_1's rmse:
0.812019	valid_1's l2: 0.659375	
[329]	training's rmse: 0.776109	training's l2: 0.602345 valid_1's rmse:
0.811976	valid_1's l2: 0.659305	
[330]	training's rmse: 0.776027	training's l2: 0.602218 valid_1's rmse:
0.811977	valid_1's l2: 0.659307	
[331]	training's rmse: 0.775942	training's l2: 0.602086 valid_1's rmse:
0.811965	valid_1's l2: 0.659288	
[332]	training's rmse: 0.775869	training's l2: 0.601973 valid_1's rmse:
0.811958	valid_1's l2: 0.659276	
[333]	training's rmse: 0.775792	training's l2: 0.601853 valid_1's rmse:
0.811982	valid_1's l2: 0.659314	
[334]	training's rmse: 0.775718	training's l2: 0.601739 valid_1's rmse:
0.811984	valid_1's l2: 0.659318	
[335]	training's rmse: 0.775627	training's l2: 0.601597 valid_1's rmse:
0.811778	valid_1's l2: 0.658983	
[336]	training's rmse: 0.775551	training's l2: 0.601479 valid_1's rmse:
0.811821	valid_1's l2: 0.659054	
[337]	training's rmse: 0.775462	training's l2: 0.601341 valid_1's rmse:
0.811879	valid_1's l2: 0.659148	
[338]	training's rmse: 0.775371	training's l2: 0.601201 valid_1's rmse:
0.811876	valid_1's l2: 0.659143	
[339]	training's rmse: 0.775302	training's l2: 0.601093 valid_1's rmse:
0.81186	valid_1's l2: 0.659116	
[340]	training's rmse: 0.77523	training's l2: 0.600981 valid_1's rmse:
0.81186	valid_1's l2: 0.659117	
[341]	training's rmse: 0.775152	training's l2: 0.60086 valid_1's rmse:
0.811836	valid_1's l2: 0.659078	
[342]	training's rmse: 0.775078	training's l2: 0.600746 valid_1's rmse:
0.811819	valid_1's l2: 0.65905	
[343]	training's rmse: 0.775004	training's l2: 0.600631 valid_1's rmse:
0.811793	valid_1's l2: 0.659007	
[344]	training's rmse: 0.774925	training's l2: 0.600509 valid_1's rmse:
0.811803	valid_1's l2: 0.659024	
[345]	training's rmse: 0.774842	training's l2: 0.60038 valid_1's rmse:
0.811713	valid_1's l2: 0.658878	
[346]	training's rmse: 0.774771	training's l2: 0.600271 valid_1's rmse:
0.811673	valid_1's l2: 0.658813	
[347]	training's rmse: 0.774689	training's l2: 0.600144 valid_1's rmse:
0.811597	valid_1's l2: 0.658689	
[348]	training's rmse: 0.774618	training's l2: 0.600033 valid_1's rmse:
0.811576	valid_1's l2: 0.658655	
[349]	training's rmse: 0.774545	training's l2: 0.59992 valid_1's rmse:

0.811564	valid_1's l2: 0.658636	
[350]	training's rmse: 0.774478	training's l2: 0.599815 valid_1's rmse:
0.811571	valid_1's l2: 0.658647	
[351]	training's rmse: 0.774416	training's l2: 0.59972 valid_1's rmse:
0.811542	valid_1's l2: 0.6586	
[352]	training's rmse: 0.774352	training's l2: 0.599621 valid_1's rmse:
0.811509	valid_1's l2: 0.658548	
[353]	training's rmse: 0.774265	training's l2: 0.599486 valid_1's rmse:
0.811506	valid_1's l2: 0.658541	
[354]	training's rmse: 0.774189	training's l2: 0.599369 valid_1's rmse:
0.811489	valid_1's l2: 0.658514	
[355]	training's rmse: 0.77412	training's l2: 0.599261 valid_1's rmse:
0.811412	valid_1's l2: 0.658389	
[356]	training's rmse: 0.774024	training's l2: 0.599113 valid_1's rmse:
0.8114	valid_1's l2: 0.658369	
[357]	training's rmse: 0.77396	training's l2: 0.599014 valid_1's rmse:
0.811338	valid_1's l2: 0.65827	
[358]	training's rmse: 0.77389	training's l2: 0.598905 valid_1's rmse:
0.811339	valid_1's l2: 0.658271	
[359]	training's rmse: 0.773827	training's l2: 0.598808 valid_1's rmse:
0.811327	valid_1's l2: 0.658251	
[360]	training's rmse: 0.773745	training's l2: 0.598681 valid_1's rmse:
0.811273	valid_1's l2: 0.658163	
[361]	training's rmse: 0.773684	training's l2: 0.598586 valid_1's rmse:
0.811256	valid_1's l2: 0.658137	
[362]	training's rmse: 0.773622	training's l2: 0.598491 valid_1's rmse:
0.811228	valid_1's l2: 0.65809	
[363]	training's rmse: 0.773558	training's l2: 0.598392 valid_1's rmse:
0.811199	valid_1's l2: 0.658043	
[364]	training's rmse: 0.773471	training's l2: 0.598258 valid_1's rmse:
0.811136	valid_1's l2: 0.657941	
[365]	training's rmse: 0.773397	training's l2: 0.598142 valid_1's rmse:
0.811121	valid_1's l2: 0.657917	
[366]	training's rmse: 0.773328	training's l2: 0.598036 valid_1's rmse:
0.81111	valid_1's l2: 0.6579	
[367]	training's rmse: 0.773259	training's l2: 0.597929 valid_1's rmse:
0.811122	valid_1's l2: 0.657919	
[368]	training's rmse: 0.773194	training's l2: 0.59783 valid_1's rmse:
0.811134	valid_1's l2: 0.657938	
[369]	training's rmse: 0.773123	training's l2: 0.59772 valid_1's rmse:
0.811094	valid_1's l2: 0.657874	
[370]	training's rmse: 0.773052	training's l2: 0.597609 valid_1's rmse:
0.811074	valid_1's l2: 0.657841	
[371]	training's rmse: 0.772986	training's l2: 0.597508 valid_1's rmse:
0.811062	valid_1's l2: 0.657822	
[372]	training's rmse: 0.772928	training's l2: 0.597417 valid_1's rmse:
0.811063	valid_1's l2: 0.657823	
[373]	training's rmse: 0.772866	training's l2: 0.597322 valid_1's rmse:

0.811052	valid_1's l2: 0.657805	
[374]	training's rmse: 0.772791	training's l2: 0.597206 valid_1's rmse:
0.811031	valid_1's l2: 0.657771	
[375]	training's rmse: 0.772714	training's l2: 0.597087 valid_1's rmse:
0.81109	valid_1's l2: 0.657868	
[376]	training's rmse: 0.772636	training's l2: 0.596966 valid_1's rmse:
0.811081	valid_1's l2: 0.657853	
[377]	training's rmse: 0.772565	training's l2: 0.596857 valid_1's rmse:
0.811105	valid_1's l2: 0.657891	
[378]	training's rmse: 0.772486	training's l2: 0.596734 valid_1's rmse:
0.811149	valid_1's l2: 0.657962	
[379]	training's rmse: 0.772419	training's l2: 0.596631 valid_1's rmse:
0.811153	valid_1's l2: 0.657968	
[380]	training's rmse: 0.772352	training's l2: 0.596527 valid_1's rmse:
0.811117	valid_1's l2: 0.65791	
[381]	training's rmse: 0.772276	training's l2: 0.596411 valid_1's rmse:
0.811112	valid_1's l2: 0.657902	
[382]	training's rmse: 0.772209	training's l2: 0.596306 valid_1's rmse:
0.811078	valid_1's l2: 0.657847	
[383]	training's rmse: 0.772149	training's l2: 0.596215 valid_1's rmse:
0.81105	valid_1's l2: 0.657802	
[384]	training's rmse: 0.77207	training's l2: 0.596092 valid_1's rmse:
0.810983	valid_1's l2: 0.657694	
[385]	training's rmse: 0.771998	training's l2: 0.595981 valid_1's rmse:
0.810971	valid_1's l2: 0.657673	
[386]	training's rmse: 0.771931	training's l2: 0.595877 valid_1's rmse:
0.810984	valid_1's l2: 0.657696	
[387]	training's rmse: 0.771867	training's l2: 0.595779 valid_1's rmse:
0.810987	valid_1's l2: 0.6577	
[388]	training's rmse: 0.771795	training's l2: 0.595668 valid_1's rmse:
0.811004	valid_1's l2: 0.657727	
[389]	training's rmse: 0.771722	training's l2: 0.595554 valid_1's rmse:
0.811007	valid_1's l2: 0.657732	
[390]	training's rmse: 0.771615	training's l2: 0.59539 valid_1's rmse:
0.810828	valid_1's l2: 0.657443	
[391]	training's rmse: 0.771544	training's l2: 0.595281 valid_1's rmse:
0.810842	valid_1's l2: 0.657466	
[392]	training's rmse: 0.771468	training's l2: 0.595163 valid_1's rmse:
0.810837	valid_1's l2: 0.657456	
[393]	training's rmse: 0.771392	training's l2: 0.595046 valid_1's rmse:
0.810828	valid_1's l2: 0.657443	
[394]	training's rmse: 0.771321	training's l2: 0.594935 valid_1's rmse:
0.810844	valid_1's l2: 0.657467	
[395]	training's rmse: 0.771259	training's l2: 0.594841 valid_1's rmse:
0.810853	valid_1's l2: 0.657483	
[396]	training's rmse: 0.771195	training's l2: 0.594742 valid_1's rmse:
0.810835	valid_1's l2: 0.657454	
[397]	training's rmse: 0.771122	training's l2: 0.594629 valid_1's rmse:

```

0.810892         valid_1's l2: 0.657546
[398]   training's rmse: 0.771037         training's l2: 0.594498 valid_1's rmse:
0.810906         valid_1's l2: 0.657569
[399]   training's rmse: 0.770983         training's l2: 0.594415 valid_1's rmse:
0.810894         valid_1's l2: 0.657549
[400]   training's rmse: 0.770917         training's l2: 0.594313 valid_1's rmse:
0.81088 valid_1's l2: 0.657526
Early stopping, best iteration is:
[390]   training's rmse: 0.771615         training's l2: 0.59539  valid_1's rmse:
0.810828         valid_1's l2: 0.657443

```

```

[26]: LGBMRegressor(bagging_fraction=0.2, boosting_type='gbdt', class_weight=None,
                    colsample_bytree=1.0, feature_fraction=0.8,
                    importance_type='split', learning_rate=0.05, max_depth=-1,
                    min_child_samples=20, min_child_weight=0.001,
                    min_data_in_leaf=300, min_split_gain=0.0, n_estimators=1000,
                    n_jobs=-1, num_leaves=128, objective=None, random_state=None,
                    reg_alpha=0.0, reg_lambda=0.0, seed=42, silent=True,
                    subsample=1.0, subsample_for_bin=200000, subsample_freq=0)

```

```

[27]: lgb_params['n_estimators'] = 200
      lgb_params

```

```

[27]: {'bagging_fraction': 0.2,
      'feature_fraction': 0.8,
      'learning_rate': 0.05,
      'max_depth': -1,
      'min_data_in_leaf': 300,
      'num_leaves': 128,
      'seed': 42,
      'n_estimators': 200}

```

```

[28]: # Save untrained model to file

Pkl_Filename = "LBG_Params.pkl"

with open(Pkl_Filename, 'wb') as file:
    pickle.dump(lgb_params, file)

```

### 1.3 Random Forest

```

[29]: model = RandomForestRegressor()
      param_grid={
          'bootstrap':[True, False],
          'max_features': ['auto', 'sqrt'],
          #'max_depth': [None, 5, 10, 20, 50, 100],
          #'min_samples_leaf': [1, 2, 4],

```

```

    #'min_samples_split': [2, 5, 10],
    #'n_estimators': [100,200,500,1000],
}

model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,
                                param_grid, cv=3)

print(np.sqrt(-model.best_score_))
print(model.best_params_)

```

Fitting 3 folds for each of 4 candidates, totalling 12 fits

```

[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.
[Parallel(n_jobs=-1)]: Done  2 out of  12 | elapsed:  8.6min remaining: 43.2min
[Parallel(n_jobs=-1)]: Done  9 out of  12 | elapsed: 46.5min remaining: 15.5min
[Parallel(n_jobs=-1)]: Done 12 out of  12 | elapsed: 64.2min finished

```

0.8773244574839543

{'bootstrap': True, 'max\_features': 'sqrt'}

```

[30]: model = RandomForestRegressor()
      param_grid={
          'bootstrap':[True],
          'max_features': ['sqrt'],
          'max_depth': [None, 5, 10, 20, 50, 100],
          'min_samples_leaf': [1, 2, 4],
          #'min_samples_split': [2, 5, 10],
          #'n_estimators': [100,200,500,1000],
      }

      model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,
                                      param_grid, cv=3)

      print(np.sqrt(-model.best_score_))
      print(model.best_params_)

```

Fitting 3 folds for each of 18 candidates, totalling 54 fits

```

[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.
[Parallel(n_jobs=-1)]: Done  9 tasks      | elapsed:  5.3min
[Parallel(n_jobs=-1)]: Done 51 out of  54 | elapsed: 28.4min remaining:  1.7min
[Parallel(n_jobs=-1)]: Done 54 out of  54 | elapsed: 29.6min finished

```

0.8395895077874228

{'bootstrap': True, 'max\_depth': 20, 'max\_features': 'sqrt', 'min\_samples\_leaf': 4}

```

[31]: model = RandomForestRegressor()
      param_grid={

```

```

    'bootstrap':[True],
    'max_features': ['sqrt'],
    'max_depth': [20],
    'min_samples_leaf': [4],
    'min_samples_split': [2, 5, 8, 10],
    'n_estimators': [50, 100, 150, 200],
}

model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,
                                param_grid, cv=3)

print(np.sqrt(-model.best_score_))
print(model.best_params_)

```

Fitting 3 folds for each of 16 candidates, totalling 48 fits

```

[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.
[Parallel(n_jobs=-1)]: Done   9 tasks      | elapsed: 87.7min
[Parallel(n_jobs=-1)]: Done  42 out of  48 | elapsed: 316.0min remaining:
45.1min
[Parallel(n_jobs=-1)]: Done  48 out of  48 | elapsed: 350.5min finished

0.8239613504079909
{'bootstrap': True, 'max_depth': 20, 'max_features': 'sqrt', 'min_samples_leaf':
4, 'min_samples_split': 5, 'n_estimators': 200}

```

```

[32]: rf_params = model.best_params_
      rf_params

```

```

[32]: {'bootstrap': True,
      'max_depth': 20,
      'max_features': 'sqrt',
      'min_samples_leaf': 4,
      'min_samples_split': 5,
      'n_estimators': 200}

```

```

[33]: # Save untrained model to file

      Pkl_Filename = "RF_Params.pkl"

      with open(Pkl_Filename, 'wb') as file:
          pickle.dump(rf_params, file)

```

## 1.4 Keras Regressor

```
[11]: from keras.models import Sequential
      from keras.layers import Dense
      from keras.layers import Dropout
      from keras.wrappers.scikit_learn import KerasRegressor
```

```
[15]: def create_model(neurons=50, activation='relu', dropout_rate=0.0,
      ↪ init='uniform', optimizer='adam', activation2='sigmoid'):
      # create model
      model = Sequential()
      model.add(Dense(neurons, input_dim=74, kernel_initializer=init,
      ↪ activation=activation))
      model.add(Dropout(dropout_rate))
      model.add(Dense(1, kernel_initializer=init, activation=activation2))
      # Compile model
      model.compile(loss='mse', optimizer=optimizer, metrics=['mse'])
      return model
```

```
[23]: #learn_rate = [0.001, 0.01, 0.1, 0.2, 0.3]
      dropout_rate = [0.0, 0.2, 0.4, 0.6, 0.8]
      #weight_constraints = [1, 2, 3, 4, 5]
      neurons = [20, 50, 100, 200]
      init =
      ↪ ['uniform', 'lecun_uniform', 'normal', 'zero', 'glorot_normal', 'glorot_uniform', 'he_uniform', 'h
      optimizer = ['SGD', 'RMSprop', 'Adagrad', 'Adadelta', 'Adam', 'Adamax', 'Nadam']
      activation = ['relu', 'tanh', 'sigmoid', 'hard_sigmoid', 'linear', 'softmax']
      activation2 = ['relu', 'tanh', 'sigmoid', 'hard_sigmoid', 'linear', 'softmax']
      epochs = [5, 10, 30, 50, 100, 150, 200]
      batch_size=[1000, 5000, 10000]
```

```
[17]: train_x = X_train.values
      train_y = Y_train.ravel()
      valid_x = X_valid.values
      valid_y = Y_valid.ravel()
```

```
param_grid = dict(epochs=epochs, batch_size=batch_size)
```

```
model = KerasRegressor(build_fn=create_model, verbose=1)
```

```
grid = GridSearchCV(estimator=model, param_grid=param_grid) grid_result = grid.fit(train_x,
train_y, validation_data=(valid_x, valid_y))
```

```
print(np.sqrt(-grid_result.best_score_)) print(grid_result.best_params_)
```

```
[18]: param_grid = dict(optimizer=optimizer, epochs=[5], batch_size=[1000])

      model = KerasRegressor(build_fn=create_model, verbose=1)
```



```

grid = GridSearchCV(estimator=model, param_grid=param_grid, cv=3)
grid_result = grid.fit(train_x, train_y, validation_data=(valid_x, valid_y))

print(np.sqrt(-grid_result.best_score_))
print(grid_result.best_params_)

```

Train on 3353317 samples, validate on 221802 samples

Epoch 1/5

3353317/3353317 [=====] - 12s 4us/step - loss: 1.4525 -  
mse: 1.4525 - val\_loss: 1.1312 - val\_mse: 1.1312

Epoch 2/5

3353317/3353317 [=====] - 12s 3us/step - loss: 1.3584 -  
mse: 1.3584 - val\_loss: 1.0720 - val\_mse: 1.0720

Epoch 3/5

3353317/3353317 [=====] - 11s 3us/step - loss: 1.3165 -  
mse: 1.3165 - val\_loss: 1.0610 - val\_mse: 1.0610

Epoch 4/5

3353317/3353317 [=====] - 11s 3us/step - loss: 1.3057 -  
mse: 1.3057 - val\_loss: 1.0564 - val\_mse: 1.0564

Epoch 5/5

3353317/3353317 [=====] - 11s 3us/step - loss: 1.3000 -  
mse: 1.3000 - val\_loss: 1.0525 - val\_mse: 1.0525

1676659/1676659 [=====] - 3s 2us/step

Train on 3353317 samples, validate on 221802 samples

Epoch 1/5

3353317/3353317 [=====] - 13s 4us/step - loss: 1.3055 -  
mse: 1.3055 - val\_loss: 1.1259 - val\_mse: 1.1259

Epoch 2/5

3353317/3353317 [=====] - 11s 3us/step - loss: 1.2126 -  
mse: 1.2126 - val\_loss: 1.0712 - val\_mse: 1.0712

Epoch 3/5

3353317/3353317 [=====] - 12s 3us/step - loss: 1.1758 -  
mse: 1.1758 - val\_loss: 1.0606 - val\_mse: 1.0606

Epoch 4/5

3353317/3353317 [=====] - 11s 3us/step - loss: 1.1663 -  
mse: 1.1663 - val\_loss: 1.0556 - val\_mse: 1.0556

Epoch 5/5

3353317/3353317 [=====] - 11s 3us/step - loss: 1.1615 -  
mse: 1.1615 - val\_loss: 1.0520 - val\_mse: 1.0520

1676659/1676659 [=====] - 3s 2us/step

Train on 3353318 samples, validate on 221802 samples

Epoch 1/5

3353318/3353318 [=====] - 13s 4us/step - loss: 1.5667 -  
mse: 1.5667 - val\_loss: 1.1352 - val\_mse: 1.1352

Epoch 2/5

3353318/3353318 [=====] - 13s 4us/step - loss: 1.4599 -  
mse: 1.4599 - val\_loss: 1.0722 - val\_mse: 1.0722

Epoch 3/5  
3353318/3353318 [=====] - 12s 4us/step - loss: 1.4120 -  
mse: 1.4120 - val\_loss: 1.0614 - val\_mse: 1.0614

Epoch 4/5  
3353318/3353318 [=====] - 11s 3us/step - loss: 1.4008 -  
mse: 1.4008 - val\_loss: 1.0561 - val\_mse: 1.0561

Epoch 5/5  
3353318/3353318 [=====] - 11s 3us/step - loss: 1.3954 -  
mse: 1.3954 - val\_loss: 1.0536 - val\_mse: 1.0536  
1676658/1676658 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples

Epoch 1/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2780 -  
mse: 1.2780 - val\_loss: 1.0280 - val\_mse: 1.0280

Epoch 2/5  
3353317/3353317 [=====] - 12s 3us/step - loss: 1.2604 -  
mse: 1.2604 - val\_loss: 1.0294 - val\_mse: 1.0294

Epoch 3/5  
3353317/3353317 [=====] - 12s 3us/step - loss: 1.2569 -  
mse: 1.2569 - val\_loss: 1.0302 - val\_mse: 1.0302

Epoch 4/5  
3353317/3353317 [=====] - 12s 3us/step - loss: 1.2544 -  
mse: 1.2544 - val\_loss: 1.0280 - val\_mse: 1.0280

Epoch 5/5  
3353317/3353317 [=====] - 12s 3us/step - loss: 1.2527 -  
mse: 1.2527 - val\_loss: 1.0276 - val\_mse: 1.0276  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples

Epoch 1/5  
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1480 -  
mse: 1.1480 - val\_loss: 1.0333 - val\_mse: 1.0333

Epoch 2/5  
3353317/3353317 [=====] - 11s 3us/step - loss: 1.1353 -  
mse: 1.1353 - val\_loss: 1.0311 - val\_mse: 1.0311

Epoch 3/5  
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1327 -  
mse: 1.1327 - val\_loss: 1.0333 - val\_mse: 1.0333

Epoch 4/5  
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1311 -  
mse: 1.1311 - val\_loss: 1.0296 - val\_mse: 1.0296

Epoch 5/5  
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1293 -  
mse: 1.1293 - val\_loss: 1.0274 - val\_mse: 1.0274  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353318 samples, validate on 221802 samples

Epoch 1/5  
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3797 -  
mse: 1.3797 - val\_loss: 1.0358 - val\_mse: 1.0358

Epoch 2/5  
3353318/3353318 [=====] - 12s 3us/step - loss: 1.3682 -  
mse: 1.3682 - val\_loss: 1.0417 - val\_mse: 1.0417  
Epoch 3/5  
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3675 -  
mse: 1.3675 - val\_loss: 1.0404 - val\_mse: 1.0404  
Epoch 4/5  
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3672 -  
mse: 1.3672 - val\_loss: 1.0409 - val\_mse: 1.0409  
Epoch 5/5  
3353318/3353318 [=====] - 12s 3us/step - loss: 1.3670 -  
mse: 1.3670 - val\_loss: 1.0384 - val\_mse: 1.0384  
1676658/1676658 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2862 -  
mse: 1.2862 - val\_loss: 1.0387 - val\_mse: 1.0387  
Epoch 2/5  
3353317/3353317 [=====] - 11s 3us/step - loss: 1.2718 -  
mse: 1.2718 - val\_loss: 1.0327 - val\_mse: 1.0327  
Epoch 3/5  
3353317/3353317 [=====] - 12s 3us/step - loss: 1.2669 -  
mse: 1.2669 - val\_loss: 1.0286 - val\_mse: 1.0286  
Epoch 4/5  
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2644 -  
mse: 1.2644 - val\_loss: 1.0279 - val\_mse: 1.0279  
Epoch 5/5  
3353317/3353317 [=====] - 11s 3us/step - loss: 1.2629 -  
mse: 1.2629 - val\_loss: 1.0282 - val\_mse: 1.0282  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1500 -  
mse: 1.1500 - val\_loss: 1.0327 - val\_mse: 1.0327  
Epoch 2/5  
3353317/3353317 [=====] - 11s 3us/step - loss: 1.1357 -  
mse: 1.1357 - val\_loss: 1.0287 - val\_mse: 1.0287  
Epoch 3/5  
3353317/3353317 [=====] - 11s 3us/step - loss: 1.1324 -  
mse: 1.1324 - val\_loss: 1.0281 - val\_mse: 1.0281  
Epoch 4/5  
3353317/3353317 [=====] - 12s 3us/step - loss: 1.1305 -  
mse: 1.1305 - val\_loss: 1.0277 - val\_mse: 1.0277  
Epoch 5/5  
3353317/3353317 [=====] - 11s 3us/step - loss: 1.1294 -  
mse: 1.1294 - val\_loss: 1.0272 - val\_mse: 1.0272  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353318 samples, validate on 221802 samples

Epoch 1/5  
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3846 -  
mse: 1.3846 - val\_loss: 1.0362 - val\_mse: 1.0362

Epoch 2/5  
3353318/3353318 [=====] - 11s 3us/step - loss: 1.3700 -  
mse: 1.3700 - val\_loss: 1.0323 - val\_mse: 1.0323

Epoch 3/5  
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3644 -  
mse: 1.3644 - val\_loss: 1.0294 - val\_mse: 1.0294

Epoch 4/5  
3353318/3353318 [=====] - 11s 3us/step - loss: 1.3608 -  
mse: 1.3608 - val\_loss: 1.0282 - val\_mse: 1.0282

Epoch 5/5  
3353318/3353318 [=====] - 12s 3us/step - loss: 1.3588 -  
mse: 1.3588 - val\_loss: 1.0286 - val\_mse: 1.0286  
1676658/1676658 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples

Epoch 1/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2849 -  
mse: 1.2849 - val\_loss: 1.0377 - val\_mse: 1.0377

Epoch 2/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2634 -  
mse: 1.2634 - val\_loss: 1.0323 - val\_mse: 1.0323

Epoch 3/5  
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2576 -  
mse: 1.2576 - val\_loss: 1.0239 - val\_mse: 1.0239

Epoch 4/5  
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2542 -  
mse: 1.2542 - val\_loss: 1.0228 - val\_mse: 1.0228

Epoch 5/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2516 -  
mse: 1.2516 - val\_loss: 1.0251 - val\_mse: 1.0251  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples

Epoch 1/5  
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1505 -  
mse: 1.1505 - val\_loss: 1.0349 - val\_mse: 1.0349

Epoch 2/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1319 -  
mse: 1.1319 - val\_loss: 1.0255 - val\_mse: 1.0255

Epoch 3/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1263 -  
mse: 1.1263 - val\_loss: 1.0307 - val\_mse: 1.0307

Epoch 4/5  
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1228 -  
mse: 1.1228 - val\_loss: 1.0310 - val\_mse: 1.0310

Epoch 5/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1205 -

```

mse: 1.1205 - val_loss: 1.0258 - val_mse: 1.0258
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3813 -
mse: 1.3813 - val_loss: 1.0286 - val_mse: 1.0286
Epoch 2/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3606 -
mse: 1.3606 - val_loss: 1.0381 - val_mse: 1.0381
Epoch 3/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3532 -
mse: 1.3532 - val_loss: 1.0256 - val_mse: 1.0256
Epoch 4/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3488 -
mse: 1.3488 - val_loss: 1.0269 - val_mse: 1.0269
Epoch 5/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3456 -
mse: 1.3456 - val_loss: 1.0291 - val_mse: 1.0291
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2790 -
mse: 1.2790 - val_loss: 1.0288 - val_mse: 1.0288
Epoch 2/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2581 -
mse: 1.2581 - val_loss: 1.0264 - val_mse: 1.0264
Epoch 3/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2542 -
mse: 1.2542 - val_loss: 1.0289 - val_mse: 1.0289
Epoch 4/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2519 -
mse: 1.2519 - val_loss: 1.0241 - val_mse: 1.0241
Epoch 5/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2504 -
mse: 1.2504 - val_loss: 1.0252 - val_mse: 1.0252
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1452 -
mse: 1.1452 - val_loss: 1.0285 - val_mse: 1.0285
Epoch 2/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1272 -
mse: 1.1272 - val_loss: 1.0261 - val_mse: 1.0261
Epoch 3/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1240 -
mse: 1.1240 - val_loss: 1.0266 - val_mse: 1.0266
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1219 -

```

```

mse: 1.1219 - val_loss: 1.0266 - val_mse: 1.0266
Epoch 5/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1201 -
mse: 1.1201 - val_loss: 1.0251 - val_mse: 1.0251
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3756 -
mse: 1.3756 - val_loss: 1.0277 - val_mse: 1.0277
Epoch 2/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3538 -
mse: 1.3538 - val_loss: 1.0289 - val_mse: 1.0289
Epoch 3/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3490 -
mse: 1.3490 - val_loss: 1.0277 - val_mse: 1.0277
Epoch 4/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3455 -
mse: 1.3455 - val_loss: 1.0276 - val_mse: 1.0276
Epoch 5/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3432 -
mse: 1.3432 - val_loss: 1.0281 - val_mse: 1.0281
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2871 -
mse: 1.2871 - val_loss: 1.0372 - val_mse: 1.0372
Epoch 2/5
3353317/3353317 [=====] - 12s 3us/step - loss: 1.2677 -
mse: 1.2677 - val_loss: 1.0300 - val_mse: 1.0300
Epoch 3/5
3353317/3353317 [=====] - 12s 3us/step - loss: 1.2629 -
mse: 1.2629 - val_loss: 1.0272 - val_mse: 1.0272
Epoch 4/5
3353317/3353317 [=====] - 11s 3us/step - loss: 1.2600 -
mse: 1.2600 - val_loss: 1.0267 - val_mse: 1.0267
Epoch 5/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2577 -
mse: 1.2577 - val_loss: 1.0279 - val_mse: 1.0279
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1529 -
mse: 1.1529 - val_loss: 1.0342 - val_mse: 1.0342
Epoch 2/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1358 -
mse: 1.1358 - val_loss: 1.0307 - val_mse: 1.0307
Epoch 3/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1323 -

```

```

mse: 1.1323 - val_loss: 1.0313 - val_mse: 1.0313
Epoch 4/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1303 -
mse: 1.1303 - val_loss: 1.0272 - val_mse: 1.0272
Epoch 5/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1288 -
mse: 1.1288 - val_loss: 1.0252 - val_mse: 1.0252
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3840 -
mse: 1.3840 - val_loss: 1.0326 - val_mse: 1.0326
Epoch 2/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3611 -
mse: 1.3611 - val_loss: 1.0293 - val_mse: 1.0293
Epoch 3/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3559 -
mse: 1.3559 - val_loss: 1.0299 - val_mse: 1.0299
Epoch 4/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3526 -
mse: 1.3526 - val_loss: 1.0273 - val_mse: 1.0273
Epoch 5/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3502 -
mse: 1.3502 - val_loss: 1.0264 - val_mse: 1.0264
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2794 -
mse: 1.2794 - val_loss: 1.0356 - val_mse: 1.0356
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2715 -
mse: 1.2715 - val_loss: 1.0354 - val_mse: 1.0354
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2710 -
mse: 1.2710 - val_loss: 1.0343 - val_mse: 1.0343
Epoch 4/5
3353317/3353317 [=====] - 15s 4us/step - loss: 1.2708 -
mse: 1.2708 - val_loss: 1.0351 - val_mse: 1.0351
Epoch 5/5
3353317/3353317 [=====] - 15s 5us/step - loss: 1.2679 -
mse: 1.2679 - val_loss: 1.0294 - val_mse: 1.0294
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 15s 4us/step - loss: 1.1337 -
mse: 1.1337 - val_loss: 1.0270 - val_mse: 1.0270
Epoch 2/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1198 -

```

```

mse: 1.1198 - val_loss: 1.0242 - val_mse: 1.0242
Epoch 3/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1159 -
mse: 1.1159 - val_loss: 1.0223 - val_mse: 1.0223
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1128 -
mse: 1.1128 - val_loss: 1.0197 - val_mse: 1.0197
Epoch 5/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1108 -
mse: 1.1108 - val_loss: 1.0187 - val_mse: 1.0187
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3676 -
mse: 1.3676 - val_loss: 1.0315 - val_mse: 1.0315
Epoch 2/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3505 -
mse: 1.3505 - val_loss: 1.0282 - val_mse: 1.0282
Epoch 3/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3445 -
mse: 1.3445 - val_loss: 1.0317 - val_mse: 1.0317
Epoch 4/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3416 -
mse: 1.3416 - val_loss: 1.0329 - val_mse: 1.0329
Epoch 5/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3397 -
mse: 1.3397 - val_loss: 1.0278 - val_mse: 1.0278
1676658/1676658 [=====] - 3s 2us/step
Train on 5029976 samples, validate on 221802 samples
Epoch 1/5
5029976/5029976 [=====] - 27s 5us/step - loss: 1.2626 -
mse: 1.2626 - val_loss: 1.0285 - val_mse: 1.0285
Epoch 2/5
5029976/5029976 [=====] - 25s 5us/step - loss: 1.2468 -
mse: 1.2468 - val_loss: 1.0263 - val_mse: 1.0263
Epoch 3/5
5029976/5029976 [=====] - 27s 5us/step - loss: 1.2430 -
mse: 1.2430 - val_loss: 1.0264 - val_mse: 1.0264
Epoch 4/5
5029976/5029976 [=====] - 26s 5us/step - loss: 1.2390 -
mse: 1.2390 - val_loss: 1.0246 - val_mse: 1.0246
Epoch 5/5
5029976/5029976 [=====] - 27s 5us/step - loss: 1.2359 -
mse: 1.2359 - val_loss: 1.0226 - val_mse: 1.0226
1.114456920082972
{'batch_size': 1000, 'epochs': 5, 'optimizer': 'Adam'}

```



```
[19]: param_grid = dict(optimizer=['Adam'], epochs=[5], batch_size=[1000], init=init)

model = KerasRegressor(build_fn=create_model, verbose=1)

grid = GridSearchCV(estimator=model, param_grid=param_grid, cv=3)
grid_result = grid.fit(train_x, train_y, validation_data=(valid_x, valid_y))

print(np.sqrt(-grid_result.best_score_))
print(grid_result.best_params_)
```

Train on 3353317 samples, validate on 221802 samples

Epoch 1/5

3353317/3353317 [=====] - 13s 4us/step - loss: 1.2827 -  
mse: 1.2827 - val\_loss: 1.0333 - val\_mse: 1.0333

Epoch 2/5

3353317/3353317 [=====] - 12s 4us/step - loss: 1.2649 -  
mse: 1.2649 - val\_loss: 1.0299 - val\_mse: 1.0299

Epoch 3/5

3353317/3353317 [=====] - 12s 4us/step - loss: 1.2632 -  
mse: 1.2632 - val\_loss: 1.0315 - val\_mse: 1.0315

Epoch 4/5

3353317/3353317 [=====] - 12s 4us/step - loss: 1.2623 -  
mse: 1.2623 - val\_loss: 1.0280 - val\_mse: 1.0280

Epoch 5/5

3353317/3353317 [=====] - 12s 4us/step - loss: 1.2616 -  
mse: 1.2616 - val\_loss: 1.0277 - val\_mse: 1.0277

1676659/1676659 [=====] - 3s 2us/step

Train on 3353317 samples, validate on 221802 samples

Epoch 1/5

3353317/3353317 [=====] - 14s 4us/step - loss: 1.1441 -  
mse: 1.1441 - val\_loss: 1.0278 - val\_mse: 1.0278

Epoch 2/5

3353317/3353317 [=====] - 12s 4us/step - loss: 1.1250 -  
mse: 1.1250 - val\_loss: 1.0243 - val\_mse: 1.0243

Epoch 3/5

3353317/3353317 [=====] - 12s 4us/step - loss: 1.1213 -  
mse: 1.1213 - val\_loss: 1.0232 - val\_mse: 1.0232

Epoch 4/5

3353317/3353317 [=====] - 12s 4us/step - loss: 1.1190 -  
mse: 1.1190 - val\_loss: 1.0234 - val\_mse: 1.0234

Epoch 5/5

3353317/3353317 [=====] - 12s 4us/step - loss: 1.1173 -  
mse: 1.1173 - val\_loss: 1.0234 - val\_mse: 1.0234

1676659/1676659 [=====] - 3s 2us/step

Train on 3353318 samples, validate on 221802 samples

Epoch 1/5

3353318/3353318 [=====] - 14s 4us/step - loss: 1.3769 -

```

mse: 1.3769 - val_loss: 1.0299 - val_mse: 1.0299
Epoch 2/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3555 -
mse: 1.3555 - val_loss: 1.0281 - val_mse: 1.0281
Epoch 3/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3518 -
mse: 1.3519 - val_loss: 1.0282 - val_mse: 1.0282
Epoch 4/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3497 -
mse: 1.3497 - val_loss: 1.0277 - val_mse: 1.0277
Epoch 5/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3479 -
mse: 1.3479 - val_loss: 1.0286 - val_mse: 1.0286
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2746 -
mse: 1.2746 - val_loss: 1.0278 - val_mse: 1.0278
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2538 -
mse: 1.2538 - val_loss: 1.0257 - val_mse: 1.0257
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2490 -
mse: 1.2490 - val_loss: 1.0256 - val_mse: 1.0256
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2457 -
mse: 1.2457 - val_loss: 1.0196 - val_mse: 1.0196
Epoch 5/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2430 -
mse: 1.2430 - val_loss: 1.0165 - val_mse: 1.0165
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1423 -
mse: 1.1423 - val_loss: 1.0268 - val_mse: 1.0268
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1243 -
mse: 1.1243 - val_loss: 1.0242 - val_mse: 1.0242
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1198 -
mse: 1.1198 - val_loss: 1.0231 - val_mse: 1.0231
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1170 -
mse: 1.1170 - val_loss: 1.0200 - val_mse: 1.0200
Epoch 5/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1146 -
mse: 1.1146 - val_loss: 1.0192 - val_mse: 1.0192
1676659/1676659 [=====] - 3s 2us/step

```

Train on 3353318 samples, validate on 221802 samples

Epoch 1/5  
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3710 -  
mse: 1.3710 - val\_loss: 1.0261 - val\_mse: 1.0261

Epoch 2/5  
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3492 -  
mse: 1.3492 - val\_loss: 1.0249 - val\_mse: 1.0249

Epoch 3/5  
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3435 -  
mse: 1.3435 - val\_loss: 1.0258 - val\_mse: 1.0258

Epoch 4/5  
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3400 -  
mse: 1.3400 - val\_loss: 1.0252 - val\_mse: 1.0252

Epoch 5/5  
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3378 -  
mse: 1.3378 - val\_loss: 1.0234 - val\_mse: 1.0234  
1676658/1676658 [=====] - 3s 2us/step

Train on 3353317 samples, validate on 221802 samples

Epoch 1/5  
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2774 -  
mse: 1.2774 - val\_loss: 1.0264 - val\_mse: 1.0264

Epoch 2/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2560 -  
mse: 1.2560 - val\_loss: 1.0238 - val\_mse: 1.0238

Epoch 3/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2521 -  
mse: 1.2521 - val\_loss: 1.0240 - val\_mse: 1.0240

Epoch 4/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2494 -  
mse: 1.2494 - val\_loss: 1.0234 - val\_mse: 1.0234

Epoch 5/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2472 -  
mse: 1.2472 - val\_loss: 1.0231 - val\_mse: 1.0231  
1676659/1676659 [=====] - 3s 2us/step

Train on 3353317 samples, validate on 221802 samples

Epoch 1/5  
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1438 -  
mse: 1.1438 - val\_loss: 1.0289 - val\_mse: 1.0289

Epoch 2/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1256 -  
mse: 1.1256 - val\_loss: 1.0259 - val\_mse: 1.0259

Epoch 3/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1221 -  
mse: 1.1221 - val\_loss: 1.0260 - val\_mse: 1.0260

Epoch 4/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1196 -  
mse: 1.1196 - val\_loss: 1.0238 - val\_mse: 1.0238

Epoch 5/5

```

3353317/3353317 [=====] - 13s 4us/step - loss: 1.1177 -
mse: 1.1177 - val_loss: 1.0227 - val_mse: 1.0227
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3756 -
mse: 1.3756 - val_loss: 1.0263 - val_mse: 1.0263
Epoch 2/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3528 -
mse: 1.3528 - val_loss: 1.0266 - val_mse: 1.0266
Epoch 3/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3489 -
mse: 1.3489 - val_loss: 1.0268 - val_mse: 1.0268
Epoch 4/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3463 -
mse: 1.3463 - val_loss: 1.0272 - val_mse: 1.0272
Epoch 5/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3438 -
mse: 1.3438 - val_loss: 1.0254 - val_mse: 1.0254
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.4656 -
mse: 1.4656 - val_loss: 1.1683 - val_mse: 1.1683
Epoch 2/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.4615 -
mse: 1.4615 - val_loss: 1.1687 - val_mse: 1.1687
Epoch 3/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.4615 -
mse: 1.4615 - val_loss: 1.1688 - val_mse: 1.1688
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.4615 -
mse: 1.4615 - val_loss: 1.1685 - val_mse: 1.1685
Epoch 5/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.4615 -
mse: 1.4615 - val_loss: 1.1684 - val_mse: 1.1684
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.3209 -
mse: 1.3209 - val_loss: 1.1676 - val_mse: 1.1676
Epoch 2/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.3160 -
mse: 1.3161 - val_loss: 1.1676 - val_mse: 1.1676
Epoch 3/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.3161 -
mse: 1.3161 - val_loss: 1.1675 - val_mse: 1.1675
Epoch 4/5

```

```

3353317/3353317 [=====] - 12s 4us/step - loss: 1.3160 -
mse: 1.3160 - val_loss: 1.1673 - val_mse: 1.1673
Epoch 5/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.3161 -
mse: 1.3161 - val_loss: 1.1677 - val_mse: 1.1677
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 14s 4us/step - loss: 1.5785 -
mse: 1.5785 - val_loss: 1.1698 - val_mse: 1.1698
Epoch 2/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.5752 -
mse: 1.5752 - val_loss: 1.1700 - val_mse: 1.1700
Epoch 3/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.5752 -
mse: 1.5752 - val_loss: 1.1695 - val_mse: 1.1695
Epoch 4/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.5752 -
mse: 1.5752 - val_loss: 1.1698 - val_mse: 1.1698
Epoch 5/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.5752 -
mse: 1.5752 - val_loss: 1.1697 - val_mse: 1.1697
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2763 -
mse: 1.2763 - val_loss: 1.0274 - val_mse: 1.0274
Epoch 2/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2547 -
mse: 1.2547 - val_loss: 1.0237 - val_mse: 1.0237
Epoch 3/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2499 -
mse: 1.2499 - val_loss: 1.0221 - val_mse: 1.0221
Epoch 4/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2461 -
mse: 1.2461 - val_loss: 1.0187 - val_mse: 1.0187
Epoch 5/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2432 -
mse: 1.2432 - val_loss: 1.0174 - val_mse: 1.0174
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1407 -
mse: 1.1407 - val_loss: 1.0244 - val_mse: 1.0244
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1228 -
mse: 1.1228 - val_loss: 1.0237 - val_mse: 1.0237
Epoch 3/5

```

```

3353317/3353317 [=====] - 12s 4us/step - loss: 1.1184 -
mse: 1.1184 - val_loss: 1.0219 - val_mse: 1.0219
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1156 -
mse: 1.1156 - val_loss: 1.0201 - val_mse: 1.0201
Epoch 5/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1136 -
mse: 1.1136 - val_loss: 1.0210 - val_mse: 1.0210
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3695 -
mse: 1.3695 - val_loss: 1.0255 - val_mse: 1.0255
Epoch 2/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3487 -
mse: 1.3487 - val_loss: 1.0248 - val_mse: 1.0248
Epoch 3/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3438 -
mse: 1.3438 - val_loss: 1.0246 - val_mse: 1.0246
Epoch 4/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3406 -
mse: 1.3406 - val_loss: 1.0238 - val_mse: 1.0238
Epoch 5/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3383 -
mse: 1.3383 - val_loss: 1.0234 - val_mse: 1.0234
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2747 -
mse: 1.2747 - val_loss: 1.0277 - val_mse: 1.0277
Epoch 2/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2537 -
mse: 1.2537 - val_loss: 1.0208 - val_mse: 1.0208
Epoch 3/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2485 -
mse: 1.2485 - val_loss: 1.0194 - val_mse: 1.0194
Epoch 4/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2445 -
mse: 1.2445 - val_loss: 1.0167 - val_mse: 1.0167
Epoch 5/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2413 -
mse: 1.2413 - val_loss: 1.0139 - val_mse: 1.0139
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1392 -
mse: 1.1392 - val_loss: 1.0260 - val_mse: 1.0260
Epoch 2/5

```

```

3353317/3353317 [=====] - 14s 4us/step - loss: 1.1229 -
mse: 1.1229 - val_loss: 1.0247 - val_mse: 1.0247
Epoch 3/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1191 -
mse: 1.1191 - val_loss: 1.0249 - val_mse: 1.0249
Epoch 4/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1167 -
mse: 1.1167 - val_loss: 1.0231 - val_mse: 1.0231
Epoch 5/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1149 -
mse: 1.1149 - val_loss: 1.0241 - val_mse: 1.0241
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3705 -
mse: 1.3705 - val_loss: 1.0254 - val_mse: 1.0254
Epoch 2/5
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3492 -
mse: 1.3492 - val_loss: 1.0256 - val_mse: 1.0256
Epoch 3/5
3353318/3353318 [=====] - 15s 4us/step - loss: 1.3443 -
mse: 1.3443 - val_loss: 1.0245 - val_mse: 1.0245
Epoch 4/5
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3411 -
mse: 1.3411 - val_loss: 1.0241 - val_mse: 1.0241
Epoch 5/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3388 -
mse: 1.3388 - val_loss: 1.0213 - val_mse: 1.0213
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2740 -
mse: 1.2740 - val_loss: 1.0246 - val_mse: 1.0246
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2536 -
mse: 1.2536 - val_loss: 1.0235 - val_mse: 1.0235
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2489 -
mse: 1.2489 - val_loss: 1.0195 - val_mse: 1.0195
Epoch 4/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2454 -
mse: 1.2454 - val_loss: 1.0214 - val_mse: 1.0214
Epoch 5/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2428 -
mse: 1.2428 - val_loss: 1.0223 - val_mse: 1.0223
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5

```

```

3353317/3353317 [=====] - 14s 4us/step - loss: 1.1399 -
mse: 1.1399 - val_loss: 1.0260 - val_mse: 1.0260
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1238 -
mse: 1.1238 - val_loss: 1.0236 - val_mse: 1.0236
Epoch 3/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1201 -
mse: 1.1201 - val_loss: 1.0225 - val_mse: 1.0225
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1174 -
mse: 1.1174 - val_loss: 1.0227 - val_mse: 1.0227
Epoch 5/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1154 -
mse: 1.1154 - val_loss: 1.0199 - val_mse: 1.0199
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3705 -
mse: 1.3705 - val_loss: 1.0255 - val_mse: 1.0255
Epoch 2/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3498 -
mse: 1.3498 - val_loss: 1.0244 - val_mse: 1.0244
Epoch 3/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3449 -
mse: 1.3449 - val_loss: 1.0242 - val_mse: 1.0242
Epoch 4/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3415 -
mse: 1.3415 - val_loss: 1.0223 - val_mse: 1.0223
Epoch 5/5
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3389 -
mse: 1.3389 - val_loss: 1.0214 - val_mse: 1.0214
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2723 -
mse: 1.2723 - val_loss: 1.0273 - val_mse: 1.0273
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2531 -
mse: 1.2531 - val_loss: 1.0260 - val_mse: 1.0260
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2482 -
mse: 1.2482 - val_loss: 1.0211 - val_mse: 1.0211
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2446 -
mse: 1.2446 - val_loss: 1.0177 - val_mse: 1.0177
Epoch 5/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2419 -
mse: 1.2419 - val_loss: 1.0169 - val_mse: 1.0169

```



```

1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1402 -
mse: 1.1402 - val_loss: 1.0280 - val_mse: 1.0280
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1228 -
mse: 1.1228 - val_loss: 1.0237 - val_mse: 1.0237
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1185 -
mse: 1.1185 - val_loss: 1.0197 - val_mse: 1.0197
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1153 -
mse: 1.1153 - val_loss: 1.0198 - val_mse: 1.0198
Epoch 5/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1129 -
mse: 1.1129 - val_loss: 1.0172 - val_mse: 1.0172
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3734 -
mse: 1.3734 - val_loss: 1.0251 - val_mse: 1.0251
Epoch 2/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3507 -
mse: 1.3507 - val_loss: 1.0263 - val_mse: 1.0263
Epoch 3/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3452 -
mse: 1.3452 - val_loss: 1.0272 - val_mse: 1.0272
Epoch 4/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3414 -
mse: 1.3414 - val_loss: 1.0238 - val_mse: 1.0238
Epoch 5/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3388 -
mse: 1.3388 - val_loss: 1.0240 - val_mse: 1.0240
1676658/1676658 [=====] - 3s 2us/step
Train on 5029976 samples, validate on 221802 samples
Epoch 1/5
5029976/5029976 [=====] - 26s 5us/step - loss: 1.2571 -
mse: 1.2571 - val_loss: 1.0274 - val_mse: 1.0274
Epoch 2/5
5029976/5029976 [=====] - 27s 5us/step - loss: 1.2390 -
mse: 1.2391 - val_loss: 1.0203 - val_mse: 1.0203
Epoch 3/5
5029976/5029976 [=====] - 27s 5us/step - loss: 1.2338 -
mse: 1.2338 - val_loss: 1.0189 - val_mse: 1.0189
Epoch 4/5
5029976/5029976 [=====] - 28s 5us/step - loss: 1.2306 -
mse: 1.2306 - val_loss: 1.0172 - val_mse: 1.0172

```

```
Epoch 5/5
5029976/5029976 [=====] - 29s 6us/step - loss: 1.2282 -
mse: 1.2282 - val_loss: 1.0144 - val_mse: 1.0144
1.1115695249190403
{'batch_size': 1000, 'epochs': 5, 'init': 'he_normal', 'optimizer': 'Adam'}
```

```
[20]: param_grid = dict(optimizer=['Adam'], epochs=[5], batch_size=[1000],
    ↪init=['he_normal'], activation=activation)

model = KerasRegressor(build_fn=create_model, verbose=1)

grid = GridSearchCV(estimator=model, param_grid=param_grid, cv=3)
grid_result = grid.fit(train_x, train_y, validation_data=(valid_x, valid_y))

print(np.sqrt(-grid_result.best_score_))
print(grid_result.best_params_)
```

Train on 3353317 samples, validate on 221802 samples

```
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2745 -
mse: 1.2745 - val_loss: 1.0303 - val_mse: 1.0303
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2527 -
mse: 1.2527 - val_loss: 1.0225 - val_mse: 1.0225
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2477 -
mse: 1.2477 - val_loss: 1.0198 - val_mse: 1.0198
Epoch 4/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2442 -
mse: 1.2442 - val_loss: 1.0170 - val_mse: 1.0170
Epoch 5/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2412 -
mse: 1.2412 - val_loss: 1.0196 - val_mse: 1.0196
1676659/1676659 [=====] - 3s 2us/step
```

Train on 3353317 samples, validate on 221802 samples

```
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1401 -
mse: 1.1401 - val_loss: 1.0247 - val_mse: 1.0247
Epoch 2/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1229 -
mse: 1.1229 - val_loss: 1.0236 - val_mse: 1.0236
Epoch 3/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1186 -
mse: 1.1186 - val_loss: 1.0218 - val_mse: 1.0218
Epoch 4/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1154 -
mse: 1.1154 - val_loss: 1.0202 - val_mse: 1.0202
Epoch 5/5
```

```

3353317/3353317 [=====] - 12s 4us/step - loss: 1.1131 -
mse: 1.1131 - val_loss: 1.0186 - val_mse: 1.0186
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 1626s 485us/step - loss:
1.3698 - mse: 1.3698 - val_loss: 1.0282 - val_mse: 1.0282
Epoch 2/5
3353318/3353318 [=====] - 508s 152us/step - loss:
1.3482 - mse: 1.3482 - val_loss: 1.0242 - val_mse: 1.0242
Epoch 3/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3426 -
mse: 1.3426 - val_loss: 1.0237 - val_mse: 1.0237
Epoch 4/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3393 -
mse: 1.3393 - val_loss: 1.0215 - val_mse: 1.0215
Epoch 5/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3369 -
mse: 1.3369 - val_loss: 1.0240 - val_mse: 1.0240
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 15s 4us/step - loss: 1.2740 -
mse: 1.2740 - val_loss: 1.0304 - val_mse: 1.0304
Epoch 2/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2539 -
mse: 1.2539 - val_loss: 1.0230 - val_mse: 1.0230
Epoch 3/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2500 -
mse: 1.2500 - val_loss: 1.0227 - val_mse: 1.0227
Epoch 4/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2471 -
mse: 1.2471 - val_loss: 1.0200 - val_mse: 1.0200
Epoch 5/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2444 -
mse: 1.2444 - val_loss: 1.0187 - val_mse: 1.0187
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 15s 4us/step - loss: 1.1429 -
mse: 1.1429 - val_loss: 1.0255 - val_mse: 1.0255
Epoch 2/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1241 -
mse: 1.1241 - val_loss: 1.0320 - val_mse: 1.0320
Epoch 3/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1204 -
mse: 1.1204 - val_loss: 1.0254 - val_mse: 1.0254
Epoch 4/5

```

```

3353317/3353317 [=====] - 14s 4us/step - loss: 1.1178 -
mse: 1.1178 - val_loss: 1.0215 - val_mse: 1.0215
Epoch 5/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1158 -
mse: 1.1158 - val_loss: 1.0203 - val_mse: 1.0203
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3718 -
mse: 1.3718 - val_loss: 1.0271 - val_mse: 1.0271
Epoch 2/5
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3498 -
mse: 1.3498 - val_loss: 1.0275 - val_mse: 1.0275
Epoch 3/5
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3456 -
mse: 1.3456 - val_loss: 1.0257 - val_mse: 1.0257
Epoch 4/5
3353318/3353318 [=====] - 15s 4us/step - loss: 1.3428 -
mse: 1.3428 - val_loss: 1.0236 - val_mse: 1.0236
Epoch 5/5
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3406 -
mse: 1.3406 - val_loss: 1.0219 - val_mse: 1.0219
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2998 -
mse: 1.2998 - val_loss: 1.0344 - val_mse: 1.0344
Epoch 2/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2665 -
mse: 1.2665 - val_loss: 1.0284 - val_mse: 1.0284
Epoch 3/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2581 -
mse: 1.2581 - val_loss: 1.0262 - val_mse: 1.0262
Epoch 4/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2550 -
mse: 1.2550 - val_loss: 1.0262 - val_mse: 1.0262
Epoch 5/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2530 -
mse: 1.2530 - val_loss: 1.0251 - val_mse: 1.0251
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 15s 4us/step - loss: 1.1606 -
mse: 1.1606 - val_loss: 1.0344 - val_mse: 1.0344
Epoch 2/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1327 -
mse: 1.1327 - val_loss: 1.0260 - val_mse: 1.0260
Epoch 3/5

```

```

3353317/3353317 [=====] - 14s 4us/step - loss: 1.1266 -
mse: 1.1266 - val_loss: 1.0260 - val_mse: 1.0260
Epoch 4/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1243 -
mse: 1.1243 - val_loss: 1.0257 - val_mse: 1.0257
Epoch 5/5
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1227 -
mse: 1.1227 - val_loss: 1.0256 - val_mse: 1.0256
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 15s 5us/step - loss: 1.3972 -
mse: 1.3972 - val_loss: 1.0371 - val_mse: 1.0371
Epoch 2/5
3353318/3353318 [=====] - 15s 4us/step - loss: 1.3638 -
mse: 1.3638 - val_loss: 1.0273 - val_mse: 1.0273
Epoch 3/5
3353318/3353318 [=====] - 15s 4us/step - loss: 1.3546 -
mse: 1.3546 - val_loss: 1.0269 - val_mse: 1.0269
Epoch 4/5
3353318/3353318 [=====] - 15s 4us/step - loss: 1.3510 -
mse: 1.3510 - val_loss: 1.0269 - val_mse: 1.0269
Epoch 5/5
3353318/3353318 [=====] - 15s 4us/step - loss: 1.3488 -
mse: 1.3488 - val_loss: 1.0269 - val_mse: 1.0269
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 20s 6us/step - loss: 1.3013 -
mse: 1.3013 - val_loss: 1.0374 - val_mse: 1.0374
Epoch 2/5
3353317/3353317 [=====] - 20s 6us/step - loss: 1.2757 -
mse: 1.2757 - val_loss: 1.0373 - val_mse: 1.0373
Epoch 3/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.2727 -
mse: 1.2727 - val_loss: 1.0368 - val_mse: 1.0368
Epoch 4/5
3353317/3353317 [=====] - 20s 6us/step - loss: 1.2719 -
mse: 1.2719 - val_loss: 1.0356 - val_mse: 1.0356
Epoch 5/5
3353317/3353317 [=====] - 20s 6us/step - loss: 1.2714 -
mse: 1.2714 - val_loss: 1.0362 - val_mse: 1.0362
1676659/1676659 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.1632 -
mse: 1.1632 - val_loss: 1.0379 - val_mse: 1.0379
Epoch 2/5

```

```

3353317/3353317 [=====] - 19s 6us/step - loss: 1.1412 -
mse: 1.1412 - val_loss: 1.0344 - val_mse: 1.0344
Epoch 3/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.1391 -
mse: 1.1391 - val_loss: 1.0341 - val_mse: 1.0341
Epoch 4/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.1385 -
mse: 1.1385 - val_loss: 1.0348 - val_mse: 1.0348
Epoch 5/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.1382 -
mse: 1.1382 - val_loss: 1.0344 - val_mse: 1.0344
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 19s 6us/step - loss: 1.4002 -
mse: 1.4002 - val_loss: 1.0389 - val_mse: 1.0389
Epoch 2/5
3353318/3353318 [=====] - 20s 6us/step - loss: 1.3722 -
mse: 1.3722 - val_loss: 1.0350 - val_mse: 1.0350
Epoch 3/5
3353318/3353318 [=====] - 20s 6us/step - loss: 1.3690 -
mse: 1.3690 - val_loss: 1.0355 - val_mse: 1.0355
Epoch 4/5
3353318/3353318 [=====] - 20s 6us/step - loss: 1.3681 -
mse: 1.3681 - val_loss: 1.0361 - val_mse: 1.0361
Epoch 5/5
3353318/3353318 [=====] - 20s 6us/step - loss: 1.3675 -
mse: 1.3675 - val_loss: 1.0374 - val_mse: 1.0374
1676658/1676658 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.2847 -
mse: 1.2847 - val_loss: 1.0342 - val_mse: 1.0342
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2719 -
mse: 1.2719 - val_loss: 1.0351 - val_mse: 1.0351
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2712 -
mse: 1.2712 - val_loss: 1.0337 - val_mse: 1.0337
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2710 -
mse: 1.2710 - val_loss: 1.0384 - val_mse: 1.0384
Epoch 5/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2709 -
mse: 1.2709 - val_loss: 1.0360 - val_mse: 1.0360
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5

```

```

3353317/3353317 [=====] - 13s 4us/step - loss: 1.1473 -
mse: 1.1473 - val_loss: 1.0344 - val_mse: 1.0344
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1386 -
mse: 1.1386 - val_loss: 1.0350 - val_mse: 1.0350
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1381 -
mse: 1.1381 - val_loss: 1.0356 - val_mse: 1.0356
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1379 -
mse: 1.1379 - val_loss: 1.0367 - val_mse: 1.0367
Epoch 5/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1378 -
mse: 1.1378 - val_loss: 1.0358 - val_mse: 1.0358
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3816 -
mse: 1.3816 - val_loss: 1.0355 - val_mse: 1.0355
Epoch 2/5
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3681 -
mse: 1.3681 - val_loss: 1.0376 - val_mse: 1.0376
Epoch 3/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3673 -
mse: 1.3673 - val_loss: 1.0399 - val_mse: 1.0399
Epoch 4/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3670 -
mse: 1.3670 - val_loss: 1.0388 - val_mse: 1.0388
Epoch 5/5
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3668 -
mse: 1.3668 - val_loss: 1.0382 - val_mse: 1.0382
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.3254 -
mse: 1.3254 - val_loss: 1.0375 - val_mse: 1.0375
Epoch 2/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.2706 -
mse: 1.2706 - val_loss: 1.0303 - val_mse: 1.0303
Epoch 3/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2614 -
mse: 1.2614 - val_loss: 1.0291 - val_mse: 1.0291
Epoch 4/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.2579 -
mse: 1.2579 - val_loss: 1.0280 - val_mse: 1.0280
Epoch 5/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.2553 -
mse: 1.2553 - val_loss: 1.0257 - val_mse: 1.0257

```

```

1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 16s 5us/step - loss: 1.1890 -
mse: 1.1890 - val_loss: 1.0391 - val_mse: 1.0391
Epoch 2/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.1385 -
mse: 1.1385 - val_loss: 1.0292 - val_mse: 1.0292
Epoch 3/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.1301 -
mse: 1.1301 - val_loss: 1.0273 - val_mse: 1.0273
Epoch 4/5
3353317/3353317 [=====] - 16s 5us/step - loss: 1.1270 -
mse: 1.1270 - val_loss: 1.0275 - val_mse: 1.0275
Epoch 5/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.1248 -
mse: 1.1248 - val_loss: 1.0270 - val_mse: 1.0270
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.4268 -
mse: 1.4268 - val_loss: 1.0428 - val_mse: 1.0428
Epoch 2/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3692 -
mse: 1.3692 - val_loss: 1.0306 - val_mse: 1.0306
Epoch 3/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3585 -
mse: 1.3585 - val_loss: 1.0290 - val_mse: 1.0290
Epoch 4/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3536 -
mse: 1.3536 - val_loss: 1.0290 - val_mse: 1.0290
Epoch 5/5
3353318/3353318 [=====] - 17s 5us/step - loss: 1.3506 -
mse: 1.3506 - val_loss: 1.0302 - val_mse: 1.0302
1676658/1676658 [=====] - 4s 2us/step
Train on 5029976 samples, validate on 221802 samples
Epoch 1/5
5029976/5029976 [=====] - 29s 6us/step - loss: 1.2588 -
mse: 1.2588 - val_loss: 1.0266 - val_mse: 1.0266
Epoch 2/5
5029976/5029976 [=====] - 29s 6us/step - loss: 1.2405 -
mse: 1.2405 - val_loss: 1.0229 - val_mse: 1.0229
Epoch 3/5
5029976/5029976 [=====] - 29s 6us/step - loss: 1.2362 -
mse: 1.2362 - val_loss: 1.0210 - val_mse: 1.0210
Epoch 4/5
5029976/5029976 [=====] - 29s 6us/step - loss: 1.2333 -
mse: 1.2333 - val_loss: 1.0186 - val_mse: 1.0186

```



```
Epoch 5/5
5029976/5029976 [=====] - 29s 6us/step - loss: 1.2306 -
mse: 1.2306 - val_loss: 1.0145 - val_mse: 1.0145
1.1119618093410104
{'activation': 'tanh', 'batch_size': 1000, 'epochs': 5, 'init': 'he_normal',
'optimizer': 'Adam'}
```

```
[21]: param_grid = dict(optimizer=['Adam'], epochs=[5], batch_size=[1000],
    ↪init=['he_normal'], activation=['tanh'], neurons=neurons)

model = KerasRegressor(build_fn=create_model, verbose=1)

grid = GridSearchCV(estimator=model, param_grid=param_grid, cv=3)
grid_result = grid.fit(train_x, train_y, validation_data=(valid_x, valid_y))

print(np.sqrt(-grid_result.best_score_))
print(grid_result.best_params_)
```

Train on 3353317 samples, validate on 221802 samples

```
Epoch 1/5
3353317/3353317 [=====] - 15s 4us/step - loss: 1.2829 -
mse: 1.2829 - val_loss: 1.0278 - val_mse: 1.0278
Epoch 2/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2573 -
mse: 1.2573 - val_loss: 1.0271 - val_mse: 1.0271
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2528 -
mse: 1.2528 - val_loss: 1.0241 - val_mse: 1.0241
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2501 -
mse: 1.2501 - val_loss: 1.0230 - val_mse: 1.0230
Epoch 5/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.2481 -
mse: 1.2481 - val_loss: 1.0211 - val_mse: 1.0211
1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1489 -
mse: 1.1489 - val_loss: 1.0276 - val_mse: 1.0276
Epoch 2/5
3353317/3353317 [=====] - 12s 4us/step - loss: 1.1258 -
mse: 1.1258 - val_loss: 1.0254 - val_mse: 1.0254
Epoch 3/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1222 -
mse: 1.1222 - val_loss: 1.0249 - val_mse: 1.0249
Epoch 4/5
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1197 -
mse: 1.1197 - val_loss: 1.0235 - val_mse: 1.0235
```

Epoch 5/5  
3353317/3353317 [=====] - 13s 4us/step - loss: 1.1175 -  
mse: 1.1175 - val\_loss: 1.0216 - val\_mse: 1.0216  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353318 samples, validate on 221802 samples  
Epoch 1/5  
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3801 -  
mse: 1.3801 - val\_loss: 1.0264 - val\_mse: 1.0264  
Epoch 2/5  
3353318/3353318 [=====] - 12s 4us/step - loss: 1.3527 -  
mse: 1.3527 - val\_loss: 1.0262 - val\_mse: 1.0262  
Epoch 3/5  
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3479 -  
mse: 1.3479 - val\_loss: 1.0275 - val\_mse: 1.0275  
Epoch 4/5  
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3451 -  
mse: 1.3451 - val\_loss: 1.0259 - val\_mse: 1.0259  
Epoch 5/5  
3353318/3353318 [=====] - 13s 4us/step - loss: 1.3431 -  
mse: 1.3431 - val\_loss: 1.0260 - val\_mse: 1.0260  
1676658/1676658 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/5  
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2747 -  
mse: 1.2747 - val\_loss: 1.0276 - val\_mse: 1.0276  
Epoch 2/5  
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2539 -  
mse: 1.2539 - val\_loss: 1.0247 - val\_mse: 1.0247  
Epoch 3/5  
3353317/3353317 [=====] - 15s 4us/step - loss: 1.2498 -  
mse: 1.2498 - val\_loss: 1.0287 - val\_mse: 1.0287  
Epoch 4/5  
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2471 -  
mse: 1.2471 - val\_loss: 1.0223 - val\_mse: 1.0223  
Epoch 5/5  
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2446 -  
mse: 1.2446 - val\_loss: 1.0200 - val\_mse: 1.0200  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/5  
3353317/3353317 [=====] - 14s 4us/step - loss: 1.1414 -  
mse: 1.1414 - val\_loss: 1.0263 - val\_mse: 1.0263  
Epoch 2/5  
3353317/3353317 [=====] - 15s 4us/step - loss: 1.1237 -  
mse: 1.1237 - val\_loss: 1.0251 - val\_mse: 1.0251  
Epoch 3/5  
3353317/3353317 [=====] - 15s 5us/step - loss: 1.1203 -  
mse: 1.1203 - val\_loss: 1.0245 - val\_mse: 1.0245

Epoch 4/5  
3353317/3353317 [=====] - 15s 4us/step - loss: 1.1180 -  
mse: 1.1180 - val\_loss: 1.0230 - val\_mse: 1.0230  
Epoch 5/5  
3353317/3353317 [=====] - 15s 4us/step - loss: 1.1159 -  
mse: 1.1159 - val\_loss: 1.0242 - val\_mse: 1.0242  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353318 samples, validate on 221802 samples  
Epoch 1/5  
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3740 -  
mse: 1.3740 - val\_loss: 1.0264 - val\_mse: 1.0264  
Epoch 2/5  
3353318/3353318 [=====] - 15s 4us/step - loss: 1.3503 -  
mse: 1.3503 - val\_loss: 1.0266 - val\_mse: 1.0266  
Epoch 3/5  
3353318/3353318 [=====] - 15s 4us/step - loss: 1.3458 -  
mse: 1.3458 - val\_loss: 1.0247 - val\_mse: 1.0247  
Epoch 4/5  
3353318/3353318 [=====] - 15s 4us/step - loss: 1.3429 -  
mse: 1.3429 - val\_loss: 1.0249 - val\_mse: 1.0249  
Epoch 5/5  
3353318/3353318 [=====] - 15s 4us/step - loss: 1.3407 -  
mse: 1.3407 - val\_loss: 1.0236 - val\_mse: 1.0236  
1676658/1676658 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/5  
3353317/3353317 [=====] - 14s 4us/step - loss: 1.2711 -  
mse: 1.2711 - val\_loss: 1.0285 - val\_mse: 1.0285  
Epoch 2/5  
3353317/3353317 [=====] - 15s 4us/step - loss: 1.2527 -  
mse: 1.2527 - val\_loss: 1.0230 - val\_mse: 1.0230  
Epoch 3/5  
3353317/3353317 [=====] - 15s 4us/step - loss: 1.2487 -  
mse: 1.2487 - val\_loss: 1.0211 - val\_mse: 1.0211  
Epoch 4/5  
3353317/3353317 [=====] - 15s 4us/step - loss: 1.2458 -  
mse: 1.2458 - val\_loss: 1.0188 - val\_mse: 1.0188  
Epoch 5/5  
3353317/3353317 [=====] - 15s 4us/step - loss: 1.2430 -  
mse: 1.2430 - val\_loss: 1.0161 - val\_mse: 1.0161  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/5  
3353317/3353317 [=====] - 15s 4us/step - loss: 1.1379 -  
mse: 1.1379 - val\_loss: 1.0261 - val\_mse: 1.0261  
Epoch 2/5  
3353317/3353317 [=====] - 15s 5us/step - loss: 1.1225 -  
mse: 1.1225 - val\_loss: 1.0255 - val\_mse: 1.0255

Epoch 3/5  
3353317/3353317 [=====] - 15s 5us/step - loss: 1.1191 -  
mse: 1.1191 - val\_loss: 1.0231 - val\_mse: 1.0231

Epoch 4/5  
3353317/3353317 [=====] - 15s 5us/step - loss: 1.1167 -  
mse: 1.1167 - val\_loss: 1.0224 - val\_mse: 1.0224

Epoch 5/5  
3353317/3353317 [=====] - 15s 5us/step - loss: 1.1146 -  
mse: 1.1146 - val\_loss: 1.0236 - val\_mse: 1.0236  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353318 samples, validate on 221802 samples

Epoch 1/5  
3353318/3353318 [=====] - 14s 4us/step - loss: 1.3691 -  
mse: 1.3691 - val\_loss: 1.0270 - val\_mse: 1.0270

Epoch 2/5  
3353318/3353318 [=====] - 15s 5us/step - loss: 1.3483 -  
mse: 1.3483 - val\_loss: 1.0261 - val\_mse: 1.0261

Epoch 3/5  
3353318/3353318 [=====] - 15s 5us/step - loss: 1.3442 -  
mse: 1.3442 - val\_loss: 1.0269 - val\_mse: 1.0269

Epoch 4/5  
3353318/3353318 [=====] - 15s 5us/step - loss: 1.3416 -  
mse: 1.3416 - val\_loss: 1.0245 - val\_mse: 1.0245

Epoch 5/5  
3353318/3353318 [=====] - 16s 5us/step - loss: 1.3393 -  
mse: 1.3393 - val\_loss: 1.0252 - val\_mse: 1.0252  
1676658/1676658 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples

Epoch 1/5  
3353317/3353317 [=====] - 17s 5us/step - loss: 1.2672 -  
mse: 1.2672 - val\_loss: 1.0349 - val\_mse: 1.0349

Epoch 2/5  
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2515 -  
mse: 1.2515 - val\_loss: 1.0232 - val\_mse: 1.0232

Epoch 3/5  
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2475 -  
mse: 1.2475 - val\_loss: 1.0191 - val\_mse: 1.0191

Epoch 4/5  
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2445 -  
mse: 1.2445 - val\_loss: 1.0170 - val\_mse: 1.0170

Epoch 5/5  
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2415 -  
mse: 1.2415 - val\_loss: 1.0146 - val\_mse: 1.0146  
1676659/1676659 [=====] - 4s 2us/step  
Train on 3353317 samples, validate on 221802 samples

Epoch 1/5  
3353317/3353317 [=====] - 17s 5us/step - loss: 1.1357 -  
mse: 1.1357 - val\_loss: 1.0253 - val\_mse: 1.0253

```

Epoch 2/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1215 -
mse: 1.1215 - val_loss: 1.0239 - val_mse: 1.0239
Epoch 3/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1183 -
mse: 1.1183 - val_loss: 1.0246 - val_mse: 1.0246
Epoch 4/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1159 -
mse: 1.1159 - val_loss: 1.0251 - val_mse: 1.0251
Epoch 5/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1136 -
mse: 1.1136 - val_loss: 1.0178 - val_mse: 1.0178
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 17s 5us/step - loss: 1.3641 -
mse: 1.3641 - val_loss: 1.0275 - val_mse: 1.0275
Epoch 2/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3468 -
mse: 1.3468 - val_loss: 1.0282 - val_mse: 1.0282
Epoch 3/5
3353318/3353318 [=====] - 17s 5us/step - loss: 1.3430 -
mse: 1.3430 - val_loss: 1.0277 - val_mse: 1.0277
Epoch 4/5
3353318/3353318 [=====] - 17s 5us/step - loss: 1.3403 -
mse: 1.3403 - val_loss: 1.0252 - val_mse: 1.0252
Epoch 5/5
3353318/3353318 [=====] - 17s 5us/step - loss: 1.3384 -
mse: 1.3384 - val_loss: 1.0214 - val_mse: 1.0214
1676658/1676658 [=====] - 4s 2us/step
Train on 5029976 samples, validate on 221802 samples
Epoch 1/5
5029976/5029976 [=====] - 33s 7us/step - loss: 1.2528 -
mse: 1.2528 - val_loss: 1.0241 - val_mse: 1.0241
Epoch 2/5
5029976/5029976 [=====] - 34s 7us/step - loss: 1.2379 -
mse: 1.2379 - val_loss: 1.0230 - val_mse: 1.0230
Epoch 3/5
5029976/5029976 [=====] - 33s 7us/step - loss: 1.2337 -
mse: 1.2337 - val_loss: 1.0185 - val_mse: 1.0185
Epoch 4/5
5029976/5029976 [=====] - 34s 7us/step - loss: 1.2303 -
mse: 1.2303 - val_loss: 1.0138 - val_mse: 1.0138
Epoch 5/5
5029976/5029976 [=====] - 33s 7us/step - loss: 1.2278 -
mse: 1.2278 - val_loss: 1.0112 - val_mse: 1.0112
1.1115709604966868
{'activation': 'tanh', 'batch_size': 1000, 'epochs': 5, 'init': 'he_normal',

```

```
'neurons': 200, 'optimizer': 'Adam']
```

```
[22]: param_grid = dict(optimizer=['Adam'], epochs=[5], batch_size=[1000],  
    ↪init=['he_normal'], activation=['tanh'], neurons=[200],  
    ↪activation2=activation2)  
  
model = KerasRegressor(build_fn=create_model, verbose=1)  
  
grid = GridSearchCV(estimator=model, param_grid=param_grid, cv=3)  
grid_result = grid.fit(train_x, train_y, validation_data=(valid_x, valid_y))  
  
print(np.sqrt(-grid_result.best_score_))  
print(grid_result.best_params_)
```

Train on 3353317 samples, validate on 221802 samples

Epoch 1/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.8449 -  
mse: 0.8449 - val\_loss: 0.7668 - val\_mse: 0.7668

Epoch 2/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.7877 -  
mse: 0.7877 - val\_loss: 0.7575 - val\_mse: 0.7575

Epoch 3/5

3353317/3353317 [=====] - 18s 5us/step - loss: 0.7595 -  
mse: 0.7595 - val\_loss: 0.7452 - val\_mse: 0.7452

Epoch 4/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.7426 -  
mse: 0.7426 - val\_loss: 0.7346 - val\_mse: 0.7346

Epoch 5/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.7303 -  
mse: 0.7303 - val\_loss: 0.7368 - val\_mse: 0.7368

1676659/1676659 [=====] - 4s 2us/step

Train on 3353317 samples, validate on 221802 samples

Epoch 1/5

3353317/3353317 [=====] - 18s 5us/step - loss: 0.7480 -  
mse: 0.7480 - val\_loss: 0.7729 - val\_mse: 0.7729

Epoch 2/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.7083 -  
mse: 0.7083 - val\_loss: 0.7519 - val\_mse: 0.7519

Epoch 3/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.6896 -  
mse: 0.6896 - val\_loss: 0.7502 - val\_mse: 0.7502

Epoch 4/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.6765 -  
mse: 0.6765 - val\_loss: 0.7417 - val\_mse: 0.7417

Epoch 5/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.6680 -  
mse: 0.6680 - val\_loss: 0.7345 - val\_mse: 0.7345

1676659/1676659 [=====] - 4s 2us/step

```

Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 17s 5us/step - loss: 0.8582 -
mse: 0.8582 - val_loss: 0.8241 - val_mse: 0.8241
Epoch 2/5
3353318/3353318 [=====] - 17s 5us/step - loss: 0.8025 -
mse: 0.8025 - val_loss: 0.8070 - val_mse: 0.8070
Epoch 3/5
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7813 -
mse: 0.7813 - val_loss: 0.7818 - val_mse: 0.7818
Epoch 4/5
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7679 -
mse: 0.7679 - val_loss: 0.7736 - val_mse: 0.7736
Epoch 5/5
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7579 -
mse: 0.7579 - val_loss: 0.7665 - val_mse: 0.7665
1676658/1676658 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.2723 -
mse: 1.2723 - val_loss: 1.0270 - val_mse: 1.0270
Epoch 2/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2579 -
mse: 1.2579 - val_loss: 1.0238 - val_mse: 1.0238
Epoch 3/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2535 -
mse: 1.2535 - val_loss: 1.0222 - val_mse: 1.0222
Epoch 4/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2509 -
mse: 1.2509 - val_loss: 1.0247 - val_mse: 1.0247
Epoch 5/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2488 -
mse: 1.2488 - val_loss: 1.0200 - val_mse: 1.0200
1676659/1676659 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1404 -
mse: 1.1404 - val_loss: 1.0281 - val_mse: 1.0281
Epoch 2/5
3353317/3353317 [=====] - 18s 6us/step - loss: 1.1283 -
mse: 1.1283 - val_loss: 1.0247 - val_mse: 1.0247
Epoch 3/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1240 -
mse: 1.1240 - val_loss: 1.0240 - val_mse: 1.0240
Epoch 4/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.1216 -
mse: 1.1216 - val_loss: 1.0225 - val_mse: 1.0225
Epoch 5/5

```

```

3353317/3353317 [=====] - 19s 6us/step - loss: 1.1198 -
mse: 1.1198 - val_loss: 1.0230 - val_mse: 1.0230
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3703 -
mse: 1.3703 - val_loss: 1.0289 - val_mse: 1.0289
Epoch 2/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3543 -
mse: 1.3543 - val_loss: 1.0300 - val_mse: 1.0300
Epoch 3/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3496 -
mse: 1.3496 - val_loss: 1.0277 - val_mse: 1.0277
Epoch 4/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3470 -
mse: 1.3470 - val_loss: 1.0290 - val_mse: 1.0290
Epoch 5/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3454 -
mse: 1.3454 - val_loss: 1.0273 - val_mse: 1.0273
1676658/1676658 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.2681 -
mse: 1.2681 - val_loss: 1.0253 - val_mse: 1.0253
Epoch 2/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2516 -
mse: 1.2516 - val_loss: 1.0241 - val_mse: 1.0241
Epoch 3/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.2476 -
mse: 1.2476 - val_loss: 1.0193 - val_mse: 1.0193
Epoch 4/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2444 -
mse: 1.2444 - val_loss: 1.0236 - val_mse: 1.0236
Epoch 5/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2416 -
mse: 1.2416 - val_loss: 1.0142 - val_mse: 1.0142
1676659/1676659 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 17s 5us/step - loss: 1.1364 -
mse: 1.1364 - val_loss: 1.0260 - val_mse: 1.0260
Epoch 2/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1216 -
mse: 1.1216 - val_loss: 1.0245 - val_mse: 1.0245
Epoch 3/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1182 -
mse: 1.1182 - val_loss: 1.0244 - val_mse: 1.0244
Epoch 4/5

```



```

3353317/3353317 [=====] - 19s 6us/step - loss: 1.1156 -
mse: 1.1156 - val_loss: 1.0205 - val_mse: 1.0205
Epoch 5/5
3353317/3353317 [=====] - 20s 6us/step - loss: 1.1134 -
mse: 1.1134 - val_loss: 1.0192 - val_mse: 1.0192
1676659/1676659 [=====] - 4s 3us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3655 -
mse: 1.3655 - val_loss: 1.0268 - val_mse: 1.0268
Epoch 2/5
3353318/3353318 [=====] - 20s 6us/step - loss: 1.3472 -
mse: 1.3472 - val_loss: 1.0308 - val_mse: 1.0308
Epoch 3/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3433 -
mse: 1.3433 - val_loss: 1.0266 - val_mse: 1.0266
Epoch 4/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3406 -
mse: 1.3406 - val_loss: 1.0243 - val_mse: 1.0243
Epoch 5/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3384 -
mse: 1.3384 - val_loss: 1.0207 - val_mse: 1.0207
1676658/1676658 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.2697 -
mse: 1.2697 - val_loss: 1.0254 - val_mse: 1.0254
Epoch 2/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.2518 -
mse: 1.2518 - val_loss: 1.0247 - val_mse: 1.0247
Epoch 3/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.2479 -
mse: 1.2479 - val_loss: 1.0221 - val_mse: 1.0221
Epoch 4/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.2451 -
mse: 1.2451 - val_loss: 1.0198 - val_mse: 1.0198
Epoch 5/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.2427 -
mse: 1.2427 - val_loss: 1.0171 - val_mse: 1.0171
1676659/1676659 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1355 -
mse: 1.1355 - val_loss: 1.0251 - val_mse: 1.0251
Epoch 2/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1214 -
mse: 1.1214 - val_loss: 1.0246 - val_mse: 1.0246
Epoch 3/5

```

```

3353317/3353317 [=====] - 18s 5us/step - loss: 1.1185 -
mse: 1.1185 - val_loss: 1.0263 - val_mse: 1.0263
Epoch 4/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1164 -
mse: 1.1164 - val_loss: 1.0222 - val_mse: 1.0222
Epoch 5/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.1147 -
mse: 1.1147 - val_loss: 1.0202 - val_mse: 1.0202
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3654 -
mse: 1.3654 - val_loss: 1.0288 - val_mse: 1.0288
Epoch 2/5
3353318/3353318 [=====] - 19s 6us/step - loss: 1.3470 -
mse: 1.3470 - val_loss: 1.0295 - val_mse: 1.0295
Epoch 3/5
3353318/3353318 [=====] - 19s 6us/step - loss: 1.3435 -
mse: 1.3435 - val_loss: 1.0302 - val_mse: 1.0302
Epoch 4/5
3353318/3353318 [=====] - 18s 5us/step - loss: 1.3410 -
mse: 1.3410 - val_loss: 1.0301 - val_mse: 1.0301
Epoch 5/5
3353318/3353318 [=====] - 19s 6us/step - loss: 1.3392 -
mse: 1.3392 - val_loss: 1.0258 - val_mse: 1.0258
1676658/1676658 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 17s 5us/step - loss: 0.8597 -
mse: 0.8597 - val_loss: 0.7627 - val_mse: 0.7627
Epoch 2/5
3353317/3353317 [=====] - 18s 5us/step - loss: 0.8030 -
mse: 0.8030 - val_loss: 0.7565 - val_mse: 0.7565
Epoch 3/5
3353317/3353317 [=====] - 18s 5us/step - loss: 0.7778 -
mse: 0.7778 - val_loss: 0.7610 - val_mse: 0.7610
Epoch 4/5
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7592 -
mse: 0.7592 - val_loss: 0.7554 - val_mse: 0.7554
Epoch 5/5
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7454 -
mse: 0.7454 - val_loss: 0.7298 - val_mse: 0.7298
1676659/1676659 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 17s 5us/step - loss: 0.7571 -
mse: 0.7571 - val_loss: 0.7735 - val_mse: 0.7735
Epoch 2/5

```

```

3353317/3353317 [=====] - 18s 5us/step - loss: 0.7146 -
mse: 0.7146 - val_loss: 0.7573 - val_mse: 0.7573
Epoch 3/5
3353317/3353317 [=====] - 18s 5us/step - loss: 0.6975 -
mse: 0.6975 - val_loss: 0.7514 - val_mse: 0.7514
Epoch 4/5
3353317/3353317 [=====] - 18s 5us/step - loss: 0.6845 -
mse: 0.6845 - val_loss: 0.7430 - val_mse: 0.7430
Epoch 5/5
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6750 -
mse: 0.6750 - val_loss: 0.7449 - val_mse: 0.7449
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 17s 5us/step - loss: 0.8743 -
mse: 0.8743 - val_loss: 0.8202 - val_mse: 0.8202
Epoch 2/5
3353318/3353318 [=====] - 17s 5us/step - loss: 0.8204 -
mse: 0.8204 - val_loss: 0.8738 - val_mse: 0.8738
Epoch 3/5
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7976 -
mse: 0.7976 - val_loss: 0.8053 - val_mse: 0.8053
Epoch 4/5
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7813 -
mse: 0.7813 - val_loss: 0.7738 - val_mse: 0.7738
Epoch 5/5
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7694 -
mse: 0.7694 - val_loss: 0.7748 - val_mse: 0.7748
1676658/1676658 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 18s 5us/step - loss: 1.9505 -
mse: 1.9505 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 2/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.9505 -
mse: 1.9505 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 3/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.9505 -
mse: 1.9505 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 4/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.9505 -
mse: 1.9505 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 5/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.9505 -
mse: 1.9505 - val_loss: 1.7170 - val_mse: 1.7170
1676659/1676659 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5

```

```

3353317/3353317 [=====] - 19s 6us/step - loss: 1.8235 -
mse: 1.8235 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 2/5
3353317/3353317 [=====] - 20s 6us/step - loss: 1.8235 -
mse: 1.8235 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 3/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.8235 -
mse: 1.8235 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 4/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.8235 -
mse: 1.8235 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 5/5
3353317/3353317 [=====] - 19s 6us/step - loss: 1.8235 -
mse: 1.8235 - val_loss: 1.7170 - val_mse: 1.7170
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 19s 6us/step - loss: 2.0460 -
mse: 2.0460 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 2/5
3353318/3353318 [=====] - 19s 6us/step - loss: 2.0460 -
mse: 2.0460 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 3/5
3353318/3353318 [=====] - 19s 6us/step - loss: 2.0460 -
mse: 2.0460 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 4/5
3353318/3353318 [=====] - 19s 6us/step - loss: 2.0460 -
mse: 2.0460 - val_loss: 1.7170 - val_mse: 1.7170
Epoch 5/5
3353318/3353318 [=====] - 19s 6us/step - loss: 2.0460 -
mse: 2.0460 - val_loss: 1.7170 - val_mse: 1.7170
1676658/1676658 [=====] - 4s 3us/step
Train on 5029976 samples, validate on 221802 samples
Epoch 1/5
5029976/5029976 [=====] - 34s 7us/step - loss: 0.8085 -
mse: 0.8085 - val_loss: 0.7662 - val_mse: 0.7662
Epoch 2/5
5029976/5029976 [=====] - 34s 7us/step - loss: 0.7567 -
mse: 0.7567 - val_loss: 0.7541 - val_mse: 0.7541
Epoch 3/5
5029976/5029976 [=====] - 34s 7us/step - loss: 0.7341 -
mse: 0.7341 - val_loss: 0.7359 - val_mse: 0.7359
Epoch 4/5
5029976/5029976 [=====] - 34s 7us/step - loss: 0.7203 -
mse: 0.7203 - val_loss: 0.7358 - val_mse: 0.7358
Epoch 5/5
5029976/5029976 [=====] - 34s 7us/step - loss: 0.7110 -
mse: 0.7110 - val_loss: 0.7249 - val_mse: 0.7249

```

0.8739637301445746

```
{'activation': 'tanh', 'activation2': 'relu', 'batch_size': 1000, 'epochs': 5,
 'init': 'he_normal', 'neurons': 200, 'optimizer': 'Adam'}
```

```
[24]: param_grid = dict(optimizer=['Adam'], epochs=[5], batch_size=[1000],
    ↪init=['he_normal'], activation=['tanh'], neurons=[200],
    ↪activation2=['relu'], dropout_rate=dropout_rate)

model = KerasRegressor(build_fn=create_model, verbose=1)

grid = GridSearchCV(estimator=model, param_grid=param_grid, cv=3)
grid_result = grid.fit(train_x, train_y, validation_data=(valid_x, valid_y))

print(np.sqrt(-grid_result.best_score_))
print(grid_result.best_params_)
```

Train on 3353317 samples, validate on 221802 samples

Epoch 1/5

3353317/3353317 [=====] - 18s 5us/step - loss: 0.8464 -  
mse: 0.8464 - val\_loss: 0.7970 - val\_mse: 0.7970

Epoch 2/5

3353317/3353317 [=====] - 18s 5us/step - loss: 0.7906 -  
mse: 0.7906 - val\_loss: 0.7566 - val\_mse: 0.7566

Epoch 3/5

3353317/3353317 [=====] - 19s 6us/step - loss: 0.7646 -  
mse: 0.7646 - val\_loss: 0.7486 - val\_mse: 0.7486

Epoch 4/5

3353317/3353317 [=====] - 18s 5us/step - loss: 0.7461 -  
mse: 0.7461 - val\_loss: 0.7313 - val\_mse: 0.7313

Epoch 5/5

3353317/3353317 [=====] - 18s 5us/step - loss: 0.7337 -  
mse: 0.7337 - val\_loss: 0.7395 - val\_mse: 0.7395

1676659/1676659 [=====] - 4s 2us/step

Train on 3353317 samples, validate on 221802 samples

Epoch 1/5

3353317/3353317 [=====] - 18s 5us/step - loss: 0.7491 -  
mse: 0.7491 - val\_loss: 0.7617 - val\_mse: 0.7617

Epoch 2/5

3353317/3353317 [=====] - 18s 5us/step - loss: 0.7055 -  
mse: 0.7055 - val\_loss: 0.7477 - val\_mse: 0.7477

Epoch 3/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.6876 -  
mse: 0.6876 - val\_loss: 0.7451 - val\_mse: 0.7451

Epoch 4/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.6748 -  
mse: 0.6748 - val\_loss: 0.7432 - val\_mse: 0.7432

Epoch 5/5

3353317/3353317 [=====] - 17s 5us/step - loss: 0.6657 -

```

mse: 0.6657 - val_loss: 0.7311 - val_mse: 0.7311
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 18s 5us/step - loss: 0.8648 -
mse: 0.8648 - val_loss: 0.8409 - val_mse: 0.8409
Epoch 2/5
3353318/3353318 [=====] - 18s 5us/step - loss: 0.8060 -
mse: 0.8060 - val_loss: 0.8168 - val_mse: 0.8168
Epoch 3/5
3353318/3353318 [=====] - 18s 5us/step - loss: 0.7832 -
mse: 0.7832 - val_loss: 0.7841 - val_mse: 0.7841
Epoch 4/5
3353318/3353318 [=====] - 18s 5us/step - loss: 0.7690 -
mse: 0.7690 - val_loss: 0.7941 - val_mse: 0.7941
Epoch 5/5
3353318/3353318 [=====] - 18s 5us/step - loss: 0.7593 -
mse: 0.7593 - val_loss: 0.7697 - val_mse: 0.7697
1676658/1676658 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 36s 11us/step - loss: 0.8816
- mse: 0.8816 - val_loss: 0.7845 - val_mse: 0.7845
Epoch 2/5
3353317/3353317 [=====] - 36s 11us/step - loss: 0.8394
- mse: 0.8394 - val_loss: 0.7755 - val_mse: 0.7755
Epoch 3/5
3353317/3353317 [=====] - 36s 11us/step - loss: 0.8247
- mse: 0.8247 - val_loss: 0.7706 - val_mse: 0.7706
Epoch 4/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.8131
- mse: 0.8131 - val_loss: 0.7645 - val_mse: 0.7645
Epoch 5/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.8044
- mse: 0.8044 - val_loss: 0.7582 - val_mse: 0.7582
1676659/1676659 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 36s 11us/step - loss: 0.7880
- mse: 0.7880 - val_loss: 0.7892 - val_mse: 0.7892
Epoch 2/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.7450
- mse: 0.7450 - val_loss: 0.7755 - val_mse: 0.7755
Epoch 3/5
3353317/3353317 [=====] - 36s 11us/step - loss: 0.7330
- mse: 0.7330 - val_loss: 0.7727 - val_mse: 0.7727
Epoch 4/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.7251

```

```

- mse: 0.7251 - val_loss: 0.7673 - val_mse: 0.7673
Epoch 5/5
3353317/3353317 [=====] - 36s 11us/step - loss: 0.7184
- mse: 0.7184 - val_loss: 0.7543 - val_mse: 0.7543
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 37s 11us/step - loss: 0.8950
- mse: 0.8950 - val_loss: 0.8460 - val_mse: 0.8460
Epoch 2/5
3353318/3353318 [=====] - 37s 11us/step - loss: 0.8498
- mse: 0.8498 - val_loss: 0.8414 - val_mse: 0.8414
Epoch 3/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.8361
- mse: 0.8361 - val_loss: 0.8301 - val_mse: 0.8301
Epoch 4/5
3353318/3353318 [=====] - 37s 11us/step - loss: 0.8275
- mse: 0.8275 - val_loss: 0.8159 - val_mse: 0.8159
Epoch 5/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.8212
- mse: 0.8212 - val_loss: 0.8173 - val_mse: 0.8173
1676658/1676658 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.9050
- mse: 0.9050 - val_loss: 0.7895 - val_mse: 0.7895
Epoch 2/5
3353317/3353317 [=====] - 39s 11us/step - loss: 0.8581
- mse: 0.8581 - val_loss: 0.7816 - val_mse: 0.7816
Epoch 3/5
3353317/3353317 [=====] - 39s 12us/step - loss: 0.8439
- mse: 0.8439 - val_loss: 0.8096 - val_mse: 0.8096
Epoch 4/5
3353317/3353317 [=====] - 39s 12us/step - loss: 0.8338
- mse: 0.8338 - val_loss: 0.7746 - val_mse: 0.7746
Epoch 5/5
3353317/3353317 [=====] - 39s 12us/step - loss: 0.8261
- mse: 0.8260 - val_loss: 0.7696 - val_mse: 0.7696
1676659/1676659 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.7962
- mse: 0.7962 - val_loss: 0.7892 - val_mse: 0.7892
Epoch 2/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.7613
- mse: 0.7613 - val_loss: 0.7840 - val_mse: 0.7840
Epoch 3/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.7504

```

```

- mse: 0.7504 - val_loss: 0.7777 - val_mse: 0.7777
Epoch 4/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.7423
- mse: 0.7423 - val_loss: 0.7753 - val_mse: 0.7753
Epoch 5/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.7372
- mse: 0.7372 - val_loss: 0.7673 - val_mse: 0.7673
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.9111
- mse: 0.9111 - val_loss: 0.8641 - val_mse: 0.8641
Epoch 2/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.8669
- mse: 0.8669 - val_loss: 0.8510 - val_mse: 0.8510
Epoch 3/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.8539
- mse: 0.8539 - val_loss: 0.8430 - val_mse: 0.8430
Epoch 4/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.8450
- mse: 0.8450 - val_loss: 0.8485 - val_mse: 0.8485
Epoch 5/5
3353318/3353318 [=====] - 39s 11us/step - loss: 0.8402
- mse: 0.8402 - val_loss: 0.8344 - val_mse: 0.8344
1676658/1676658 [=====] - 4s 2us/step
WARNING:tensorflow:Large dropout rate: 0.6 (>0.5). In TensorFlow 2.x, dropout()
uses dropout rate instead of keep_prob. Please ensure that this is intended.
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.9187
- mse: 0.9187 - val_loss: 0.8004 - val_mse: 0.8004
Epoch 2/5
3353317/3353317 [=====] - 39s 12us/step - loss: 0.8741
- mse: 0.8741 - val_loss: 0.7967 - val_mse: 0.7967
Epoch 3/5
3353317/3353317 [=====] - 39s 12us/step - loss: 0.8622
- mse: 0.8622 - val_loss: 0.7906 - val_mse: 0.7906
Epoch 4/5
3353317/3353317 [=====] - 39s 12us/step - loss: 0.8543
- mse: 0.8543 - val_loss: 0.7875 - val_mse: 0.7875
Epoch 5/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.8484
- mse: 0.8484 - val_loss: 0.7854 - val_mse: 0.7854
1676659/1676659 [=====] - 4s 2us/step
WARNING:tensorflow:Large dropout rate: 0.6 (>0.5). In TensorFlow 2.x, dropout()
uses dropout rate instead of keep_prob. Please ensure that this is intended.
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5

```



```

3353317/3353317 [=====] - 37s 11us/step - loss: 0.8121
- mse: 0.8121 - val_loss: 0.8074 - val_mse: 0.8074
Epoch 2/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.7738
- mse: 0.7738 - val_loss: 0.8066 - val_mse: 0.8066
Epoch 3/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.7628
- mse: 0.7628 - val_loss: 0.7972 - val_mse: 0.7972
Epoch 4/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.7565
- mse: 0.7565 - val_loss: 0.7973 - val_mse: 0.7973
Epoch 5/5
3353317/3353317 [=====] - 38s 11us/step - loss: 0.7519
- mse: 0.7519 - val_loss: 0.7929 - val_mse: 0.7929
1676659/1676659 [=====] - 4s 2us/step
WARNING:tensorflow:Large dropout rate: 0.6 (>0.5). In TensorFlow 2.x, dropout()
uses dropout rate instead of keep_prob. Please ensure that this is intended.
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.9489
- mse: 0.9489 - val_loss: 0.8534 - val_mse: 0.8534
Epoch 2/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.8809
- mse: 0.8809 - val_loss: 0.8677 - val_mse: 0.8677
Epoch 3/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.8684
- mse: 0.8684 - val_loss: 0.8622 - val_mse: 0.8622
Epoch 4/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.8623
- mse: 0.8623 - val_loss: 0.8639 - val_mse: 0.8639
Epoch 5/5
3353318/3353318 [=====] - 38s 11us/step - loss: 0.8577
- mse: 0.8577 - val_loss: 0.8771 - val_mse: 0.8771
1676658/1676658 [=====] - 4s 2us/step
WARNING:tensorflow:Large dropout rate: 0.8 (>0.5). In TensorFlow 2.x, dropout()
uses dropout rate instead of keep_prob. Please ensure that this is intended.
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.9659
- mse: 0.9659 - val_loss: 0.7966 - val_mse: 0.7966
Epoch 2/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.8949
- mse: 0.8949 - val_loss: 0.8112 - val_mse: 0.8112
Epoch 3/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.8825
- mse: 0.8825 - val_loss: 0.8091 - val_mse: 0.8091
Epoch 4/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.8750

```

```

- mse: 0.8750 - val_loss: 0.7968 - val_mse: 0.7968
Epoch 5/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.8704
- mse: 0.8704 - val_loss: 0.7951 - val_mse: 0.7951
1676659/1676659 [=====] - 4s 2us/step
WARNING:tensorflow:Large dropout rate: 0.8 (>0.5). In TensorFlow 2.x, dropout()
uses dropout rate instead of keep_prob. Please ensure that this is intended.
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.8632
- mse: 0.8632 - val_loss: 0.8194 - val_mse: 0.8194
Epoch 2/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.7950
- mse: 0.7950 - val_loss: 0.8104 - val_mse: 0.8104
Epoch 3/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.7814
- mse: 0.7814 - val_loss: 0.8133 - val_mse: 0.8133
Epoch 4/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.7739
- mse: 0.7739 - val_loss: 0.8015 - val_mse: 0.8015
Epoch 5/5
3353317/3353317 [=====] - 37s 11us/step - loss: 0.7694
- mse: 0.7694 - val_loss: 0.7951 - val_mse: 0.7951
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 36s 11us/step - loss: 0.9801
- mse: 0.9801 - val_loss: 0.8398 - val_mse: 0.8398
Epoch 2/5
3353318/3353318 [=====] - 37s 11us/step - loss: 0.9030
- mse: 0.9030 - val_loss: 0.8661 - val_mse: 0.8661
Epoch 3/5
3353318/3353318 [=====] - 37s 11us/step - loss: 0.8879
- mse: 0.8879 - val_loss: 0.8727 - val_mse: 0.8727
Epoch 4/5
3353318/3353318 [=====] - 37s 11us/step - loss: 0.8816
- mse: 0.8816 - val_loss: 0.8725 - val_mse: 0.8725
Epoch 5/5
3353318/3353318 [=====] - 37s 11us/step - loss: 0.8777
- mse: 0.8777 - val_loss: 0.8731 - val_mse: 0.8731
1676658/1676658 [=====] - 4s 2us/step
Train on 5029976 samples, validate on 221802 samples
Epoch 1/5
5029976/5029976 [=====] - 35s 7us/step - loss: 0.8101 -
mse: 0.8101 - val_loss: 0.7701 - val_mse: 0.7701
Epoch 2/5
5029976/5029976 [=====] - 34s 7us/step - loss: 0.7571 -
mse: 0.7571 - val_loss: 0.7664 - val_mse: 0.7664

```

```
Epoch 3/5
5029976/5029976 [=====] - 34s 7us/step - loss: 0.7343 -
mse: 0.7343 - val_loss: 0.7310 - val_mse: 0.7310
Epoch 4/5
5029976/5029976 [=====] - 34s 7us/step - loss: 0.7209 -
mse: 0.7209 - val_loss: 0.7599 - val_mse: 0.7599
Epoch 5/5
5029976/5029976 [=====] - 34s 7us/step - loss: 0.7111 -
mse: 0.7111 - val_loss: 0.7455 - val_mse: 0.7455
0.8749114688256486
{'activation': 'tanh', 'activation2': 'relu', 'batch_size': 1000,
'dropout_rate': 0.0, 'epochs': 5, 'init': 'he_normal', 'neurons': 200,
'optimizer': 'Adam'}
```

```
[26]: param_grid = dict(optimizer=['Adam'], epochs=epochs, batch_size=batch_size,
    ↪init=['he_normal'], activation=['tanh'], dropout_rate=[0.0], neurons=[200],
    ↪activation2=['relu'])

model = KerasRegressor(build_fn=create_model, verbose=1)

grid = GridSearchCV(estimator=model, param_grid=param_grid, cv=3)
grid_result = grid.fit(train_x, train_y, validation_data=(valid_x, valid_y))

print(np.sqrt(-grid_result.best_score_))
print(grid_result.best_params_)
```

Train on 3353317 samples, validate on 221802 samples

```
Epoch 1/5
3353317/3353317 [=====] - 19s 6us/step - loss: 0.8460 -
mse: 0.8460 - val_loss: 0.7806 - val_mse: 0.7806
Epoch 2/5
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7900 -
mse: 0.7900 - val_loss: 0.7758 - val_mse: 0.7758
Epoch 3/5
3353317/3353317 [=====] - 20s 6us/step - loss: 0.7629 -
mse: 0.7629 - val_loss: 0.7413 - val_mse: 0.7413
Epoch 4/5
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7454 -
mse: 0.7454 - val_loss: 0.7526 - val_mse: 0.7526
Epoch 5/5
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7334 -
mse: 0.7334 - val_loss: 0.7449 - val_mse: 0.7449
1676659/1676659 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7500 -
mse: 0.7500 - val_loss: 0.7681 - val_mse: 0.7681
Epoch 2/5
```

```

3353317/3353317 [=====] - 19s 6us/step - loss: 0.7067 -
mse: 0.7067 - val_loss: 0.7623 - val_mse: 0.7623
Epoch 3/5
3353317/3353317 [=====] - 19s 6us/step - loss: 0.6882 -
mse: 0.6882 - val_loss: 0.7562 - val_mse: 0.7562
Epoch 4/5
3353317/3353317 [=====] - 19s 6us/step - loss: 0.6753 -
mse: 0.6753 - val_loss: 0.7425 - val_mse: 0.7425
Epoch 5/5
3353317/3353317 [=====] - 18s 5us/step - loss: 0.6663 -
mse: 0.6663 - val_loss: 0.7291 - val_mse: 0.7291
1676659/1676659 [=====] - 4s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 19s 6us/step - loss: 0.8604 -
mse: 0.8604 - val_loss: 0.8264 - val_mse: 0.8264
Epoch 2/5
3353318/3353318 [=====] - 19s 6us/step - loss: 0.8035 -
mse: 0.8035 - val_loss: 0.8087 - val_mse: 0.8087
Epoch 3/5
3353318/3353318 [=====] - 19s 6us/step - loss: 0.7826 -
mse: 0.7826 - val_loss: 0.7914 - val_mse: 0.7914
Epoch 4/5
3353318/3353318 [=====] - 19s 6us/step - loss: 0.7685 -
mse: 0.7685 - val_loss: 0.7832 - val_mse: 0.7832
Epoch 5/5
3353318/3353318 [=====] - 19s 6us/step - loss: 0.7593 -
mse: 0.7593 - val_loss: 0.7706 - val_mse: 0.7706
1676658/1676658 [=====] - 4s 3us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/10
3353317/3353317 [=====] - 20s 6us/step - loss: 0.8473 -
mse: 0.8473 - val_loss: 0.7724 - val_mse: 0.7724
Epoch 2/10
3353317/3353317 [=====] - 20s 6us/step - loss: 0.7896 -
mse: 0.7896 - val_loss: 0.7567 - val_mse: 0.7567
Epoch 3/10
3353317/3353317 [=====] - 20s 6us/step - loss: 0.7622 -
mse: 0.7622 - val_loss: 0.7658 - val_mse: 0.7658
Epoch 4/10
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7440 -
mse: 0.7440 - val_loss: 0.7353 - val_mse: 0.7353
Epoch 5/10
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7317 -
mse: 0.7317 - val_loss: 0.7214 - val_mse: 0.7214
Epoch 6/10
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7239 -
mse: 0.7239 - val_loss: 0.7162 - val_mse: 0.7162

```

Epoch 7/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7168 -  
mse: 0.7168 - val\_loss: 0.7047 - val\_mse: 0.7047  
Epoch 8/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7108 -  
mse: 0.7108 - val\_loss: 0.7057 - val\_mse: 0.7057  
Epoch 9/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7051 -  
mse: 0.7051 - val\_loss: 0.7108 - val\_mse: 0.7108  
Epoch 10/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.6999 -  
mse: 0.6999 - val\_loss: 0.7068 - val\_mse: 0.7068  
1676659/1676659 [=====] - 4s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7495 -  
mse: 0.7495 - val\_loss: 0.7634 - val\_mse: 0.7634  
Epoch 2/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.7066 -  
mse: 0.7066 - val\_loss: 0.7532 - val\_mse: 0.7532  
Epoch 3/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.6879 -  
mse: 0.6879 - val\_loss: 0.7440 - val\_mse: 0.7440  
Epoch 4/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.6763 -  
mse: 0.6763 - val\_loss: 0.7445 - val\_mse: 0.7445  
Epoch 5/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.6672 -  
mse: 0.6672 - val\_loss: 0.7287 - val\_mse: 0.7287  
Epoch 6/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.6605 -  
mse: 0.6605 - val\_loss: 0.7245 - val\_mse: 0.7245  
Epoch 7/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.6548 -  
mse: 0.6548 - val\_loss: 0.7207 - val\_mse: 0.7207  
Epoch 8/10  
3353317/3353317 [=====] - 19s 6us/step - loss: 0.6497 -  
mse: 0.6497 - val\_loss: 0.7247 - val\_mse: 0.7247  
Epoch 9/10  
3353317/3353317 [=====] - 18s 5us/step - loss: 0.6454 -  
mse: 0.6454 - val\_loss: 0.7287 - val\_mse: 0.7287  
Epoch 10/10  
3353317/3353317 [=====] - 18s 5us/step - loss: 0.6412 -  
mse: 0.6412 - val\_loss: 0.7091 - val\_mse: 0.7091  
1676659/1676659 [=====] - 4s 2us/step  
Train on 3353318 samples, validate on 221802 samples  
Epoch 1/10  
3353318/3353318 [=====] - 18s 5us/step - loss: 0.8601 -

```

mse: 0.8601 - val_loss: 0.8250 - val_mse: 0.8250
Epoch 2/10
3353318/3353318 [=====] - 19s 6us/step - loss: 0.8042 -
mse: 0.8042 - val_loss: 0.8084 - val_mse: 0.8084
Epoch 3/10
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7819 -
mse: 0.7819 - val_loss: 0.7870 - val_mse: 0.7870
Epoch 4/10
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7681 -
mse: 0.7681 - val_loss: 0.7845 - val_mse: 0.7845
Epoch 5/10
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7587 -
mse: 0.7587 - val_loss: 0.7819 - val_mse: 0.7819
Epoch 6/10
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7505 -
mse: 0.7505 - val_loss: 0.7709 - val_mse: 0.7709
Epoch 7/10
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7450 -
mse: 0.7450 - val_loss: 0.7642 - val_mse: 0.7642
Epoch 8/10
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7394 -
mse: 0.7394 - val_loss: 0.7574 - val_mse: 0.7574
Epoch 9/10
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7342 -
mse: 0.7342 - val_loss: 0.7445 - val_mse: 0.7445
Epoch 10/10
3353318/3353318 [=====] - 17s 5us/step - loss: 0.7297 -
mse: 0.7297 - val_loss: 0.7502 - val_mse: 0.7502
1676658/1676658 [=====] - 4s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.8450 -
mse: 0.8450 - val_loss: 0.7715 - val_mse: 0.7715
Epoch 2/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.7890 -
mse: 0.7890 - val_loss: 0.8104 - val_mse: 0.8104
Epoch 3/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.7619 -
mse: 0.7619 - val_loss: 0.7462 - val_mse: 0.7462
Epoch 4/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.7446 -
mse: 0.7446 - val_loss: 0.7394 - val_mse: 0.7394
Epoch 5/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.7326 -
mse: 0.7326 - val_loss: 0.7278 - val_mse: 0.7278
Epoch 6/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.7247 -
mse: 0.7247 - val_loss: 0.7179 - val_mse: 0.7179

```

Epoch 7/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.7183 -  
mse: 0.7183 - val\_loss: 0.7105 - val\_mse: 0.7105

Epoch 8/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.7120 -  
mse: 0.7120 - val\_loss: 0.7746 - val\_mse: 0.7746

Epoch 9/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.7067 -  
mse: 0.7067 - val\_loss: 0.7088 - val\_mse: 0.7088

Epoch 10/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.7015 -  
mse: 0.7015 - val\_loss: 0.7008 - val\_mse: 0.7008

Epoch 11/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6966 -  
mse: 0.6966 - val\_loss: 0.6970 - val\_mse: 0.6970

Epoch 12/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6926 -  
mse: 0.6926 - val\_loss: 0.7036 - val\_mse: 0.7036

Epoch 13/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6888 -  
mse: 0.6888 - val\_loss: 0.6913 - val\_mse: 0.6913

Epoch 14/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6848 -  
mse: 0.6848 - val\_loss: 0.7005 - val\_mse: 0.7005

Epoch 15/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6815 -  
mse: 0.6815 - val\_loss: 0.6856 - val\_mse: 0.6856

Epoch 16/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6781 -  
mse: 0.6781 - val\_loss: 0.7071 - val\_mse: 0.7071

Epoch 17/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6750 -  
mse: 0.6750 - val\_loss: 0.6974 - val\_mse: 0.6974

Epoch 18/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6722 -  
mse: 0.6722 - val\_loss: 0.6815 - val\_mse: 0.6815

Epoch 19/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6695 -  
mse: 0.6695 - val\_loss: 0.6797 - val\_mse: 0.6797

Epoch 20/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6662 -  
mse: 0.6662 - val\_loss: 0.6862 - val\_mse: 0.6862

Epoch 21/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6642 -  
mse: 0.6642 - val\_loss: 0.6905 - val\_mse: 0.6905

Epoch 22/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6612 -  
mse: 0.6612 - val\_loss: 0.6737 - val\_mse: 0.6737

Epoch 23/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6586 -  
mse: 0.6586 - val\_loss: 0.6950 - val\_mse: 0.6950  
Epoch 24/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6559 -  
mse: 0.6559 - val\_loss: 0.6675 - val\_mse: 0.6675  
Epoch 25/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6542 -  
mse: 0.6542 - val\_loss: 0.6780 - val\_mse: 0.6780  
Epoch 26/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6517 -  
mse: 0.6517 - val\_loss: 0.6892 - val\_mse: 0.6892  
Epoch 27/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6496 -  
mse: 0.6496 - val\_loss: 0.6876 - val\_mse: 0.6876  
Epoch 28/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6476 -  
mse: 0.6476 - val\_loss: 0.6707 - val\_mse: 0.6707  
Epoch 29/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6456 -  
mse: 0.6456 - val\_loss: 0.6691 - val\_mse: 0.6691  
Epoch 30/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6436 -  
mse: 0.6436 - val\_loss: 0.6738 - val\_mse: 0.6738  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7498 -  
mse: 0.7498 - val\_loss: 0.7775 - val\_mse: 0.7775  
Epoch 2/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7057 -  
mse: 0.7057 - val\_loss: 0.7459 - val\_mse: 0.7459  
Epoch 3/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6873 -  
mse: 0.6873 - val\_loss: 0.7500 - val\_mse: 0.7500  
Epoch 4/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6750 -  
mse: 0.6750 - val\_loss: 0.7380 - val\_mse: 0.7380  
Epoch 5/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6661 -  
mse: 0.6661 - val\_loss: 0.7400 - val\_mse: 0.7400  
Epoch 6/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6593 -  
mse: 0.6593 - val\_loss: 0.7296 - val\_mse: 0.7296  
Epoch 7/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6538 -  
mse: 0.6538 - val\_loss: 0.7314 - val\_mse: 0.7314  
Epoch 8/30



3353317/3353317 [=====] - 16s 5us/step - loss: 0.6490 -  
mse: 0.6490 - val\_loss: 0.7191 - val\_mse: 0.7191  
Epoch 9/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6449 -  
mse: 0.6449 - val\_loss: 0.7047 - val\_mse: 0.7047  
Epoch 10/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6398 -  
mse: 0.6398 - val\_loss: 0.7129 - val\_mse: 0.7129  
Epoch 11/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6362 -  
mse: 0.6362 - val\_loss: 0.7035 - val\_mse: 0.7035  
Epoch 12/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6326 -  
mse: 0.6326 - val\_loss: 0.7048 - val\_mse: 0.7048  
Epoch 13/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6296 -  
mse: 0.6296 - val\_loss: 0.7011 - val\_mse: 0.7011  
Epoch 14/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6262 -  
mse: 0.6262 - val\_loss: 0.7050 - val\_mse: 0.7050  
Epoch 15/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6231 -  
mse: 0.6231 - val\_loss: 0.7191 - val\_mse: 0.7191  
Epoch 16/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6209 -  
mse: 0.6209 - val\_loss: 0.7023 - val\_mse: 0.7023  
Epoch 17/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6179 -  
mse: 0.6179 - val\_loss: 0.7035 - val\_mse: 0.7035  
Epoch 18/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6159 -  
mse: 0.6159 - val\_loss: 0.7013 - val\_mse: 0.7013  
Epoch 19/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6137 -  
mse: 0.6137 - val\_loss: 0.6898 - val\_mse: 0.6898  
Epoch 20/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6115 -  
mse: 0.6115 - val\_loss: 0.6931 - val\_mse: 0.6931  
Epoch 21/30  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6099 -  
mse: 0.6099 - val\_loss: 0.7094 - val\_mse: 0.7094  
Epoch 22/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6077 -  
mse: 0.6077 - val\_loss: 0.6868 - val\_mse: 0.6868  
Epoch 23/30  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6063 -  
mse: 0.6063 - val\_loss: 0.6834 - val\_mse: 0.6834  
Epoch 24/30

```

3353317/3353317 [=====] - 17s 5us/step - loss: 0.6042 -
mse: 0.6042 - val_loss: 0.6929 - val_mse: 0.6929
Epoch 25/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6024 -
mse: 0.6024 - val_loss: 0.6897 - val_mse: 0.6897
Epoch 26/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6010 -
mse: 0.6010 - val_loss: 0.6897 - val_mse: 0.6897
Epoch 27/30
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5995 -
mse: 0.5995 - val_loss: 0.6837 - val_mse: 0.6837
Epoch 28/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5977 -
mse: 0.5977 - val_loss: 0.6982 - val_mse: 0.6982
Epoch 29/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5968 -
mse: 0.5968 - val_loss: 0.6805 - val_mse: 0.6805
Epoch 30/30
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5950 -
mse: 0.5950 - val_loss: 0.6712 - val_mse: 0.6712
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.8616 -
mse: 0.8616 - val_loss: 0.8367 - val_mse: 0.8367
Epoch 2/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.8052 -
mse: 0.8052 - val_loss: 0.8086 - val_mse: 0.8086
Epoch 3/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7831 -
mse: 0.7831 - val_loss: 0.7889 - val_mse: 0.7889
Epoch 4/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7686 -
mse: 0.7686 - val_loss: 0.7827 - val_mse: 0.7827
Epoch 5/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7588 -
mse: 0.7588 - val_loss: 0.8022 - val_mse: 0.8022
Epoch 6/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7511 -
mse: 0.7511 - val_loss: 0.7740 - val_mse: 0.7740
Epoch 7/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7448 -
mse: 0.7448 - val_loss: 0.7538 - val_mse: 0.7538
Epoch 8/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7388 -
mse: 0.7388 - val_loss: 0.7486 - val_mse: 0.7486
Epoch 9/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7343 -

```

```

mse: 0.7343 - val_loss: 0.7714 - val_mse: 0.7714
Epoch 10/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7290 -
mse: 0.7290 - val_loss: 0.7904 - val_mse: 0.7904
Epoch 11/30
3353318/3353318 [=====] - 15s 5us/step - loss: 0.7247 -
mse: 0.7247 - val_loss: 0.7506 - val_mse: 0.7506
Epoch 12/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7210 -
mse: 0.7210 - val_loss: 0.7445 - val_mse: 0.7445
Epoch 13/30
3353318/3353318 [=====] - 15s 5us/step - loss: 0.7174 -
mse: 0.7174 - val_loss: 0.7439 - val_mse: 0.7439
Epoch 14/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7141 -
mse: 0.7141 - val_loss: 0.7467 - val_mse: 0.7467
Epoch 15/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7107 -
mse: 0.7107 - val_loss: 0.7430 - val_mse: 0.7430
Epoch 16/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7075 -
mse: 0.7075 - val_loss: 0.7410 - val_mse: 0.7410
Epoch 17/30
3353318/3353318 [=====] - 15s 5us/step - loss: 0.7044 -
mse: 0.7044 - val_loss: 0.7383 - val_mse: 0.7383
Epoch 18/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7013 -
mse: 0.7013 - val_loss: 0.7353 - val_mse: 0.7353
Epoch 19/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6989 -
mse: 0.6989 - val_loss: 0.7398 - val_mse: 0.7398
Epoch 20/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6958 -
mse: 0.6958 - val_loss: 0.7504 - val_mse: 0.7504
Epoch 21/30
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6938 -
mse: 0.6938 - val_loss: 0.7547 - val_mse: 0.7547
Epoch 22/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6915 -
mse: 0.6915 - val_loss: 0.7420 - val_mse: 0.7420
Epoch 23/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6886 -
mse: 0.6886 - val_loss: 0.7385 - val_mse: 0.7385
Epoch 24/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6863 -
mse: 0.6863 - val_loss: 0.7334 - val_mse: 0.7334
Epoch 25/30
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6846 -

```

```

mse: 0.6846 - val_loss: 0.7533 - val_mse: 0.7533
Epoch 26/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6825 -
mse: 0.6825 - val_loss: 0.7435 - val_mse: 0.7435
Epoch 27/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6804 -
mse: 0.6804 - val_loss: 0.7317 - val_mse: 0.7317
Epoch 28/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6777 -
mse: 0.6777 - val_loss: 0.7480 - val_mse: 0.7480
Epoch 29/30
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6758 -
mse: 0.6758 - val_loss: 0.7375 - val_mse: 0.7375
Epoch 30/30
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6742 -
mse: 0.6742 - val_loss: 0.7388 - val_mse: 0.7388
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.8478 -
mse: 0.8478 - val_loss: 0.7657 - val_mse: 0.7657
Epoch 2/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7902 -
mse: 0.7902 - val_loss: 0.7590 - val_mse: 0.7590
Epoch 3/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7626 -
mse: 0.7626 - val_loss: 0.7418 - val_mse: 0.7418
Epoch 4/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7444 -
mse: 0.7444 - val_loss: 0.7287 - val_mse: 0.7287
Epoch 5/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7329 -
mse: 0.7329 - val_loss: 0.7295 - val_mse: 0.7295
Epoch 6/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7243 -
mse: 0.7243 - val_loss: 0.7318 - val_mse: 0.7318
Epoch 7/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7174 -
mse: 0.7174 - val_loss: 0.7177 - val_mse: 0.7177
Epoch 8/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7111 -
mse: 0.7111 - val_loss: 0.7079 - val_mse: 0.7079
Epoch 9/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7054 -
mse: 0.7054 - val_loss: 0.7060 - val_mse: 0.7060
Epoch 10/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7008 -
mse: 0.7008 - val_loss: 0.7015 - val_mse: 0.7015

```

Epoch 11/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6955 -  
mse: 0.6955 - val\_loss: 0.7095 - val\_mse: 0.7095

Epoch 12/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6919 -  
mse: 0.6919 - val\_loss: 0.7046 - val\_mse: 0.7046

Epoch 13/50  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6883 -  
mse: 0.6883 - val\_loss: 0.7220 - val\_mse: 0.7220

Epoch 14/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6842 -  
mse: 0.6842 - val\_loss: 0.6965 - val\_mse: 0.6965

Epoch 15/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6805 -  
mse: 0.6805 - val\_loss: 0.6908 - val\_mse: 0.6908

Epoch 16/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6774 -  
mse: 0.6774 - val\_loss: 0.7060 - val\_mse: 0.7060

Epoch 17/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6737 -  
mse: 0.6737 - val\_loss: 0.6816 - val\_mse: 0.6816

Epoch 18/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6705 -  
mse: 0.6705 - val\_loss: 0.6736 - val\_mse: 0.6736

Epoch 19/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6678 -  
mse: 0.6678 - val\_loss: 0.6806 - val\_mse: 0.6806

Epoch 20/50  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6643 -  
mse: 0.6643 - val\_loss: 0.6832 - val\_mse: 0.6832

Epoch 21/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6618 -  
mse: 0.6618 - val\_loss: 0.6745 - val\_mse: 0.6745

Epoch 22/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6593 -  
mse: 0.6593 - val\_loss: 0.6828 - val\_mse: 0.6828

Epoch 23/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6566 -  
mse: 0.6566 - val\_loss: 0.6775 - val\_mse: 0.6775

Epoch 24/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6547 -  
mse: 0.6547 - val\_loss: 0.6918 - val\_mse: 0.6918

Epoch 25/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6527 -  
mse: 0.6527 - val\_loss: 0.6768 - val\_mse: 0.6768

Epoch 26/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6506 -  
mse: 0.6506 - val\_loss: 0.6977 - val\_mse: 0.6977

Epoch 27/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6488 -  
mse: 0.6488 - val\_loss: 0.6682 - val\_mse: 0.6682  
Epoch 28/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6465 -  
mse: 0.6465 - val\_loss: 0.6857 - val\_mse: 0.6857  
Epoch 29/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6453 -  
mse: 0.6453 - val\_loss: 0.6868 - val\_mse: 0.6868  
Epoch 30/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6435 -  
mse: 0.6435 - val\_loss: 0.6782 - val\_mse: 0.6782  
Epoch 31/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6413 -  
mse: 0.6413 - val\_loss: 0.6664 - val\_mse: 0.6664  
Epoch 32/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6402 -  
mse: 0.6402 - val\_loss: 0.6867 - val\_mse: 0.6867  
Epoch 33/50  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6386 -  
mse: 0.6386 - val\_loss: 0.6741 - val\_mse: 0.6741  
Epoch 34/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6369 -  
mse: 0.6369 - val\_loss: 0.6601 - val\_mse: 0.6601  
Epoch 35/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6354 -  
mse: 0.6354 - val\_loss: 0.6671 - val\_mse: 0.6671  
Epoch 36/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6342 -  
mse: 0.6342 - val\_loss: 0.6649 - val\_mse: 0.6649  
Epoch 37/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6331 -  
mse: 0.6331 - val\_loss: 0.6665 - val\_mse: 0.6665  
Epoch 38/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6314 -  
mse: 0.6314 - val\_loss: 0.6669 - val\_mse: 0.6669  
Epoch 39/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6303 -  
mse: 0.6303 - val\_loss: 0.6556 - val\_mse: 0.6556  
Epoch 40/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6292 -  
mse: 0.6292 - val\_loss: 0.6609 - val\_mse: 0.6609  
Epoch 41/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6275 -  
mse: 0.6275 - val\_loss: 0.6800 - val\_mse: 0.6800  
Epoch 42/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6262 -  
mse: 0.6262 - val\_loss: 0.6623 - val\_mse: 0.6623

Epoch 43/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6250 -  
mse: 0.6250 - val\_loss: 0.6637 - val\_mse: 0.6637  
Epoch 44/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6235 -  
mse: 0.6235 - val\_loss: 0.6647 - val\_mse: 0.6647  
Epoch 45/50  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6228 -  
mse: 0.6228 - val\_loss: 0.6672 - val\_mse: 0.6672  
Epoch 46/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6217 -  
mse: 0.6217 - val\_loss: 0.6707 - val\_mse: 0.6707  
Epoch 47/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6207 -  
mse: 0.6207 - val\_loss: 0.6809 - val\_mse: 0.6809  
Epoch 48/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6191 -  
mse: 0.6191 - val\_loss: 0.6526 - val\_mse: 0.6526  
Epoch 49/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6184 -  
mse: 0.6184 - val\_loss: 0.6640 - val\_mse: 0.6640  
Epoch 50/50  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6169 -  
mse: 0.6169 - val\_loss: 0.6646 - val\_mse: 0.6646  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7470 -  
mse: 0.7470 - val\_loss: 0.7663 - val\_mse: 0.7663  
Epoch 2/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7073 -  
mse: 0.7073 - val\_loss: 0.7537 - val\_mse: 0.7537  
Epoch 3/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6896 -  
mse: 0.6896 - val\_loss: 0.7553 - val\_mse: 0.7553  
Epoch 4/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6767 -  
mse: 0.6767 - val\_loss: 0.7622 - val\_mse: 0.7622  
Epoch 5/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6680 -  
mse: 0.6680 - val\_loss: 0.7322 - val\_mse: 0.7322  
Epoch 6/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6610 -  
mse: 0.6610 - val\_loss: 0.7319 - val\_mse: 0.7319  
Epoch 7/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6550 -  
mse: 0.6550 - val\_loss: 0.7216 - val\_mse: 0.7216  
Epoch 8/50

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.6496 -
mse: 0.6496 - val_loss: 0.7229 - val_mse: 0.7229
Epoch 9/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6449 -
mse: 0.6449 - val_loss: 0.7191 - val_mse: 0.7191
Epoch 10/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6410 -
mse: 0.6410 - val_loss: 0.7116 - val_mse: 0.7116
Epoch 11/50
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6377 -
mse: 0.6377 - val_loss: 0.7105 - val_mse: 0.7105
Epoch 12/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6333 -
mse: 0.6333 - val_loss: 0.7015 - val_mse: 0.7015
Epoch 13/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6304 -
mse: 0.6304 - val_loss: 0.7227 - val_mse: 0.7227
Epoch 14/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6272 -
mse: 0.6272 - val_loss: 0.7053 - val_mse: 0.7053
Epoch 15/50
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6244 -
mse: 0.6244 - val_loss: 0.7074 - val_mse: 0.7074
Epoch 16/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6217 -
mse: 0.6217 - val_loss: 0.7038 - val_mse: 0.7038
Epoch 17/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6191 -
mse: 0.6191 - val_loss: 0.7007 - val_mse: 0.7007
Epoch 18/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6170 -
mse: 0.6170 - val_loss: 0.7026 - val_mse: 0.7026
Epoch 19/50
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6146 -
mse: 0.6146 - val_loss: 0.6935 - val_mse: 0.6935
Epoch 20/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6124 -
mse: 0.6124 - val_loss: 0.7308 - val_mse: 0.7308
Epoch 21/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6104 -
mse: 0.6104 - val_loss: 0.7005 - val_mse: 0.7005
Epoch 22/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6087 -
mse: 0.6087 - val_loss: 0.6873 - val_mse: 0.6873
Epoch 23/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6068 -
mse: 0.6068 - val_loss: 0.7069 - val_mse: 0.7069
Epoch 24/50

```



3353317/3353317 [=====] - 16s 5us/step - loss: 0.6053 -  
mse: 0.6053 - val\_loss: 0.6894 - val\_mse: 0.6894  
Epoch 25/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6036 -  
mse: 0.6036 - val\_loss: 0.6806 - val\_mse: 0.6806  
Epoch 26/50  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6018 -  
mse: 0.6018 - val\_loss: 0.6937 - val\_mse: 0.6937  
Epoch 27/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6000 -  
mse: 0.6000 - val\_loss: 0.6866 - val\_mse: 0.6866  
Epoch 28/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5988 -  
mse: 0.5988 - val\_loss: 0.6774 - val\_mse: 0.6774  
Epoch 29/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5976 -  
mse: 0.5976 - val\_loss: 0.6971 - val\_mse: 0.6971  
Epoch 30/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5963 -  
mse: 0.5963 - val\_loss: 0.6826 - val\_mse: 0.6826  
Epoch 31/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5945 -  
mse: 0.5945 - val\_loss: 0.6833 - val\_mse: 0.6833  
Epoch 32/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5933 -  
mse: 0.5933 - val\_loss: 0.6817 - val\_mse: 0.6817  
Epoch 33/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5923 -  
mse: 0.5923 - val\_loss: 0.6967 - val\_mse: 0.6967  
Epoch 34/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5910 -  
mse: 0.5910 - val\_loss: 0.6862 - val\_mse: 0.6862  
Epoch 35/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5897 -  
mse: 0.5897 - val\_loss: 0.6809 - val\_mse: 0.6809  
Epoch 36/50  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5883 -  
mse: 0.5883 - val\_loss: 0.6798 - val\_mse: 0.6798  
Epoch 37/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5873 -  
mse: 0.5873 - val\_loss: 0.6807 - val\_mse: 0.6807  
Epoch 38/50  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5864 -  
mse: 0.5864 - val\_loss: 0.7036 - val\_mse: 0.7036  
Epoch 39/50  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5851 -  
mse: 0.5851 - val\_loss: 0.6860 - val\_mse: 0.6860  
Epoch 40/50

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5840 -
mse: 0.5840 - val_loss: 0.6740 - val_mse: 0.6740
Epoch 41/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5830 -
mse: 0.5830 - val_loss: 0.6881 - val_mse: 0.6881
Epoch 42/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5820 -
mse: 0.5820 - val_loss: 0.6809 - val_mse: 0.6809
Epoch 43/50
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5808 -
mse: 0.5807 - val_loss: 0.6681 - val_mse: 0.6681
Epoch 44/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5801 -
mse: 0.5801 - val_loss: 0.6843 - val_mse: 0.6843
Epoch 45/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5790 -
mse: 0.5790 - val_loss: 0.6859 - val_mse: 0.6859
Epoch 46/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5777 -
mse: 0.5777 - val_loss: 0.6709 - val_mse: 0.6709
Epoch 47/50
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5769 -
mse: 0.5769 - val_loss: 0.6691 - val_mse: 0.6691
Epoch 48/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5758 -
mse: 0.5758 - val_loss: 0.6703 - val_mse: 0.6703
Epoch 49/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5748 -
mse: 0.5748 - val_loss: 0.6845 - val_mse: 0.6845
Epoch 50/50
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5741 -
mse: 0.5741 - val_loss: 0.6889 - val_mse: 0.6889
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.8599 -
mse: 0.8599 - val_loss: 0.8232 - val_mse: 0.8232
Epoch 2/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.8052 -
mse: 0.8052 - val_loss: 0.8070 - val_mse: 0.8070
Epoch 3/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7835 -
mse: 0.7835 - val_loss: 0.7824 - val_mse: 0.7824
Epoch 4/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7694 -
mse: 0.7694 - val_loss: 0.7715 - val_mse: 0.7715
Epoch 5/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7605 -

```

```

mse: 0.7605 - val_loss: 0.7600 - val_mse: 0.7600
Epoch 6/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7530 -
mse: 0.7530 - val_loss: 0.7625 - val_mse: 0.7625
Epoch 7/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7462 -
mse: 0.7462 - val_loss: 0.7665 - val_mse: 0.7665
Epoch 8/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7406 -
mse: 0.7406 - val_loss: 0.7454 - val_mse: 0.7454
Epoch 9/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7354 -
mse: 0.7354 - val_loss: 0.7546 - val_mse: 0.7546
Epoch 10/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7306 -
mse: 0.7306 - val_loss: 0.7346 - val_mse: 0.7346
Epoch 11/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7269 -
mse: 0.7269 - val_loss: 0.7356 - val_mse: 0.7356
Epoch 12/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7221 -
mse: 0.7221 - val_loss: 0.7371 - val_mse: 0.7371
Epoch 13/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7193 -
mse: 0.7193 - val_loss: 0.7398 - val_mse: 0.7398
Epoch 14/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7154 -
mse: 0.7154 - val_loss: 0.7452 - val_mse: 0.7452
Epoch 15/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7124 -
mse: 0.7124 - val_loss: 0.7506 - val_mse: 0.7506
Epoch 16/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7092 -
mse: 0.7092 - val_loss: 0.7437 - val_mse: 0.7437
Epoch 17/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7061 -
mse: 0.7061 - val_loss: 0.7350 - val_mse: 0.7350
Epoch 18/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7041 -
mse: 0.7041 - val_loss: 0.7601 - val_mse: 0.7601
Epoch 19/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7011 -
mse: 0.7011 - val_loss: 0.7314 - val_mse: 0.7314
Epoch 20/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6989 -
mse: 0.6989 - val_loss: 0.7804 - val_mse: 0.7804
Epoch 21/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6963 -

```

```

mse: 0.6963 - val_loss: 0.7537 - val_mse: 0.7537
Epoch 22/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6943 -
mse: 0.6943 - val_loss: 0.7525 - val_mse: 0.7525
Epoch 23/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6919 -
mse: 0.6919 - val_loss: 0.7497 - val_mse: 0.7497
Epoch 24/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6898 -
mse: 0.6898 - val_loss: 0.7486 - val_mse: 0.7486
Epoch 25/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6876 -
mse: 0.6876 - val_loss: 0.7566 - val_mse: 0.7566
Epoch 26/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6860 -
mse: 0.6860 - val_loss: 0.7544 - val_mse: 0.7544
Epoch 27/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6835 -
mse: 0.6835 - val_loss: 0.7693 - val_mse: 0.7693
Epoch 28/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6819 -
mse: 0.6819 - val_loss: 0.7838 - val_mse: 0.7838
Epoch 29/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6793 -
mse: 0.6793 - val_loss: 0.7766 - val_mse: 0.7766
Epoch 30/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6775 -
mse: 0.6775 - val_loss: 0.7652 - val_mse: 0.7652
Epoch 31/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6761 -
mse: 0.6761 - val_loss: 0.7521 - val_mse: 0.7521
Epoch 32/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6745 -
mse: 0.6745 - val_loss: 0.7504 - val_mse: 0.7504
Epoch 33/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6729 -
mse: 0.6729 - val_loss: 0.7610 - val_mse: 0.7610
Epoch 34/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6709 -
mse: 0.6709 - val_loss: 0.7686 - val_mse: 0.7686
Epoch 35/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6696 -
mse: 0.6696 - val_loss: 0.7485 - val_mse: 0.7485
Epoch 36/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6680 -
mse: 0.6680 - val_loss: 0.7758 - val_mse: 0.7758
Epoch 37/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6666 -

```

```

mse: 0.6666 - val_loss: 0.7707 - val_mse: 0.7707
Epoch 38/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6645 -
mse: 0.6645 - val_loss: 0.7593 - val_mse: 0.7593
Epoch 39/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6634 -
mse: 0.6634 - val_loss: 0.7785 - val_mse: 0.7785
Epoch 40/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6620 -
mse: 0.6620 - val_loss: 0.7623 - val_mse: 0.7623
Epoch 41/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6608 -
mse: 0.6608 - val_loss: 0.7919 - val_mse: 0.7919
Epoch 42/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6592 -
mse: 0.6592 - val_loss: 0.7701 - val_mse: 0.7701
Epoch 43/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6576 -
mse: 0.6576 - val_loss: 0.7790 - val_mse: 0.7790
Epoch 44/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6568 -
mse: 0.6568 - val_loss: 0.7654 - val_mse: 0.7654
Epoch 45/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6551 -
mse: 0.6551 - val_loss: 0.7630 - val_mse: 0.7630
Epoch 46/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6541 -
mse: 0.6541 - val_loss: 0.7783 - val_mse: 0.7783
Epoch 47/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6531 -
mse: 0.6531 - val_loss: 0.7722 - val_mse: 0.7722
Epoch 48/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6521 -
mse: 0.6521 - val_loss: 0.7949 - val_mse: 0.7949
Epoch 49/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6505 -
mse: 0.6505 - val_loss: 0.7875 - val_mse: 0.7875
Epoch 50/50
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6497 -
mse: 0.6497 - val_loss: 0.7844 - val_mse: 0.7844
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.8486 -
mse: 0.8486 - val_loss: 0.7829 - val_mse: 0.7829
Epoch 2/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7885 -
mse: 0.7885 - val_loss: 0.7888 - val_mse: 0.7888

```

Epoch 3/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7623 -  
mse: 0.7623 - val\_loss: 0.7423 - val\_mse: 0.7423

Epoch 4/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7440 -  
mse: 0.7440 - val\_loss: 0.7343 - val\_mse: 0.7343

Epoch 5/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7323 -  
mse: 0.7323 - val\_loss: 0.7268 - val\_mse: 0.7268

Epoch 6/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7242 -  
mse: 0.7242 - val\_loss: 0.7146 - val\_mse: 0.7146

Epoch 7/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7173 -  
mse: 0.7173 - val\_loss: 0.7182 - val\_mse: 0.7182

Epoch 8/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7100 -  
mse: 0.7100 - val\_loss: 0.7158 - val\_mse: 0.7158

Epoch 9/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7046 -  
mse: 0.7046 - val\_loss: 0.7029 - val\_mse: 0.7029

Epoch 10/100  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6997 -  
mse: 0.6997 - val\_loss: 0.6992 - val\_mse: 0.6992

Epoch 11/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6946 -  
mse: 0.6946 - val\_loss: 0.6996 - val\_mse: 0.6996

Epoch 12/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6900 -  
mse: 0.6900 - val\_loss: 0.6898 - val\_mse: 0.6898

Epoch 13/100  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6860 -  
mse: 0.6860 - val\_loss: 0.6951 - val\_mse: 0.6951

Epoch 14/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6818 -  
mse: 0.6818 - val\_loss: 0.6916 - val\_mse: 0.6916

Epoch 15/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6784 -  
mse: 0.6784 - val\_loss: 0.6884 - val\_mse: 0.6884

Epoch 16/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6748 -  
mse: 0.6748 - val\_loss: 0.6808 - val\_mse: 0.6808

Epoch 17/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6717 -  
mse: 0.6717 - val\_loss: 0.6910 - val\_mse: 0.6910

Epoch 18/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6684 -  
mse: 0.6684 - val\_loss: 0.6818 - val\_mse: 0.6818

Epoch 19/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6653 -  
mse: 0.6653 - val\_loss: 0.6853 - val\_mse: 0.6853

Epoch 20/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6628 -  
mse: 0.6628 - val\_loss: 0.6828 - val\_mse: 0.6828

Epoch 21/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6602 -  
mse: 0.6602 - val\_loss: 0.6860 - val\_mse: 0.6860

Epoch 22/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6578 -  
mse: 0.6578 - val\_loss: 0.6805 - val\_mse: 0.6805

Epoch 23/100  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6559 -  
mse: 0.6559 - val\_loss: 0.7028 - val\_mse: 0.7028

Epoch 24/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6537 -  
mse: 0.6537 - val\_loss: 0.6753 - val\_mse: 0.6753

Epoch 25/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6516 -  
mse: 0.6516 - val\_loss: 0.6653 - val\_mse: 0.6653

Epoch 26/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6494 -  
mse: 0.6494 - val\_loss: 0.6740 - val\_mse: 0.6740

Epoch 27/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6476 -  
mse: 0.6476 - val\_loss: 0.6767 - val\_mse: 0.6767

Epoch 28/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6458 -  
mse: 0.6458 - val\_loss: 0.6724 - val\_mse: 0.6724

Epoch 29/100  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6441 -  
mse: 0.6441 - val\_loss: 0.6948 - val\_mse: 0.6948

Epoch 30/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6423 -  
mse: 0.6423 - val\_loss: 0.6849 - val\_mse: 0.6849

Epoch 31/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6406 -  
mse: 0.6406 - val\_loss: 0.7070 - val\_mse: 0.7070

Epoch 32/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6392 -  
mse: 0.6392 - val\_loss: 0.6899 - val\_mse: 0.6899

Epoch 33/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6374 -  
mse: 0.6374 - val\_loss: 0.6925 - val\_mse: 0.6925

Epoch 34/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6364 -  
mse: 0.6364 - val\_loss: 0.6727 - val\_mse: 0.6727

Epoch 35/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6343 -  
mse: 0.6343 - val\_loss: 0.6657 - val\_mse: 0.6657  
Epoch 36/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6326 -  
mse: 0.6326 - val\_loss: 0.6658 - val\_mse: 0.6658  
Epoch 37/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6316 -  
mse: 0.6316 - val\_loss: 0.6675 - val\_mse: 0.6675  
Epoch 38/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6304 -  
mse: 0.6304 - val\_loss: 0.6802 - val\_mse: 0.6802  
Epoch 39/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6284 -  
mse: 0.6284 - val\_loss: 0.6784 - val\_mse: 0.6784  
Epoch 40/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6274 -  
mse: 0.6274 - val\_loss: 0.6888 - val\_mse: 0.6888  
Epoch 41/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6264 -  
mse: 0.6264 - val\_loss: 0.7123 - val\_mse: 0.7123  
Epoch 42/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6248 -  
mse: 0.6248 - val\_loss: 0.6909 - val\_mse: 0.6909  
Epoch 43/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6230 -  
mse: 0.6230 - val\_loss: 0.6935 - val\_mse: 0.6935  
Epoch 44/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6224 -  
mse: 0.6224 - val\_loss: 0.6625 - val\_mse: 0.6625  
Epoch 45/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6210 -  
mse: 0.6210 - val\_loss: 0.6774 - val\_mse: 0.6774  
Epoch 46/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6199 -  
mse: 0.6199 - val\_loss: 0.6715 - val\_mse: 0.6715  
Epoch 47/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6185 -  
mse: 0.6185 - val\_loss: 0.6733 - val\_mse: 0.6733  
Epoch 48/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6180 -  
mse: 0.6180 - val\_loss: 0.6952 - val\_mse: 0.6952  
Epoch 49/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6166 -  
mse: 0.6166 - val\_loss: 0.7174 - val\_mse: 0.7174  
Epoch 50/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6153 -  
mse: 0.6153 - val\_loss: 0.6683 - val\_mse: 0.6683



Epoch 51/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6143 -  
mse: 0.6143 - val\_loss: 0.6701 - val\_mse: 0.6701  
Epoch 52/100  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6133 -  
mse: 0.6133 - val\_loss: 0.7129 - val\_mse: 0.7129  
Epoch 53/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6124 -  
mse: 0.6124 - val\_loss: 0.6769 - val\_mse: 0.6769  
Epoch 54/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6110 -  
mse: 0.6110 - val\_loss: 0.6855 - val\_mse: 0.6855  
Epoch 55/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6101 -  
mse: 0.6101 - val\_loss: 0.6998 - val\_mse: 0.6998  
Epoch 56/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6086 -  
mse: 0.6086 - val\_loss: 0.6672 - val\_mse: 0.6672  
Epoch 57/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6083 -  
mse: 0.6083 - val\_loss: 0.6732 - val\_mse: 0.6732  
Epoch 58/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6072 -  
mse: 0.6072 - val\_loss: 0.6536 - val\_mse: 0.6536  
Epoch 59/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6056 -  
mse: 0.6056 - val\_loss: 0.7208 - val\_mse: 0.7208  
Epoch 60/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6049 -  
mse: 0.6049 - val\_loss: 0.6582 - val\_mse: 0.6582  
Epoch 61/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6035 -  
mse: 0.6035 - val\_loss: 0.6979 - val\_mse: 0.6979  
Epoch 62/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6028 -  
mse: 0.6028 - val\_loss: 0.6944 - val\_mse: 0.6944  
Epoch 63/100  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6018 -  
mse: 0.6018 - val\_loss: 0.6613 - val\_mse: 0.6613  
Epoch 64/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6010 -  
mse: 0.6010 - val\_loss: 0.6697 - val\_mse: 0.6697  
Epoch 65/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5999 -  
mse: 0.5999 - val\_loss: 0.6786 - val\_mse: 0.6786  
Epoch 66/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5990 -  
mse: 0.5990 - val\_loss: 0.6573 - val\_mse: 0.6573

Epoch 67/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5981 -  
mse: 0.5981 - val\_loss: 0.6643 - val\_mse: 0.6643  
Epoch 68/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5970 -  
mse: 0.5970 - val\_loss: 0.6798 - val\_mse: 0.6798  
Epoch 69/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5966 -  
mse: 0.5966 - val\_loss: 0.6848 - val\_mse: 0.6848  
Epoch 70/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5954 -  
mse: 0.5954 - val\_loss: 0.6546 - val\_mse: 0.6546  
Epoch 71/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5948 -  
mse: 0.5948 - val\_loss: 0.6923 - val\_mse: 0.6923  
Epoch 72/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5939 -  
mse: 0.5939 - val\_loss: 0.6789 - val\_mse: 0.6789  
Epoch 73/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5931 -  
mse: 0.5931 - val\_loss: 0.6742 - val\_mse: 0.6742  
Epoch 74/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5924 -  
mse: 0.5924 - val\_loss: 0.6633 - val\_mse: 0.6633  
Epoch 75/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5918 -  
mse: 0.5918 - val\_loss: 0.6765 - val\_mse: 0.6765  
Epoch 76/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5909 -  
mse: 0.5909 - val\_loss: 0.6845 - val\_mse: 0.6845  
Epoch 77/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5900 -  
mse: 0.5901 - val\_loss: 0.6678 - val\_mse: 0.6678  
Epoch 78/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5892 -  
mse: 0.5892 - val\_loss: 0.6824 - val\_mse: 0.6824  
Epoch 79/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5888 -  
mse: 0.5888 - val\_loss: 0.6736 - val\_mse: 0.6736  
Epoch 80/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5880 -  
mse: 0.5880 - val\_loss: 0.6868 - val\_mse: 0.6868  
Epoch 81/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5873 -  
mse: 0.5873 - val\_loss: 0.6775 - val\_mse: 0.6775  
Epoch 82/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5868 -  
mse: 0.5868 - val\_loss: 0.6618 - val\_mse: 0.6618

Epoch 83/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5856 -  
mse: 0.5856 - val\_loss: 0.6762 - val\_mse: 0.6762

Epoch 84/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5853 -  
mse: 0.5853 - val\_loss: 0.6799 - val\_mse: 0.6799

Epoch 85/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5848 -  
mse: 0.5848 - val\_loss: 0.6962 - val\_mse: 0.6962

Epoch 86/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5842 -  
mse: 0.5842 - val\_loss: 0.6981 - val\_mse: 0.6981

Epoch 87/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5828 -  
mse: 0.5828 - val\_loss: 0.6690 - val\_mse: 0.6690

Epoch 88/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5829 -  
mse: 0.5829 - val\_loss: 0.6844 - val\_mse: 0.6844

Epoch 89/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5820 -  
mse: 0.5820 - val\_loss: 0.6813 - val\_mse: 0.6813

Epoch 90/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5814 -  
mse: 0.5814 - val\_loss: 0.6774 - val\_mse: 0.6774

Epoch 91/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5814 -  
mse: 0.5814 - val\_loss: 0.6959 - val\_mse: 0.6959

Epoch 92/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5807 -  
mse: 0.5807 - val\_loss: 0.7047 - val\_mse: 0.7047

Epoch 93/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5800 -  
mse: 0.5800 - val\_loss: 0.6998 - val\_mse: 0.6998

Epoch 94/100  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5790 -  
mse: 0.5790 - val\_loss: 0.6707 - val\_mse: 0.6707

Epoch 95/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5785 -  
mse: 0.5785 - val\_loss: 0.6801 - val\_mse: 0.6801

Epoch 96/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5782 -  
mse: 0.5782 - val\_loss: 0.7001 - val\_mse: 0.7001

Epoch 97/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5778 -  
mse: 0.5778 - val\_loss: 0.6580 - val\_mse: 0.6580

Epoch 98/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5768 -  
mse: 0.5768 - val\_loss: 0.6721 - val\_mse: 0.6721

Epoch 99/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5766 -  
mse: 0.5766 - val\_loss: 0.6605 - val\_mse: 0.6605  
Epoch 100/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5759 -  
mse: 0.5759 - val\_loss: 0.7004 - val\_mse: 0.7004  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7541 -  
mse: 0.7541 - val\_loss: 0.7638 - val\_mse: 0.7638  
Epoch 2/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7079 -  
mse: 0.7079 - val\_loss: 0.7527 - val\_mse: 0.7527  
Epoch 3/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6887 -  
mse: 0.6887 - val\_loss: 0.7515 - val\_mse: 0.7515  
Epoch 4/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6755 -  
mse: 0.6755 - val\_loss: 0.7342 - val\_mse: 0.7342  
Epoch 5/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6658 -  
mse: 0.6658 - val\_loss: 0.7332 - val\_mse: 0.7332  
Epoch 6/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6590 -  
mse: 0.6590 - val\_loss: 0.7195 - val\_mse: 0.7195  
Epoch 7/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6529 -  
mse: 0.6529 - val\_loss: 0.7196 - val\_mse: 0.7196  
Epoch 8/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6477 -  
mse: 0.6477 - val\_loss: 0.7294 - val\_mse: 0.7294  
Epoch 9/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6434 -  
mse: 0.6434 - val\_loss: 0.7427 - val\_mse: 0.7427  
Epoch 10/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6390 -  
mse: 0.6390 - val\_loss: 0.7231 - val\_mse: 0.7231  
Epoch 11/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6356 -  
mse: 0.6356 - val\_loss: 0.7133 - val\_mse: 0.7133  
Epoch 12/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6319 -  
mse: 0.6319 - val\_loss: 0.7042 - val\_mse: 0.7042  
Epoch 13/100  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6288 -  
mse: 0.6288 - val\_loss: 0.7141 - val\_mse: 0.7141  
Epoch 14/100

3353317/3353317 [=====] - 16s 5us/step - loss: 0.6259 -  
 mse: 0.6259 - val\_loss: 0.7025 - val\_mse: 0.7025  
 Epoch 15/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6232 -  
 mse: 0.6232 - val\_loss: 0.6944 - val\_mse: 0.6944  
 Epoch 16/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6203 -  
 mse: 0.6203 - val\_loss: 0.6993 - val\_mse: 0.6993  
 Epoch 17/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6184 -  
 mse: 0.6184 - val\_loss: 0.7094 - val\_mse: 0.7094  
 Epoch 18/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6160 -  
 mse: 0.6160 - val\_loss: 0.7013 - val\_mse: 0.7013  
 Epoch 19/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6143 -  
 mse: 0.6143 - val\_loss: 0.6959 - val\_mse: 0.6959  
 Epoch 20/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6122 -  
 mse: 0.6122 - val\_loss: 0.6921 - val\_mse: 0.6921  
 Epoch 21/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6099 -  
 mse: 0.6099 - val\_loss: 0.6884 - val\_mse: 0.6884  
 Epoch 22/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6081 -  
 mse: 0.6081 - val\_loss: 0.6839 - val\_mse: 0.6839  
 Epoch 23/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6061 -  
 mse: 0.6061 - val\_loss: 0.6841 - val\_mse: 0.6841  
 Epoch 24/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6045 -  
 mse: 0.6045 - val\_loss: 0.6792 - val\_mse: 0.6792  
 Epoch 25/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6030 -  
 mse: 0.6030 - val\_loss: 0.6844 - val\_mse: 0.6844  
 Epoch 26/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.6011 -  
 mse: 0.6011 - val\_loss: 0.6769 - val\_mse: 0.6769  
 Epoch 27/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5998 -  
 mse: 0.5998 - val\_loss: 0.6801 - val\_mse: 0.6801  
 Epoch 28/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5984 -  
 mse: 0.5984 - val\_loss: 0.6785 - val\_mse: 0.6785  
 Epoch 29/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5967 -  
 mse: 0.5967 - val\_loss: 0.6886 - val\_mse: 0.6886  
 Epoch 30/100

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5956 -
mse: 0.5956 - val_loss: 0.6759 - val_mse: 0.6759
Epoch 31/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5943 -
mse: 0.5943 - val_loss: 0.7079 - val_mse: 0.7079
Epoch 32/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5928 -
mse: 0.5928 - val_loss: 0.6734 - val_mse: 0.6734
Epoch 33/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5917 -
mse: 0.5917 - val_loss: 0.6777 - val_mse: 0.6777
Epoch 34/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5902 -
mse: 0.5902 - val_loss: 0.6727 - val_mse: 0.6727
Epoch 35/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5896 -
mse: 0.5896 - val_loss: 0.6690 - val_mse: 0.6690
Epoch 36/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5882 -
mse: 0.5882 - val_loss: 0.6663 - val_mse: 0.6663
Epoch 37/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5874 -
mse: 0.5874 - val_loss: 0.6699 - val_mse: 0.6699
Epoch 38/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5862 -
mse: 0.5862 - val_loss: 0.6715 - val_mse: 0.6715
Epoch 39/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5850 -
mse: 0.5850 - val_loss: 0.6730 - val_mse: 0.6730
Epoch 40/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5836 -
mse: 0.5836 - val_loss: 0.6641 - val_mse: 0.6641
Epoch 41/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5826 -
mse: 0.5826 - val_loss: 0.6776 - val_mse: 0.6776
Epoch 42/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5814 -
mse: 0.5814 - val_loss: 0.6763 - val_mse: 0.6763
Epoch 43/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5806 -
mse: 0.5806 - val_loss: 0.6759 - val_mse: 0.6759
Epoch 44/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5800 -
mse: 0.5800 - val_loss: 0.6785 - val_mse: 0.6785
Epoch 45/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5787 -
mse: 0.5787 - val_loss: 0.6755 - val_mse: 0.6755
Epoch 46/100

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5783 -  
 mse: 0.5783 - val\_loss: 0.6759 - val\_mse: 0.6759  
 Epoch 47/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5774 -  
 mse: 0.5774 - val\_loss: 0.6738 - val\_mse: 0.6738  
 Epoch 48/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5765 -  
 mse: 0.5765 - val\_loss: 0.6552 - val\_mse: 0.6552  
 Epoch 49/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5752 -  
 mse: 0.5752 - val\_loss: 0.6681 - val\_mse: 0.6681  
 Epoch 50/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5744 -  
 mse: 0.5744 - val\_loss: 0.6681 - val\_mse: 0.6681  
 Epoch 51/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5735 -  
 mse: 0.5735 - val\_loss: 0.6821 - val\_mse: 0.6821  
 Epoch 52/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5726 -  
 mse: 0.5726 - val\_loss: 0.6779 - val\_mse: 0.6779  
 Epoch 53/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5721 -  
 mse: 0.5721 - val\_loss: 0.6617 - val\_mse: 0.6617  
 Epoch 54/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5710 -  
 mse: 0.5710 - val\_loss: 0.6553 - val\_mse: 0.6553  
 Epoch 55/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5703 -  
 mse: 0.5703 - val\_loss: 0.6610 - val\_mse: 0.6610  
 Epoch 56/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5696 -  
 mse: 0.5696 - val\_loss: 0.6689 - val\_mse: 0.6689  
 Epoch 57/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5684 -  
 mse: 0.5684 - val\_loss: 0.6670 - val\_mse: 0.6670  
 Epoch 58/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5674 -  
 mse: 0.5674 - val\_loss: 0.6732 - val\_mse: 0.6732  
 Epoch 59/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5669 -  
 mse: 0.5669 - val\_loss: 0.6622 - val\_mse: 0.6622  
 Epoch 60/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5659 -  
 mse: 0.5659 - val\_loss: 0.6531 - val\_mse: 0.6531  
 Epoch 61/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5654 -  
 mse: 0.5654 - val\_loss: 0.6886 - val\_mse: 0.6886  
 Epoch 62/100

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5644 -  
 mse: 0.5644 - val\_loss: 0.6570 - val\_mse: 0.6570  
 Epoch 63/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5636 -  
 mse: 0.5636 - val\_loss: 0.6571 - val\_mse: 0.6571  
 Epoch 64/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5626 -  
 mse: 0.5626 - val\_loss: 0.6670 - val\_mse: 0.6670  
 Epoch 65/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5620 -  
 mse: 0.5620 - val\_loss: 0.6607 - val\_mse: 0.6607  
 Epoch 66/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5612 -  
 mse: 0.5612 - val\_loss: 0.6620 - val\_mse: 0.6620  
 Epoch 67/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5605 -  
 mse: 0.5605 - val\_loss: 0.6686 - val\_mse: 0.6686  
 Epoch 68/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5598 -  
 mse: 0.5598 - val\_loss: 0.6599 - val\_mse: 0.6599  
 Epoch 69/100  
 3353317/3353317 [=====] - 15s 5us/step - loss: 0.5589 -  
 mse: 0.5589 - val\_loss: 0.6642 - val\_mse: 0.6642  
 Epoch 70/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5584 -  
 mse: 0.5584 - val\_loss: 0.6556 - val\_mse: 0.6556  
 Epoch 71/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5575 -  
 mse: 0.5575 - val\_loss: 0.6695 - val\_mse: 0.6695  
 Epoch 72/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5571 -  
 mse: 0.5571 - val\_loss: 0.6566 - val\_mse: 0.6566  
 Epoch 73/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5560 -  
 mse: 0.5560 - val\_loss: 0.6576 - val\_mse: 0.6576  
 Epoch 74/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5555 -  
 mse: 0.5555 - val\_loss: 0.6521 - val\_mse: 0.6521  
 Epoch 75/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5551 -  
 mse: 0.5551 - val\_loss: 0.6658 - val\_mse: 0.6658  
 Epoch 76/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5541 -  
 mse: 0.5541 - val\_loss: 0.6742 - val\_mse: 0.6742  
 Epoch 77/100  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5532 -  
 mse: 0.5532 - val\_loss: 0.6508 - val\_mse: 0.6508  
 Epoch 78/100



```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5529 -
mse: 0.5529 - val_loss: 0.6562 - val_mse: 0.6562
Epoch 79/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5517 -
mse: 0.5517 - val_loss: 0.6620 - val_mse: 0.6620
Epoch 80/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5518 -
mse: 0.5518 - val_loss: 0.6611 - val_mse: 0.6611
Epoch 81/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5508 -
mse: 0.5508 - val_loss: 0.6664 - val_mse: 0.6664
Epoch 82/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5501 -
mse: 0.5501 - val_loss: 0.6808 - val_mse: 0.6808
Epoch 83/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5502 -
mse: 0.5502 - val_loss: 0.6475 - val_mse: 0.6475
Epoch 84/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5487 -
mse: 0.5487 - val_loss: 0.6635 - val_mse: 0.6635
Epoch 85/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5481 -
mse: 0.5481 - val_loss: 0.6671 - val_mse: 0.6671
Epoch 86/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5476 -
mse: 0.5476 - val_loss: 0.6560 - val_mse: 0.6560
Epoch 87/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5469 -
mse: 0.5469 - val_loss: 0.6735 - val_mse: 0.6735
Epoch 88/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5466 -
mse: 0.5466 - val_loss: 0.6697 - val_mse: 0.6697
Epoch 89/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5459 -
mse: 0.5459 - val_loss: 0.6650 - val_mse: 0.6650
Epoch 90/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5451 -
mse: 0.5451 - val_loss: 0.6693 - val_mse: 0.6693
Epoch 91/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5447 -
mse: 0.5447 - val_loss: 0.6597 - val_mse: 0.6597
Epoch 92/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5443 -
mse: 0.5443 - val_loss: 0.6572 - val_mse: 0.6572
Epoch 93/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5436 -
mse: 0.5436 - val_loss: 0.6638 - val_mse: 0.6638
Epoch 94/100

```

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5428 -
mse: 0.5428 - val_loss: 0.6548 - val_mse: 0.6548
Epoch 95/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5428 -
mse: 0.5428 - val_loss: 0.6747 - val_mse: 0.6747
Epoch 96/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5421 -
mse: 0.5421 - val_loss: 0.6578 - val_mse: 0.6578
Epoch 97/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5413 -
mse: 0.5413 - val_loss: 0.6610 - val_mse: 0.6610
Epoch 98/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5409 -
mse: 0.5409 - val_loss: 0.6568 - val_mse: 0.6568
Epoch 99/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5404 -
mse: 0.5404 - val_loss: 0.6791 - val_mse: 0.6791
Epoch 100/100
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5400 -
mse: 0.5400 - val_loss: 0.6850 - val_mse: 0.6850
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.8671 -
mse: 0.8671 - val_loss: 0.8374 - val_mse: 0.8374
Epoch 2/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.8066 -
mse: 0.8066 - val_loss: 0.8115 - val_mse: 0.8115
Epoch 3/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7836 -
mse: 0.7836 - val_loss: 0.8012 - val_mse: 0.8012
Epoch 4/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7699 -
mse: 0.7699 - val_loss: 0.7853 - val_mse: 0.7853
Epoch 5/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7603 -
mse: 0.7603 - val_loss: 0.7787 - val_mse: 0.7787
Epoch 6/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7532 -
mse: 0.7532 - val_loss: 0.7552 - val_mse: 0.7552
Epoch 7/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7467 -
mse: 0.7467 - val_loss: 0.7580 - val_mse: 0.7580
Epoch 8/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7410 -
mse: 0.7410 - val_loss: 0.7510 - val_mse: 0.7510
Epoch 9/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7365 -

```

```

mse: 0.7365 - val_loss: 0.7507 - val_mse: 0.7507
Epoch 10/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.7325 -
mse: 0.7325 - val_loss: 0.7466 - val_mse: 0.7466
Epoch 11/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7280 -
mse: 0.7280 - val_loss: 0.7374 - val_mse: 0.7374
Epoch 12/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7243 -
mse: 0.7243 - val_loss: 0.7515 - val_mse: 0.7515
Epoch 13/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7206 -
mse: 0.7206 - val_loss: 0.7409 - val_mse: 0.7409
Epoch 14/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7170 -
mse: 0.7170 - val_loss: 0.7409 - val_mse: 0.7409
Epoch 15/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7139 -
mse: 0.7139 - val_loss: 0.7498 - val_mse: 0.7498
Epoch 16/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7106 -
mse: 0.7106 - val_loss: 0.7438 - val_mse: 0.7438
Epoch 17/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7075 -
mse: 0.7075 - val_loss: 0.7395 - val_mse: 0.7395
Epoch 18/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.7049 -
mse: 0.7049 - val_loss: 0.7492 - val_mse: 0.7492
Epoch 19/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7020 -
mse: 0.7020 - val_loss: 0.7487 - val_mse: 0.7487
Epoch 20/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6994 -
mse: 0.6994 - val_loss: 0.7407 - val_mse: 0.7407
Epoch 21/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6966 -
mse: 0.6966 - val_loss: 0.7453 - val_mse: 0.7453
Epoch 22/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6940 -
mse: 0.6940 - val_loss: 0.7452 - val_mse: 0.7452
Epoch 23/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6914 -
mse: 0.6914 - val_loss: 0.7610 - val_mse: 0.7610
Epoch 24/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6890 -
mse: 0.6890 - val_loss: 0.7585 - val_mse: 0.7585
Epoch 25/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6868 -

```

```

mse: 0.6868 - val_loss: 0.7483 - val_mse: 0.7483
Epoch 26/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6848 -
mse: 0.6848 - val_loss: 0.7510 - val_mse: 0.7510
Epoch 27/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6824 -
mse: 0.6824 - val_loss: 0.7425 - val_mse: 0.7425
Epoch 28/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6805 -
mse: 0.6805 - val_loss: 0.7559 - val_mse: 0.7559
Epoch 29/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6782 -
mse: 0.6782 - val_loss: 0.7619 - val_mse: 0.7619
Epoch 30/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6757 -
mse: 0.6757 - val_loss: 0.7795 - val_mse: 0.7795
Epoch 31/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6742 -
mse: 0.6742 - val_loss: 0.7624 - val_mse: 0.7624
Epoch 32/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6727 -
mse: 0.6727 - val_loss: 0.7667 - val_mse: 0.7667
Epoch 33/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6705 -
mse: 0.6705 - val_loss: 0.7686 - val_mse: 0.7686
Epoch 34/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6688 -
mse: 0.6688 - val_loss: 0.7588 - val_mse: 0.7588
Epoch 35/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6669 -
mse: 0.6669 - val_loss: 0.7694 - val_mse: 0.7694
Epoch 36/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6652 -
mse: 0.6652 - val_loss: 0.7753 - val_mse: 0.7753
Epoch 37/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6635 -
mse: 0.6635 - val_loss: 0.7797 - val_mse: 0.7797
Epoch 38/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6621 -
mse: 0.6621 - val_loss: 0.8011 - val_mse: 0.8011
Epoch 39/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6603 -
mse: 0.6603 - val_loss: 0.7879 - val_mse: 0.7879
Epoch 40/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6588 -
mse: 0.6588 - val_loss: 0.7779 - val_mse: 0.7779
Epoch 41/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6575 -

```

```

mse: 0.6575 - val_loss: 0.7784 - val_mse: 0.7784
Epoch 42/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6557 -
mse: 0.6557 - val_loss: 0.7896 - val_mse: 0.7896
Epoch 43/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6546 -
mse: 0.6546 - val_loss: 0.7935 - val_mse: 0.7935
Epoch 44/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6530 -
mse: 0.6530 - val_loss: 0.7868 - val_mse: 0.7868
Epoch 45/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6516 -
mse: 0.6516 - val_loss: 0.7950 - val_mse: 0.7950
Epoch 46/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6502 -
mse: 0.6502 - val_loss: 0.8193 - val_mse: 0.8193
Epoch 47/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6487 -
mse: 0.6487 - val_loss: 0.7884 - val_mse: 0.7884
Epoch 48/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6478 -
mse: 0.6478 - val_loss: 0.8405 - val_mse: 0.8405
Epoch 49/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6462 -
mse: 0.6462 - val_loss: 0.8543 - val_mse: 0.8543
Epoch 50/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6451 -
mse: 0.6451 - val_loss: 0.8046 - val_mse: 0.8046
Epoch 51/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6438 -
mse: 0.6438 - val_loss: 0.8199 - val_mse: 0.8199
Epoch 52/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6424 -
mse: 0.6424 - val_loss: 0.7856 - val_mse: 0.7856
Epoch 53/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6414 -
mse: 0.6414 - val_loss: 0.8491 - val_mse: 0.8491
Epoch 54/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6403 -
mse: 0.6403 - val_loss: 0.8004 - val_mse: 0.8004
Epoch 55/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6393 -
mse: 0.6393 - val_loss: 0.8172 - val_mse: 0.8172
Epoch 56/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6380 -
mse: 0.6380 - val_loss: 0.8173 - val_mse: 0.8173
Epoch 57/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6369 -

```

```

mse: 0.6369 - val_loss: 0.8364 - val_mse: 0.8364
Epoch 58/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6358 -
mse: 0.6358 - val_loss: 0.8246 - val_mse: 0.8246
Epoch 59/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6344 -
mse: 0.6344 - val_loss: 0.8798 - val_mse: 0.8798
Epoch 60/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6338 -
mse: 0.6338 - val_loss: 0.8748 - val_mse: 0.8748
Epoch 61/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6324 -
mse: 0.6324 - val_loss: 0.8870 - val_mse: 0.8870
Epoch 62/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6318 -
mse: 0.6318 - val_loss: 0.8893 - val_mse: 0.8893
Epoch 63/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6309 -
mse: 0.6309 - val_loss: 0.8730 - val_mse: 0.8730
Epoch 64/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6302 -
mse: 0.6302 - val_loss: 0.8522 - val_mse: 0.8522
Epoch 65/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6289 -
mse: 0.6289 - val_loss: 0.8350 - val_mse: 0.8350
Epoch 66/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6280 -
mse: 0.6280 - val_loss: 0.9351 - val_mse: 0.9351
Epoch 67/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6272 -
mse: 0.6272 - val_loss: 0.8553 - val_mse: 0.8553
Epoch 68/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6261 -
mse: 0.6261 - val_loss: 0.9627 - val_mse: 0.9627
Epoch 69/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6253 -
mse: 0.6253 - val_loss: 0.9042 - val_mse: 0.9042
Epoch 70/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6246 -
mse: 0.6246 - val_loss: 0.8681 - val_mse: 0.8681
Epoch 71/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6239 -
mse: 0.6239 - val_loss: 0.9323 - val_mse: 0.9323
Epoch 72/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6230 -
mse: 0.6230 - val_loss: 0.9057 - val_mse: 0.9057
Epoch 73/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6225 -

```

```

mse: 0.6225 - val_loss: 0.9405 - val_mse: 0.9405
Epoch 74/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6217 -
mse: 0.6217 - val_loss: 0.9462 - val_mse: 0.9462
Epoch 75/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6205 -
mse: 0.6205 - val_loss: 1.0038 - val_mse: 1.0038
Epoch 76/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6199 -
mse: 0.6199 - val_loss: 0.9183 - val_mse: 0.9183
Epoch 77/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6193 -
mse: 0.6193 - val_loss: 0.9971 - val_mse: 0.9971
Epoch 78/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6186 -
mse: 0.6186 - val_loss: 0.9361 - val_mse: 0.9361
Epoch 79/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6172 -
mse: 0.6172 - val_loss: 0.9134 - val_mse: 0.9134
Epoch 80/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6171 -
mse: 0.6171 - val_loss: 0.8872 - val_mse: 0.8872
Epoch 81/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6166 -
mse: 0.6166 - val_loss: 1.0139 - val_mse: 1.0139
Epoch 82/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6158 -
mse: 0.6158 - val_loss: 0.9432 - val_mse: 0.9432
Epoch 83/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6150 -
mse: 0.6150 - val_loss: 0.9915 - val_mse: 0.9915
Epoch 84/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6148 -
mse: 0.6148 - val_loss: 0.9178 - val_mse: 0.9178
Epoch 85/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6139 -
mse: 0.6139 - val_loss: 1.0275 - val_mse: 1.0275
Epoch 86/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6131 -
mse: 0.6131 - val_loss: 1.0355 - val_mse: 1.0355
Epoch 87/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6124 -
mse: 0.6124 - val_loss: 1.0419 - val_mse: 1.0419
Epoch 88/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6122 -
mse: 0.6122 - val_loss: 0.9789 - val_mse: 0.9789
Epoch 89/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6111 -

```

```

mse: 0.6111 - val_loss: 0.9315 - val_mse: 0.9315
Epoch 90/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6105 -
mse: 0.6105 - val_loss: 1.1411 - val_mse: 1.1411
Epoch 91/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6100 -
mse: 0.6100 - val_loss: 1.0177 - val_mse: 1.0177
Epoch 92/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6093 -
mse: 0.6093 - val_loss: 1.0269 - val_mse: 1.0269
Epoch 93/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6092 -
mse: 0.6092 - val_loss: 1.0355 - val_mse: 1.0355
Epoch 94/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6085 -
mse: 0.6085 - val_loss: 1.1267 - val_mse: 1.1267
Epoch 95/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6079 -
mse: 0.6079 - val_loss: 1.1475 - val_mse: 1.1475
Epoch 96/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6075 -
mse: 0.6075 - val_loss: 1.0167 - val_mse: 1.0167
Epoch 97/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6067 -
mse: 0.6067 - val_loss: 1.1625 - val_mse: 1.1625
Epoch 98/100
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6065 -
mse: 0.6065 - val_loss: 1.0637 - val_mse: 1.0637
Epoch 99/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6061 -
mse: 0.6061 - val_loss: 1.1233 - val_mse: 1.1233
Epoch 100/100
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6050 -
mse: 0.6050 - val_loss: 1.0268 - val_mse: 1.0268
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.8450 -
mse: 0.8450 - val_loss: 0.7816 - val_mse: 0.7816
Epoch 2/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7889 -
mse: 0.7889 - val_loss: 0.7572 - val_mse: 0.7572
Epoch 3/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7616 -
mse: 0.7616 - val_loss: 0.7655 - val_mse: 0.7655
Epoch 4/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7439 -
mse: 0.7439 - val_loss: 0.7320 - val_mse: 0.7320

```



Epoch 5/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7324 -  
mse: 0.7324 - val\_loss: 0.7330 - val\_mse: 0.7330

Epoch 6/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7244 -  
mse: 0.7244 - val\_loss: 0.7209 - val\_mse: 0.7209

Epoch 7/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7173 -  
mse: 0.7173 - val\_loss: 0.7219 - val\_mse: 0.7219

Epoch 8/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7121 -  
mse: 0.7121 - val\_loss: 0.7219 - val\_mse: 0.7219

Epoch 9/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7062 -  
mse: 0.7062 - val\_loss: 0.7078 - val\_mse: 0.7078

Epoch 10/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7021 -  
mse: 0.7021 - val\_loss: 0.7088 - val\_mse: 0.7088

Epoch 11/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6968 -  
mse: 0.6968 - val\_loss: 0.6962 - val\_mse: 0.6962

Epoch 12/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6929 -  
mse: 0.6929 - val\_loss: 0.7005 - val\_mse: 0.7005

Epoch 13/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6886 -  
mse: 0.6886 - val\_loss: 0.6929 - val\_mse: 0.6929

Epoch 14/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6846 -  
mse: 0.6846 - val\_loss: 0.6939 - val\_mse: 0.6939

Epoch 15/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6815 -  
mse: 0.6815 - val\_loss: 0.6905 - val\_mse: 0.6905

Epoch 16/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6778 -  
mse: 0.6778 - val\_loss: 0.6911 - val\_mse: 0.6911

Epoch 17/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6744 -  
mse: 0.6744 - val\_loss: 0.6803 - val\_mse: 0.6803

Epoch 18/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6716 -  
mse: 0.6716 - val\_loss: 0.7042 - val\_mse: 0.7042

Epoch 19/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6684 -  
mse: 0.6684 - val\_loss: 0.6929 - val\_mse: 0.6929

Epoch 20/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6655 -  
mse: 0.6655 - val\_loss: 0.6802 - val\_mse: 0.6802

Epoch 21/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6634 -  
mse: 0.6634 - val\_loss: 0.6857 - val\_mse: 0.6857

Epoch 22/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6606 -  
mse: 0.6606 - val\_loss: 0.7062 - val\_mse: 0.7062

Epoch 23/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6580 -  
mse: 0.6580 - val\_loss: 0.6863 - val\_mse: 0.6863

Epoch 24/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6557 -  
mse: 0.6557 - val\_loss: 0.6850 - val\_mse: 0.6850

Epoch 25/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6537 -  
mse: 0.6537 - val\_loss: 0.6891 - val\_mse: 0.6891

Epoch 26/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6510 -  
mse: 0.6510 - val\_loss: 0.6770 - val\_mse: 0.6770

Epoch 27/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6491 -  
mse: 0.6491 - val\_loss: 0.6930 - val\_mse: 0.6930

Epoch 28/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6470 -  
mse: 0.6470 - val\_loss: 0.6702 - val\_mse: 0.6702

Epoch 29/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6452 -  
mse: 0.6452 - val\_loss: 0.6874 - val\_mse: 0.6874

Epoch 30/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6433 -  
mse: 0.6433 - val\_loss: 0.6776 - val\_mse: 0.6776

Epoch 31/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6413 -  
mse: 0.6413 - val\_loss: 0.6769 - val\_mse: 0.6769

Epoch 32/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6395 -  
mse: 0.6395 - val\_loss: 0.7263 - val\_mse: 0.7263

Epoch 33/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6377 -  
mse: 0.6377 - val\_loss: 0.6722 - val\_mse: 0.6722

Epoch 34/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6363 -  
mse: 0.6363 - val\_loss: 0.6810 - val\_mse: 0.6810

Epoch 35/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6348 -  
mse: 0.6348 - val\_loss: 0.6861 - val\_mse: 0.6861

Epoch 36/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6333 -  
mse: 0.6333 - val\_loss: 0.6876 - val\_mse: 0.6876

Epoch 37/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6318 -  
mse: 0.6318 - val\_loss: 0.6650 - val\_mse: 0.6650  
Epoch 38/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6305 -  
mse: 0.6305 - val\_loss: 0.6708 - val\_mse: 0.6708  
Epoch 39/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6288 -  
mse: 0.6288 - val\_loss: 0.6739 - val\_mse: 0.6739  
Epoch 40/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6270 -  
mse: 0.6270 - val\_loss: 0.6720 - val\_mse: 0.6720  
Epoch 41/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6256 -  
mse: 0.6256 - val\_loss: 0.6756 - val\_mse: 0.6756  
Epoch 42/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6243 -  
mse: 0.6243 - val\_loss: 0.6892 - val\_mse: 0.6892  
Epoch 43/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6235 -  
mse: 0.6235 - val\_loss: 0.6692 - val\_mse: 0.6692  
Epoch 44/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6215 -  
mse: 0.6215 - val\_loss: 0.6739 - val\_mse: 0.6739  
Epoch 45/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6206 -  
mse: 0.6206 - val\_loss: 0.6657 - val\_mse: 0.6657  
Epoch 46/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6192 -  
mse: 0.6192 - val\_loss: 0.6731 - val\_mse: 0.6731  
Epoch 47/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6181 -  
mse: 0.6181 - val\_loss: 0.6817 - val\_mse: 0.6817  
Epoch 48/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6170 -  
mse: 0.6170 - val\_loss: 0.7254 - val\_mse: 0.7254  
Epoch 49/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6157 -  
mse: 0.6157 - val\_loss: 0.6664 - val\_mse: 0.6664  
Epoch 50/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6146 -  
mse: 0.6146 - val\_loss: 0.6804 - val\_mse: 0.6804  
Epoch 51/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6138 -  
mse: 0.6138 - val\_loss: 0.6797 - val\_mse: 0.6797  
Epoch 52/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6119 -  
mse: 0.6119 - val\_loss: 0.6793 - val\_mse: 0.6793

Epoch 53/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6112 -  
mse: 0.6112 - val\_loss: 0.6602 - val\_mse: 0.6602

Epoch 54/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6104 -  
mse: 0.6104 - val\_loss: 0.6577 - val\_mse: 0.6577

Epoch 55/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6088 -  
mse: 0.6088 - val\_loss: 0.6637 - val\_mse: 0.6637

Epoch 56/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6080 -  
mse: 0.6080 - val\_loss: 0.7069 - val\_mse: 0.7069

Epoch 57/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6072 -  
mse: 0.6072 - val\_loss: 0.6861 - val\_mse: 0.6861

Epoch 58/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6064 -  
mse: 0.6064 - val\_loss: 0.6752 - val\_mse: 0.6752

Epoch 59/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6054 -  
mse: 0.6054 - val\_loss: 0.6687 - val\_mse: 0.6687

Epoch 60/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6043 -  
mse: 0.6043 - val\_loss: 0.6519 - val\_mse: 0.6519

Epoch 61/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6035 -  
mse: 0.6035 - val\_loss: 0.6781 - val\_mse: 0.6781

Epoch 62/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6028 -  
mse: 0.6028 - val\_loss: 0.6844 - val\_mse: 0.6844

Epoch 63/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6017 -  
mse: 0.6017 - val\_loss: 0.6823 - val\_mse: 0.6823

Epoch 64/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6009 -  
mse: 0.6009 - val\_loss: 0.6541 - val\_mse: 0.6541

Epoch 65/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5999 -  
mse: 0.5999 - val\_loss: 0.6761 - val\_mse: 0.6761

Epoch 66/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5995 -  
mse: 0.5995 - val\_loss: 0.6815 - val\_mse: 0.6815

Epoch 67/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5983 -  
mse: 0.5983 - val\_loss: 0.6657 - val\_mse: 0.6657

Epoch 68/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5975 -  
mse: 0.5975 - val\_loss: 0.6868 - val\_mse: 0.6868

Epoch 69/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5966 -  
mse: 0.5966 - val\_loss: 0.7073 - val\_mse: 0.7073  
Epoch 70/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5958 -  
mse: 0.5958 - val\_loss: 0.6585 - val\_mse: 0.6585  
Epoch 71/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5950 -  
mse: 0.5950 - val\_loss: 0.6862 - val\_mse: 0.6862  
Epoch 72/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5944 -  
mse: 0.5944 - val\_loss: 0.6648 - val\_mse: 0.6648  
Epoch 73/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5939 -  
mse: 0.5939 - val\_loss: 0.6475 - val\_mse: 0.6475  
Epoch 74/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5931 -  
mse: 0.5931 - val\_loss: 0.6697 - val\_mse: 0.6697  
Epoch 75/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5924 -  
mse: 0.5924 - val\_loss: 0.6502 - val\_mse: 0.6502  
Epoch 76/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5915 -  
mse: 0.5915 - val\_loss: 0.6639 - val\_mse: 0.6639  
Epoch 77/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5909 -  
mse: 0.5909 - val\_loss: 0.6816 - val\_mse: 0.6816  
Epoch 78/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5906 -  
mse: 0.5906 - val\_loss: 0.6727 - val\_mse: 0.6727  
Epoch 79/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5899 -  
mse: 0.5899 - val\_loss: 0.6667 - val\_mse: 0.6667  
Epoch 80/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5890 -  
mse: 0.5890 - val\_loss: 0.6927 - val\_mse: 0.6927  
Epoch 81/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5882 -  
mse: 0.5882 - val\_loss: 0.6949 - val\_mse: 0.6949  
Epoch 82/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5878 -  
mse: 0.5878 - val\_loss: 0.6642 - val\_mse: 0.6642  
Epoch 83/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5870 -  
mse: 0.5870 - val\_loss: 0.6762 - val\_mse: 0.6762  
Epoch 84/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5863 -  
mse: 0.5863 - val\_loss: 0.6622 - val\_mse: 0.6622

Epoch 85/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5862 -  
mse: 0.5862 - val\_loss: 0.6810 - val\_mse: 0.6810  
Epoch 86/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5852 -  
mse: 0.5852 - val\_loss: 0.6598 - val\_mse: 0.6598  
Epoch 87/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5844 -  
mse: 0.5844 - val\_loss: 0.6828 - val\_mse: 0.6828  
Epoch 88/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5843 -  
mse: 0.5843 - val\_loss: 0.6686 - val\_mse: 0.6686  
Epoch 89/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5836 -  
mse: 0.5836 - val\_loss: 0.6658 - val\_mse: 0.6658  
Epoch 90/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5832 -  
mse: 0.5832 - val\_loss: 0.6775 - val\_mse: 0.6775  
Epoch 91/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5827 -  
mse: 0.5827 - val\_loss: 0.6729 - val\_mse: 0.6729  
Epoch 92/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5818 -  
mse: 0.5818 - val\_loss: 0.6780 - val\_mse: 0.6780  
Epoch 93/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5815 -  
mse: 0.5815 - val\_loss: 0.6685 - val\_mse: 0.6685  
Epoch 94/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5811 -  
mse: 0.5811 - val\_loss: 0.6802 - val\_mse: 0.6802  
Epoch 95/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5805 -  
mse: 0.5805 - val\_loss: 0.6598 - val\_mse: 0.6598  
Epoch 96/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5799 -  
mse: 0.5799 - val\_loss: 0.6931 - val\_mse: 0.6931  
Epoch 97/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5790 -  
mse: 0.5790 - val\_loss: 0.6734 - val\_mse: 0.6734  
Epoch 98/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5787 -  
mse: 0.5787 - val\_loss: 0.6607 - val\_mse: 0.6607  
Epoch 99/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5781 -  
mse: 0.5781 - val\_loss: 0.6761 - val\_mse: 0.6761  
Epoch 100/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5776 -  
mse: 0.5776 - val\_loss: 0.6899 - val\_mse: 0.6899

Epoch 101/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5768 -  
mse: 0.5768 - val\_loss: 0.6553 - val\_mse: 0.6553  
Epoch 102/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5768 -  
mse: 0.5768 - val\_loss: 0.6974 - val\_mse: 0.6974  
Epoch 103/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5761 -  
mse: 0.5761 - val\_loss: 0.6658 - val\_mse: 0.6658  
Epoch 104/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5759 -  
mse: 0.5759 - val\_loss: 0.6842 - val\_mse: 0.6842  
Epoch 105/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5757 -  
mse: 0.5757 - val\_loss: 0.6614 - val\_mse: 0.6614  
Epoch 106/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5752 -  
mse: 0.5752 - val\_loss: 0.6629 - val\_mse: 0.6629  
Epoch 107/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5746 -  
mse: 0.5746 - val\_loss: 0.6752 - val\_mse: 0.6752  
Epoch 108/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5737 -  
mse: 0.5737 - val\_loss: 0.6821 - val\_mse: 0.6821  
Epoch 109/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5734 -  
mse: 0.5734 - val\_loss: 0.6701 - val\_mse: 0.6701  
Epoch 110/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5732 -  
mse: 0.5732 - val\_loss: 0.7006 - val\_mse: 0.7006  
Epoch 111/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5729 -  
mse: 0.5729 - val\_loss: 0.6959 - val\_mse: 0.6959  
Epoch 112/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5724 -  
mse: 0.5724 - val\_loss: 0.6626 - val\_mse: 0.6626  
Epoch 113/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5716 -  
mse: 0.5716 - val\_loss: 0.6679 - val\_mse: 0.6679  
Epoch 114/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5709 -  
mse: 0.5709 - val\_loss: 0.6822 - val\_mse: 0.6822  
Epoch 115/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5709 -  
mse: 0.5709 - val\_loss: 0.6675 - val\_mse: 0.6675  
Epoch 116/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5703 -  
mse: 0.5703 - val\_loss: 0.6612 - val\_mse: 0.6612

Epoch 117/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5699 -  
mse: 0.5699 - val\_loss: 0.7012 - val\_mse: 0.7012

Epoch 118/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5698 -  
mse: 0.5698 - val\_loss: 0.6597 - val\_mse: 0.6597

Epoch 119/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5697 -  
mse: 0.5697 - val\_loss: 0.6657 - val\_mse: 0.6657

Epoch 120/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5689 -  
mse: 0.5689 - val\_loss: 0.6729 - val\_mse: 0.6729

Epoch 121/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5684 -  
mse: 0.5684 - val\_loss: 0.6739 - val\_mse: 0.6739

Epoch 122/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5679 -  
mse: 0.5679 - val\_loss: 0.6902 - val\_mse: 0.6902

Epoch 123/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5679 -  
mse: 0.5679 - val\_loss: 0.6568 - val\_mse: 0.6568

Epoch 124/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5678 -  
mse: 0.5678 - val\_loss: 0.6745 - val\_mse: 0.6745

Epoch 125/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5671 -  
mse: 0.5671 - val\_loss: 0.6868 - val\_mse: 0.6868

Epoch 126/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5668 -  
mse: 0.5668 - val\_loss: 0.6819 - val\_mse: 0.6819

Epoch 127/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5663 -  
mse: 0.5663 - val\_loss: 0.6915 - val\_mse: 0.6915

Epoch 128/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5660 -  
mse: 0.5660 - val\_loss: 0.6680 - val\_mse: 0.6680

Epoch 129/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5653 -  
mse: 0.5653 - val\_loss: 0.6581 - val\_mse: 0.6581

Epoch 130/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5653 -  
mse: 0.5653 - val\_loss: 0.6598 - val\_mse: 0.6598

Epoch 131/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5651 -  
mse: 0.5651 - val\_loss: 0.6898 - val\_mse: 0.6898

Epoch 132/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5645 -  
mse: 0.5645 - val\_loss: 0.6704 - val\_mse: 0.6704



Epoch 133/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5643 -  
mse: 0.5643 - val\_loss: 0.6565 - val\_mse: 0.6565  
Epoch 134/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5643 -  
mse: 0.5643 - val\_loss: 0.6733 - val\_mse: 0.6733  
Epoch 135/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5638 -  
mse: 0.5638 - val\_loss: 0.6804 - val\_mse: 0.6804  
Epoch 136/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5632 -  
mse: 0.5632 - val\_loss: 0.6766 - val\_mse: 0.6766  
Epoch 137/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5627 -  
mse: 0.5627 - val\_loss: 0.6726 - val\_mse: 0.6726  
Epoch 138/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5624 -  
mse: 0.5624 - val\_loss: 0.7086 - val\_mse: 0.7086  
Epoch 139/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5622 -  
mse: 0.5622 - val\_loss: 0.6844 - val\_mse: 0.6844  
Epoch 140/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5623 -  
mse: 0.5623 - val\_loss: 0.6660 - val\_mse: 0.6660  
Epoch 141/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5621 -  
mse: 0.5621 - val\_loss: 0.6616 - val\_mse: 0.6616  
Epoch 142/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5615 -  
mse: 0.5615 - val\_loss: 0.6798 - val\_mse: 0.6798  
Epoch 143/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5610 -  
mse: 0.5610 - val\_loss: 0.6804 - val\_mse: 0.6804  
Epoch 144/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5607 -  
mse: 0.5607 - val\_loss: 0.6868 - val\_mse: 0.6868  
Epoch 145/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5602 -  
mse: 0.5602 - val\_loss: 0.6647 - val\_mse: 0.6647  
Epoch 146/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5600 -  
mse: 0.5600 - val\_loss: 0.6712 - val\_mse: 0.6712  
Epoch 147/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5599 -  
mse: 0.5599 - val\_loss: 0.6900 - val\_mse: 0.6900  
Epoch 148/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5595 -  
mse: 0.5595 - val\_loss: 0.6792 - val\_mse: 0.6792

Epoch 149/150  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5590 -  
mse: 0.5590 - val\_loss: 0.6581 - val\_mse: 0.6581  
Epoch 150/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5587 -  
mse: 0.5587 - val\_loss: 0.7170 - val\_mse: 0.7170  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7480 -  
mse: 0.7480 - val\_loss: 0.7622 - val\_mse: 0.7622  
Epoch 2/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7067 -  
mse: 0.7067 - val\_loss: 0.7492 - val\_mse: 0.7492  
Epoch 3/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6881 -  
mse: 0.6881 - val\_loss: 0.7466 - val\_mse: 0.7466  
Epoch 4/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6752 -  
mse: 0.6752 - val\_loss: 0.7386 - val\_mse: 0.7386  
Epoch 5/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6665 -  
mse: 0.6665 - val\_loss: 0.7363 - val\_mse: 0.7363  
Epoch 6/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6598 -  
mse: 0.6598 - val\_loss: 0.7239 - val\_mse: 0.7239  
Epoch 7/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6534 -  
mse: 0.6534 - val\_loss: 0.7244 - val\_mse: 0.7244  
Epoch 8/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6486 -  
mse: 0.6486 - val\_loss: 0.7390 - val\_mse: 0.7390  
Epoch 9/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6438 -  
mse: 0.6438 - val\_loss: 0.7124 - val\_mse: 0.7124  
Epoch 10/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6398 -  
mse: 0.6398 - val\_loss: 0.7116 - val\_mse: 0.7116  
Epoch 11/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6356 -  
mse: 0.6356 - val\_loss: 0.7017 - val\_mse: 0.7017  
Epoch 12/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6320 -  
mse: 0.6320 - val\_loss: 0.7090 - val\_mse: 0.7090  
Epoch 13/150  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6285 -  
mse: 0.6285 - val\_loss: 0.6997 - val\_mse: 0.6997  
Epoch 14/150

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.6257 -
mse: 0.6257 - val_loss: 0.6950 - val_mse: 0.6950
Epoch 15/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6231 -
mse: 0.6231 - val_loss: 0.6996 - val_mse: 0.6996
Epoch 16/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6203 -
mse: 0.6203 - val_loss: 0.6974 - val_mse: 0.6974
Epoch 17/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6178 -
mse: 0.6178 - val_loss: 0.6917 - val_mse: 0.6917
Epoch 18/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6159 -
mse: 0.6159 - val_loss: 0.6963 - val_mse: 0.6963
Epoch 19/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6139 -
mse: 0.6139 - val_loss: 0.6903 - val_mse: 0.6903
Epoch 20/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6118 -
mse: 0.6118 - val_loss: 0.6917 - val_mse: 0.6917
Epoch 21/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6096 -
mse: 0.6096 - val_loss: 0.6874 - val_mse: 0.6874
Epoch 22/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6074 -
mse: 0.6074 - val_loss: 0.6902 - val_mse: 0.6902
Epoch 23/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6061 -
mse: 0.6061 - val_loss: 0.6881 - val_mse: 0.6881
Epoch 24/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6045 -
mse: 0.6045 - val_loss: 0.6815 - val_mse: 0.6815
Epoch 25/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6028 -
mse: 0.6028 - val_loss: 0.7068 - val_mse: 0.7068
Epoch 26/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6009 -
mse: 0.6009 - val_loss: 0.6844 - val_mse: 0.6844
Epoch 27/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5995 -
mse: 0.5995 - val_loss: 0.6757 - val_mse: 0.6757
Epoch 28/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5981 -
mse: 0.5981 - val_loss: 0.6739 - val_mse: 0.6739
Epoch 29/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5969 -
mse: 0.5969 - val_loss: 0.6887 - val_mse: 0.6887
Epoch 30/150

```

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5956 -
mse: 0.5956 - val_loss: 0.6821 - val_mse: 0.6821
Epoch 31/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5945 -
mse: 0.5945 - val_loss: 0.6857 - val_mse: 0.6857
Epoch 32/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5931 -
mse: 0.5931 - val_loss: 0.6822 - val_mse: 0.6822
Epoch 33/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5922 -
mse: 0.5922 - val_loss: 0.6827 - val_mse: 0.6827
Epoch 34/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5910 -
mse: 0.5910 - val_loss: 0.6771 - val_mse: 0.6771
Epoch 35/150
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5899 -
mse: 0.5899 - val_loss: 0.6754 - val_mse: 0.6754
Epoch 36/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5885 -
mse: 0.5885 - val_loss: 0.6814 - val_mse: 0.6814
Epoch 37/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5875 -
mse: 0.5875 - val_loss: 0.6822 - val_mse: 0.6822
Epoch 38/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5861 -
mse: 0.5861 - val_loss: 0.6759 - val_mse: 0.6759
Epoch 39/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5851 -
mse: 0.5851 - val_loss: 0.6841 - val_mse: 0.6841
Epoch 40/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5842 -
mse: 0.5842 - val_loss: 0.6836 - val_mse: 0.6836
Epoch 41/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5831 -
mse: 0.5831 - val_loss: 0.6657 - val_mse: 0.6657
Epoch 42/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5822 -
mse: 0.5822 - val_loss: 0.6850 - val_mse: 0.6850
Epoch 43/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5814 -
mse: 0.5814 - val_loss: 0.6740 - val_mse: 0.6740
Epoch 44/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5801 -
mse: 0.5801 - val_loss: 0.6770 - val_mse: 0.6770
Epoch 45/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5791 -
mse: 0.5791 - val_loss: 0.6844 - val_mse: 0.6844
Epoch 46/150

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5782 -  
 mse: 0.5782 - val\_loss: 0.6804 - val\_mse: 0.6804  
 Epoch 47/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5772 -  
 mse: 0.5772 - val\_loss: 0.6781 - val\_mse: 0.6781  
 Epoch 48/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5762 -  
 mse: 0.5762 - val\_loss: 0.6691 - val\_mse: 0.6691  
 Epoch 49/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5751 -  
 mse: 0.5751 - val\_loss: 0.6744 - val\_mse: 0.6744  
 Epoch 50/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5747 -  
 mse: 0.5747 - val\_loss: 0.6626 - val\_mse: 0.6626  
 Epoch 51/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5737 -  
 mse: 0.5737 - val\_loss: 0.6603 - val\_mse: 0.6603  
 Epoch 52/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5724 -  
 mse: 0.5724 - val\_loss: 0.6609 - val\_mse: 0.6609  
 Epoch 53/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5715 -  
 mse: 0.5715 - val\_loss: 0.6671 - val\_mse: 0.6671  
 Epoch 54/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5709 -  
 mse: 0.5709 - val\_loss: 0.6721 - val\_mse: 0.6721  
 Epoch 55/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5699 -  
 mse: 0.5699 - val\_loss: 0.6855 - val\_mse: 0.6855  
 Epoch 56/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5690 -  
 mse: 0.5690 - val\_loss: 0.6712 - val\_mse: 0.6712  
 Epoch 57/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5682 -  
 mse: 0.5682 - val\_loss: 0.6785 - val\_mse: 0.6785  
 Epoch 58/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5671 -  
 mse: 0.5671 - val\_loss: 0.6666 - val\_mse: 0.6666  
 Epoch 59/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5662 -  
 mse: 0.5662 - val\_loss: 0.6619 - val\_mse: 0.6619  
 Epoch 60/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5656 -  
 mse: 0.5656 - val\_loss: 0.6709 - val\_mse: 0.6709  
 Epoch 61/150  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5647 -  
 mse: 0.5647 - val\_loss: 0.6738 - val\_mse: 0.6738  
 Epoch 62/150

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5642 -
mse: 0.5642 - val_loss: 0.6626 - val_mse: 0.6626
Epoch 63/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5630 -
mse: 0.5630 - val_loss: 0.6601 - val_mse: 0.6601
Epoch 64/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5618 -
mse: 0.5618 - val_loss: 0.6717 - val_mse: 0.6717
Epoch 65/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5611 -
mse: 0.5611 - val_loss: 0.6759 - val_mse: 0.6759
Epoch 66/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5605 -
mse: 0.5605 - val_loss: 0.6801 - val_mse: 0.6801
Epoch 67/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5595 -
mse: 0.5595 - val_loss: 0.6668 - val_mse: 0.6668
Epoch 68/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5590 -
mse: 0.5590 - val_loss: 0.6567 - val_mse: 0.6567
Epoch 69/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5580 -
mse: 0.5580 - val_loss: 0.6600 - val_mse: 0.6600
Epoch 70/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5574 -
mse: 0.5574 - val_loss: 0.6577 - val_mse: 0.6577
Epoch 71/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5568 -
mse: 0.5568 - val_loss: 0.6536 - val_mse: 0.6536
Epoch 72/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5557 -
mse: 0.5557 - val_loss: 0.6502 - val_mse: 0.6502
Epoch 73/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5553 -
mse: 0.5553 - val_loss: 0.6578 - val_mse: 0.6578
Epoch 74/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5547 -
mse: 0.5547 - val_loss: 0.6715 - val_mse: 0.6715
Epoch 75/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5540 -
mse: 0.5540 - val_loss: 0.6588 - val_mse: 0.6588
Epoch 76/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5531 -
mse: 0.5531 - val_loss: 0.6472 - val_mse: 0.6472
Epoch 77/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5526 -
mse: 0.5526 - val_loss: 0.6553 - val_mse: 0.6553
Epoch 78/150

```

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5517 -
mse: 0.5517 - val_loss: 0.6665 - val_mse: 0.6665
Epoch 79/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5512 -
mse: 0.5512 - val_loss: 0.6653 - val_mse: 0.6653
Epoch 80/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5505 -
mse: 0.5505 - val_loss: 0.6723 - val_mse: 0.6723
Epoch 81/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5498 -
mse: 0.5498 - val_loss: 0.6606 - val_mse: 0.6606
Epoch 82/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5493 -
mse: 0.5493 - val_loss: 0.6714 - val_mse: 0.6714
Epoch 83/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5486 -
mse: 0.5486 - val_loss: 0.6521 - val_mse: 0.6521
Epoch 84/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5481 -
mse: 0.5481 - val_loss: 0.6651 - val_mse: 0.6651
Epoch 85/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5474 -
mse: 0.5474 - val_loss: 0.6445 - val_mse: 0.6445
Epoch 86/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5469 -
mse: 0.5469 - val_loss: 0.6469 - val_mse: 0.6469
Epoch 87/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5464 -
mse: 0.5464 - val_loss: 0.6561 - val_mse: 0.6561
Epoch 88/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5460 -
mse: 0.5460 - val_loss: 0.6691 - val_mse: 0.6691
Epoch 89/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5451 -
mse: 0.5451 - val_loss: 0.6761 - val_mse: 0.6761
Epoch 90/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5449 -
mse: 0.5449 - val_loss: 0.6521 - val_mse: 0.6521
Epoch 91/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5439 -
mse: 0.5439 - val_loss: 0.6517 - val_mse: 0.6517
Epoch 92/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5435 -
mse: 0.5435 - val_loss: 0.6558 - val_mse: 0.6558
Epoch 93/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5428 -
mse: 0.5428 - val_loss: 0.6582 - val_mse: 0.6582
Epoch 94/150

```

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5425 -
mse: 0.5425 - val_loss: 0.6595 - val_mse: 0.6595
Epoch 95/150
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5421 -
mse: 0.5421 - val_loss: 0.6628 - val_mse: 0.6628
Epoch 96/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5413 -
mse: 0.5413 - val_loss: 0.6537 - val_mse: 0.6537
Epoch 97/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5409 -
mse: 0.5409 - val_loss: 0.6459 - val_mse: 0.6459
Epoch 98/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5401 -
mse: 0.5401 - val_loss: 0.6650 - val_mse: 0.6650
Epoch 99/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5398 -
mse: 0.5398 - val_loss: 0.6502 - val_mse: 0.6502
Epoch 100/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5396 -
mse: 0.5396 - val_loss: 0.6513 - val_mse: 0.6513
Epoch 101/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5389 -
mse: 0.5389 - val_loss: 0.6720 - val_mse: 0.6720
Epoch 102/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5383 -
mse: 0.5383 - val_loss: 0.6774 - val_mse: 0.6774
Epoch 103/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5378 -
mse: 0.5378 - val_loss: 0.6727 - val_mse: 0.6727
Epoch 104/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5373 -
mse: 0.5373 - val_loss: 0.6660 - val_mse: 0.6660
Epoch 105/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5369 -
mse: 0.5369 - val_loss: 0.6423 - val_mse: 0.6423
Epoch 106/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5368 -
mse: 0.5368 - val_loss: 0.6447 - val_mse: 0.6447
Epoch 107/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5362 -
mse: 0.5362 - val_loss: 0.6491 - val_mse: 0.6491
Epoch 108/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5357 -
mse: 0.5357 - val_loss: 0.6610 - val_mse: 0.6610
Epoch 109/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5352 -
mse: 0.5352 - val_loss: 0.6561 - val_mse: 0.6561
Epoch 110/150

```



```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5346 -
mse: 0.5346 - val_loss: 0.6510 - val_mse: 0.6510
Epoch 111/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5347 -
mse: 0.5347 - val_loss: 0.6507 - val_mse: 0.6507
Epoch 112/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5339 -
mse: 0.5339 - val_loss: 0.6469 - val_mse: 0.6469
Epoch 113/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5334 -
mse: 0.5334 - val_loss: 0.6549 - val_mse: 0.6549
Epoch 114/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5333 -
mse: 0.5333 - val_loss: 0.6527 - val_mse: 0.6527
Epoch 115/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5325 -
mse: 0.5325 - val_loss: 0.6681 - val_mse: 0.6681
Epoch 116/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5325 -
mse: 0.5325 - val_loss: 0.6585 - val_mse: 0.6585
Epoch 117/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5321 -
mse: 0.5321 - val_loss: 0.6630 - val_mse: 0.6630
Epoch 118/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5317 -
mse: 0.5317 - val_loss: 0.6394 - val_mse: 0.6394
Epoch 119/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5312 -
mse: 0.5312 - val_loss: 0.6456 - val_mse: 0.6456
Epoch 120/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5306 -
mse: 0.5306 - val_loss: 0.6443 - val_mse: 0.6443
Epoch 121/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5303 -
mse: 0.5303 - val_loss: 0.6450 - val_mse: 0.6450
Epoch 122/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5301 -
mse: 0.5301 - val_loss: 0.6487 - val_mse: 0.6487
Epoch 123/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5297 -
mse: 0.5297 - val_loss: 0.6646 - val_mse: 0.6646
Epoch 124/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5291 -
mse: 0.5291 - val_loss: 0.6521 - val_mse: 0.6521
Epoch 125/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5289 -
mse: 0.5289 - val_loss: 0.6532 - val_mse: 0.6532
Epoch 126/150

```

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5288 -
mse: 0.5288 - val_loss: 0.6525 - val_mse: 0.6525
Epoch 127/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5282 -
mse: 0.5282 - val_loss: 0.6294 - val_mse: 0.6294
Epoch 128/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5281 -
mse: 0.5281 - val_loss: 0.6444 - val_mse: 0.6444
Epoch 129/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5272 -
mse: 0.5272 - val_loss: 0.6680 - val_mse: 0.6680
Epoch 130/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5276 -
mse: 0.5276 - val_loss: 0.6642 - val_mse: 0.6642
Epoch 131/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5269 -
mse: 0.5269 - val_loss: 0.6471 - val_mse: 0.6471
Epoch 132/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5264 -
mse: 0.5264 - val_loss: 0.6425 - val_mse: 0.6425
Epoch 133/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5260 -
mse: 0.5260 - val_loss: 0.6519 - val_mse: 0.6519
Epoch 134/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5258 -
mse: 0.5258 - val_loss: 0.6605 - val_mse: 0.6605
Epoch 135/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5256 -
mse: 0.5256 - val_loss: 0.6536 - val_mse: 0.6536
Epoch 136/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5250 -
mse: 0.5250 - val_loss: 0.6366 - val_mse: 0.6366
Epoch 137/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5248 -
mse: 0.5248 - val_loss: 0.6305 - val_mse: 0.6305
Epoch 138/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5243 -
mse: 0.5243 - val_loss: 0.6738 - val_mse: 0.6738
Epoch 139/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5240 -
mse: 0.5240 - val_loss: 0.6422 - val_mse: 0.6422
Epoch 140/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5237 -
mse: 0.5237 - val_loss: 0.6481 - val_mse: 0.6481
Epoch 141/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5235 -
mse: 0.5235 - val_loss: 0.6795 - val_mse: 0.6795
Epoch 142/150

```

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5237 -
mse: 0.5237 - val_loss: 0.6492 - val_mse: 0.6492
Epoch 143/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5226 -
mse: 0.5226 - val_loss: 0.6435 - val_mse: 0.6435
Epoch 144/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5226 -
mse: 0.5226 - val_loss: 0.6377 - val_mse: 0.6377
Epoch 145/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5221 -
mse: 0.5221 - val_loss: 0.6437 - val_mse: 0.6437
Epoch 146/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5218 -
mse: 0.5218 - val_loss: 0.6410 - val_mse: 0.6410
Epoch 147/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5216 -
mse: 0.5216 - val_loss: 0.6556 - val_mse: 0.6556
Epoch 148/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5216 -
mse: 0.5216 - val_loss: 0.6455 - val_mse: 0.6455
Epoch 149/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5208 -
mse: 0.5208 - val_loss: 0.6357 - val_mse: 0.6357
Epoch 150/150
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5208 -
mse: 0.5208 - val_loss: 0.6521 - val_mse: 0.6521
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.8591 -
mse: 0.8591 - val_loss: 0.8278 - val_mse: 0.8278
Epoch 2/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.8062 -
mse: 0.8062 - val_loss: 0.8398 - val_mse: 0.8398
Epoch 3/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7850 -
mse: 0.7850 - val_loss: 0.7968 - val_mse: 0.7968
Epoch 4/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7712 -
mse: 0.7712 - val_loss: 0.8350 - val_mse: 0.8350
Epoch 5/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7606 -
mse: 0.7606 - val_loss: 0.7729 - val_mse: 0.7729
Epoch 6/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7532 -
mse: 0.7532 - val_loss: 0.7628 - val_mse: 0.7628
Epoch 7/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7469 -

```

```

mse: 0.7469 - val_loss: 0.7552 - val_mse: 0.7552
Epoch 8/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.7408 -
mse: 0.7408 - val_loss: 0.7497 - val_mse: 0.7497
Epoch 9/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7352 -
mse: 0.7352 - val_loss: 0.7542 - val_mse: 0.7542
Epoch 10/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7312 -
mse: 0.7312 - val_loss: 0.7585 - val_mse: 0.7585
Epoch 11/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.7266 -
mse: 0.7266 - val_loss: 0.7611 - val_mse: 0.7611
Epoch 12/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7222 -
mse: 0.7222 - val_loss: 0.7438 - val_mse: 0.7438
Epoch 13/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7187 -
mse: 0.7187 - val_loss: 0.7520 - val_mse: 0.7520
Epoch 14/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7158 -
mse: 0.7158 - val_loss: 0.7714 - val_mse: 0.7714
Epoch 15/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7129 -
mse: 0.7129 - val_loss: 0.7484 - val_mse: 0.7484
Epoch 16/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7092 -
mse: 0.7092 - val_loss: 0.7512 - val_mse: 0.7512
Epoch 17/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7066 -
mse: 0.7066 - val_loss: 0.7634 - val_mse: 0.7634
Epoch 18/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7033 -
mse: 0.7033 - val_loss: 0.7609 - val_mse: 0.7609
Epoch 19/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7008 -
mse: 0.7008 - val_loss: 0.7608 - val_mse: 0.7608
Epoch 20/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6978 -
mse: 0.6978 - val_loss: 0.7685 - val_mse: 0.7685
Epoch 21/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6955 -
mse: 0.6955 - val_loss: 0.7595 - val_mse: 0.7595
Epoch 22/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6933 -
mse: 0.6933 - val_loss: 0.7698 - val_mse: 0.7698
Epoch 23/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6913 -

```

```

mse: 0.6913 - val_loss: 0.7614 - val_mse: 0.7614
Epoch 24/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6883 -
mse: 0.6883 - val_loss: 0.7631 - val_mse: 0.7631
Epoch 25/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6868 -
mse: 0.6868 - val_loss: 0.7649 - val_mse: 0.7649
Epoch 26/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6842 -
mse: 0.6842 - val_loss: 0.7765 - val_mse: 0.7765
Epoch 27/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6826 -
mse: 0.6826 - val_loss: 0.7775 - val_mse: 0.7775
Epoch 28/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6808 -
mse: 0.6808 - val_loss: 0.7802 - val_mse: 0.7802
Epoch 29/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6787 -
mse: 0.6787 - val_loss: 0.7623 - val_mse: 0.7623
Epoch 30/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6768 -
mse: 0.6768 - val_loss: 0.7683 - val_mse: 0.7683
Epoch 31/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6746 -
mse: 0.6746 - val_loss: 0.7905 - val_mse: 0.7905
Epoch 32/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6731 -
mse: 0.6731 - val_loss: 0.7699 - val_mse: 0.7699
Epoch 33/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6711 -
mse: 0.6711 - val_loss: 0.7737 - val_mse: 0.7737
Epoch 34/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6695 -
mse: 0.6695 - val_loss: 0.7759 - val_mse: 0.7759
Epoch 35/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6677 -
mse: 0.6677 - val_loss: 0.7730 - val_mse: 0.7730
Epoch 36/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6659 -
mse: 0.6659 - val_loss: 0.7877 - val_mse: 0.7877
Epoch 37/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6644 -
mse: 0.6644 - val_loss: 0.7614 - val_mse: 0.7614
Epoch 38/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6628 -
mse: 0.6628 - val_loss: 0.7638 - val_mse: 0.7638
Epoch 39/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6612 -

```

```

mse: 0.6612 - val_loss: 0.7761 - val_mse: 0.7761
Epoch 40/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6604 -
mse: 0.6604 - val_loss: 0.7923 - val_mse: 0.7923
Epoch 41/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6586 -
mse: 0.6586 - val_loss: 0.7791 - val_mse: 0.7791
Epoch 42/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6573 -
mse: 0.6573 - val_loss: 0.7862 - val_mse: 0.7862
Epoch 43/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6559 -
mse: 0.6559 - val_loss: 0.7632 - val_mse: 0.7632
Epoch 44/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6544 -
mse: 0.6544 - val_loss: 0.7799 - val_mse: 0.7799
Epoch 45/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6532 -
mse: 0.6532 - val_loss: 0.7806 - val_mse: 0.7806
Epoch 46/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6520 -
mse: 0.6520 - val_loss: 0.7867 - val_mse: 0.7867
Epoch 47/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6507 -
mse: 0.6507 - val_loss: 0.7765 - val_mse: 0.7765
Epoch 48/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6498 -
mse: 0.6498 - val_loss: 0.7719 - val_mse: 0.7719
Epoch 49/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6481 -
mse: 0.6481 - val_loss: 0.7779 - val_mse: 0.7779
Epoch 50/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6470 -
mse: 0.6470 - val_loss: 0.7699 - val_mse: 0.7699
Epoch 51/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6458 -
mse: 0.6458 - val_loss: 0.7730 - val_mse: 0.7730
Epoch 52/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6448 -
mse: 0.6448 - val_loss: 0.7681 - val_mse: 0.7681
Epoch 53/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6439 -
mse: 0.6439 - val_loss: 0.7792 - val_mse: 0.7792
Epoch 54/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6427 -
mse: 0.6427 - val_loss: 0.7777 - val_mse: 0.7777
Epoch 55/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6418 -

```

```

mse: 0.6418 - val_loss: 0.7855 - val_mse: 0.7855
Epoch 56/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6404 -
mse: 0.6404 - val_loss: 0.7848 - val_mse: 0.7848
Epoch 57/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6395 -
mse: 0.6395 - val_loss: 0.7877 - val_mse: 0.7877
Epoch 58/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6388 -
mse: 0.6388 - val_loss: 0.8004 - val_mse: 0.8004
Epoch 59/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6375 -
mse: 0.6375 - val_loss: 0.8127 - val_mse: 0.8127
Epoch 60/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6366 -
mse: 0.6366 - val_loss: 0.7837 - val_mse: 0.7837
Epoch 61/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6361 -
mse: 0.6361 - val_loss: 0.7912 - val_mse: 0.7912
Epoch 62/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6349 -
mse: 0.6349 - val_loss: 0.7851 - val_mse: 0.7851
Epoch 63/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6342 -
mse: 0.6342 - val_loss: 0.8276 - val_mse: 0.8276
Epoch 64/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6333 -
mse: 0.6333 - val_loss: 0.7829 - val_mse: 0.7829
Epoch 65/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6326 -
mse: 0.6326 - val_loss: 0.8036 - val_mse: 0.8036
Epoch 66/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6317 -
mse: 0.6317 - val_loss: 0.8134 - val_mse: 0.8134
Epoch 67/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6307 -
mse: 0.6307 - val_loss: 0.8140 - val_mse: 0.8140
Epoch 68/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6298 -
mse: 0.6298 - val_loss: 0.7892 - val_mse: 0.7892
Epoch 69/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6292 -
mse: 0.6292 - val_loss: 0.8813 - val_mse: 0.8813
Epoch 70/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6285 -
mse: 0.6285 - val_loss: 0.8072 - val_mse: 0.8072
Epoch 71/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6274 -

```

```

mse: 0.6274 - val_loss: 0.8290 - val_mse: 0.8290
Epoch 72/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6269 -
mse: 0.6269 - val_loss: 0.8579 - val_mse: 0.8579
Epoch 73/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6260 -
mse: 0.6260 - val_loss: 0.8084 - val_mse: 0.8084
Epoch 74/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6251 -
mse: 0.6251 - val_loss: 0.8198 - val_mse: 0.8198
Epoch 75/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6250 -
mse: 0.6250 - val_loss: 0.8732 - val_mse: 0.8732
Epoch 76/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6238 -
mse: 0.6238 - val_loss: 0.8653 - val_mse: 0.8653
Epoch 77/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6234 -
mse: 0.6234 - val_loss: 0.8579 - val_mse: 0.8579
Epoch 78/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6224 -
mse: 0.6224 - val_loss: 0.9816 - val_mse: 0.9816
Epoch 79/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6221 -
mse: 0.6221 - val_loss: 0.8472 - val_mse: 0.8472
Epoch 80/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6210 -
mse: 0.6210 - val_loss: 0.8699 - val_mse: 0.8699
Epoch 81/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6204 -
mse: 0.6204 - val_loss: 0.9249 - val_mse: 0.9249
Epoch 82/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6197 -
mse: 0.6197 - val_loss: 1.0335 - val_mse: 1.0335
Epoch 83/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6188 -
mse: 0.6188 - val_loss: 0.9917 - val_mse: 0.9917
Epoch 84/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6180 -
mse: 0.6180 - val_loss: 0.9719 - val_mse: 0.9719
Epoch 85/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6182 -
mse: 0.6182 - val_loss: 0.9823 - val_mse: 0.9823
Epoch 86/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6174 -
mse: 0.6174 - val_loss: 1.0896 - val_mse: 1.0896
Epoch 87/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6171 -

```



```

mse: 0.6170 - val_loss: 0.9574 - val_mse: 0.9574
Epoch 88/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6160 -
mse: 0.6160 - val_loss: 1.0136 - val_mse: 1.0136
Epoch 89/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6158 -
mse: 0.6158 - val_loss: 0.9866 - val_mse: 0.9866
Epoch 90/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6153 -
mse: 0.6153 - val_loss: 0.9706 - val_mse: 0.9706
Epoch 91/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6143 -
mse: 0.6143 - val_loss: 1.0904 - val_mse: 1.0904
Epoch 92/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6140 -
mse: 0.6140 - val_loss: 1.0762 - val_mse: 1.0762
Epoch 93/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6136 -
mse: 0.6136 - val_loss: 0.9239 - val_mse: 0.9239
Epoch 94/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6130 -
mse: 0.6130 - val_loss: 1.0213 - val_mse: 1.0213
Epoch 95/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6122 -
mse: 0.6122 - val_loss: 1.0235 - val_mse: 1.0235
Epoch 96/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6116 -
mse: 0.6116 - val_loss: 1.0080 - val_mse: 1.0080
Epoch 97/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6115 -
mse: 0.6115 - val_loss: 1.1352 - val_mse: 1.1352
Epoch 98/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6109 -
mse: 0.6109 - val_loss: 1.2310 - val_mse: 1.2310
Epoch 99/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6100 -
mse: 0.6100 - val_loss: 1.1731 - val_mse: 1.1731
Epoch 100/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6098 -
mse: 0.6098 - val_loss: 1.2343 - val_mse: 1.2343
Epoch 101/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6090 -
mse: 0.6090 - val_loss: 1.1271 - val_mse: 1.1271
Epoch 102/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6090 -
mse: 0.6090 - val_loss: 1.4547 - val_mse: 1.4547
Epoch 103/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6084 -

```

```

mse: 0.6084 - val_loss: 1.3183 - val_mse: 1.3183
Epoch 104/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6081 -
mse: 0.6081 - val_loss: 1.3903 - val_mse: 1.3903
Epoch 105/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6075 -
mse: 0.6075 - val_loss: 1.3912 - val_mse: 1.3912
Epoch 106/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6070 -
mse: 0.6070 - val_loss: 1.3087 - val_mse: 1.3087
Epoch 107/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6066 -
mse: 0.6066 - val_loss: 1.4146 - val_mse: 1.4146
Epoch 108/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6060 -
mse: 0.6060 - val_loss: 1.3320 - val_mse: 1.3320
Epoch 109/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6060 -
mse: 0.6060 - val_loss: 1.4326 - val_mse: 1.4326
Epoch 110/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6049 -
mse: 0.6049 - val_loss: 1.4594 - val_mse: 1.4594
Epoch 111/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6049 -
mse: 0.6049 - val_loss: 1.7879 - val_mse: 1.7879
Epoch 112/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6044 -
mse: 0.6044 - val_loss: 1.5600 - val_mse: 1.5600
Epoch 113/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6040 -
mse: 0.6040 - val_loss: 1.6528 - val_mse: 1.6528
Epoch 114/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6040 -
mse: 0.6040 - val_loss: 1.5126 - val_mse: 1.5126
Epoch 115/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6035 -
mse: 0.6035 - val_loss: 1.5874 - val_mse: 1.5874
Epoch 116/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6028 -
mse: 0.6028 - val_loss: 1.7484 - val_mse: 1.7484
Epoch 117/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6027 -
mse: 0.6027 - val_loss: 1.3501 - val_mse: 1.3501
Epoch 118/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.6022 -
mse: 0.6022 - val_loss: 1.9412 - val_mse: 1.9412
Epoch 119/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6021 -

```

```

mse: 0.6021 - val_loss: 2.0093 - val_mse: 2.0093
Epoch 120/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6017 -
mse: 0.6017 - val_loss: 1.8465 - val_mse: 1.8465
Epoch 121/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6008 -
mse: 0.6008 - val_loss: 1.5659 - val_mse: 1.5659
Epoch 122/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6011 -
mse: 0.6011 - val_loss: 1.7851 - val_mse: 1.7851
Epoch 123/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6007 -
mse: 0.6007 - val_loss: 1.5733 - val_mse: 1.5733
Epoch 124/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6001 -
mse: 0.6001 - val_loss: 1.5681 - val_mse: 1.5681
Epoch 125/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6002 -
mse: 0.6002 - val_loss: 1.9334 - val_mse: 1.9334
Epoch 126/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.5991 -
mse: 0.5991 - val_loss: 2.3530 - val_mse: 2.3530
Epoch 127/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5990 -
mse: 0.5990 - val_loss: 1.9102 - val_mse: 1.9102
Epoch 128/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5986 -
mse: 0.5986 - val_loss: 2.4189 - val_mse: 2.4189
Epoch 129/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5981 -
mse: 0.5981 - val_loss: 2.2104 - val_mse: 2.2104
Epoch 130/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.5982 -
mse: 0.5982 - val_loss: 2.3637 - val_mse: 2.3637
Epoch 131/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5979 -
mse: 0.5979 - val_loss: 1.9553 - val_mse: 1.9553
Epoch 132/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5976 -
mse: 0.5976 - val_loss: 2.1788 - val_mse: 2.1788
Epoch 133/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5969 -
mse: 0.5969 - val_loss: 2.2919 - val_mse: 2.2919
Epoch 134/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5968 -
mse: 0.5968 - val_loss: 2.0224 - val_mse: 2.0224
Epoch 135/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5965 -

```

```

mse: 0.5965 - val_loss: 1.8783 - val_mse: 1.8783
Epoch 136/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5961 -
mse: 0.5961 - val_loss: 2.0233 - val_mse: 2.0233
Epoch 137/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5961 -
mse: 0.5961 - val_loss: 2.3430 - val_mse: 2.3430
Epoch 138/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.5957 -
mse: 0.5957 - val_loss: 2.3380 - val_mse: 2.3380
Epoch 139/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5949 -
mse: 0.5949 - val_loss: 1.9993 - val_mse: 1.9993
Epoch 140/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5952 -
mse: 0.5952 - val_loss: 1.8253 - val_mse: 1.8253
Epoch 141/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5947 -
mse: 0.5947 - val_loss: 2.1069 - val_mse: 2.1069
Epoch 142/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.5942 -
mse: 0.5942 - val_loss: 2.2016 - val_mse: 2.2016
Epoch 143/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5940 -
mse: 0.5940 - val_loss: 2.2506 - val_mse: 2.2506
Epoch 144/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5938 -
mse: 0.5938 - val_loss: 2.2416 - val_mse: 2.2416
Epoch 145/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5934 -
mse: 0.5934 - val_loss: 2.3310 - val_mse: 2.3310
Epoch 146/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.5937 -
mse: 0.5937 - val_loss: 2.3990 - val_mse: 2.3990
Epoch 147/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5932 -
mse: 0.5932 - val_loss: 2.5675 - val_mse: 2.5675
Epoch 148/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5926 -
mse: 0.5926 - val_loss: 2.3437 - val_mse: 2.3437
Epoch 149/150
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5928 -
mse: 0.5928 - val_loss: 2.6141 - val_mse: 2.6141
Epoch 150/150
3353318/3353318 [=====] - 15s 5us/step - loss: 0.5923 -
mse: 0.5923 - val_loss: 2.0017 - val_mse: 2.0017
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples

```

Epoch 1/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.8452 -  
mse: 0.8452 - val\_loss: 0.7799 - val\_mse: 0.7799

Epoch 2/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7897 -  
mse: 0.7897 - val\_loss: 0.7622 - val\_mse: 0.7622

Epoch 3/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7625 -  
mse: 0.7625 - val\_loss: 0.7358 - val\_mse: 0.7358

Epoch 4/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7454 -  
mse: 0.7454 - val\_loss: 0.7342 - val\_mse: 0.7342

Epoch 5/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7334 -  
mse: 0.7334 - val\_loss: 0.7261 - val\_mse: 0.7261

Epoch 6/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7249 -  
mse: 0.7249 - val\_loss: 0.7188 - val\_mse: 0.7188

Epoch 7/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7176 -  
mse: 0.7176 - val\_loss: 0.7516 - val\_mse: 0.7516

Epoch 8/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7119 -  
mse: 0.7119 - val\_loss: 0.7131 - val\_mse: 0.7131

Epoch 9/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7070 -  
mse: 0.7070 - val\_loss: 0.7080 - val\_mse: 0.7080

Epoch 10/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7018 -  
mse: 0.7018 - val\_loss: 0.7073 - val\_mse: 0.7073

Epoch 11/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6980 -  
mse: 0.6980 - val\_loss: 0.7066 - val\_mse: 0.7066

Epoch 12/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6935 -  
mse: 0.6935 - val\_loss: 0.7084 - val\_mse: 0.7084

Epoch 13/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6896 -  
mse: 0.6896 - val\_loss: 0.6982 - val\_mse: 0.6982

Epoch 14/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6857 -  
mse: 0.6857 - val\_loss: 0.7001 - val\_mse: 0.7001

Epoch 15/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6827 -  
mse: 0.6827 - val\_loss: 0.7221 - val\_mse: 0.7221

Epoch 16/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6788 -  
mse: 0.6788 - val\_loss: 0.6895 - val\_mse: 0.6895

Epoch 17/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6759 -  
mse: 0.6759 - val\_loss: 0.6872 - val\_mse: 0.6872  
Epoch 18/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6734 -  
mse: 0.6734 - val\_loss: 0.6876 - val\_mse: 0.6876  
Epoch 19/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6706 -  
mse: 0.6706 - val\_loss: 0.6836 - val\_mse: 0.6836  
Epoch 20/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6672 -  
mse: 0.6672 - val\_loss: 0.6891 - val\_mse: 0.6891  
Epoch 21/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6656 -  
mse: 0.6656 - val\_loss: 0.6905 - val\_mse: 0.6905  
Epoch 22/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6630 -  
mse: 0.6630 - val\_loss: 0.6840 - val\_mse: 0.6840  
Epoch 23/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6605 -  
mse: 0.6605 - val\_loss: 0.6829 - val\_mse: 0.6829  
Epoch 24/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6581 -  
mse: 0.6581 - val\_loss: 0.6910 - val\_mse: 0.6910  
Epoch 25/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6563 -  
mse: 0.6563 - val\_loss: 0.6902 - val\_mse: 0.6902  
Epoch 26/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6546 -  
mse: 0.6546 - val\_loss: 0.6790 - val\_mse: 0.6790  
Epoch 27/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6518 -  
mse: 0.6518 - val\_loss: 0.6841 - val\_mse: 0.6841  
Epoch 28/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6500 -  
mse: 0.6500 - val\_loss: 0.6833 - val\_mse: 0.6833  
Epoch 29/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6486 -  
mse: 0.6486 - val\_loss: 0.6850 - val\_mse: 0.6850  
Epoch 30/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6468 -  
mse: 0.6468 - val\_loss: 0.6778 - val\_mse: 0.6778  
Epoch 31/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6446 -  
mse: 0.6446 - val\_loss: 0.6684 - val\_mse: 0.6684  
Epoch 32/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6433 -  
mse: 0.6433 - val\_loss: 0.7031 - val\_mse: 0.7031

Epoch 33/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6415 -  
mse: 0.6415 - val\_loss: 0.6726 - val\_mse: 0.6726  
Epoch 34/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6400 -  
mse: 0.6400 - val\_loss: 0.6706 - val\_mse: 0.6706  
Epoch 35/200  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.6378 -  
mse: 0.6378 - val\_loss: 0.6825 - val\_mse: 0.6825  
Epoch 36/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6365 -  
mse: 0.6365 - val\_loss: 0.7144 - val\_mse: 0.7144  
Epoch 37/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6347 -  
mse: 0.6347 - val\_loss: 0.6785 - val\_mse: 0.6785  
Epoch 38/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6332 -  
mse: 0.6332 - val\_loss: 0.7031 - val\_mse: 0.7031  
Epoch 39/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6313 -  
mse: 0.6313 - val\_loss: 0.6617 - val\_mse: 0.6617  
Epoch 40/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6297 -  
mse: 0.6297 - val\_loss: 0.6748 - val\_mse: 0.6748  
Epoch 41/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6281 -  
mse: 0.6281 - val\_loss: 0.6754 - val\_mse: 0.6754  
Epoch 42/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6264 -  
mse: 0.6264 - val\_loss: 0.6731 - val\_mse: 0.6731  
Epoch 43/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6255 -  
mse: 0.6255 - val\_loss: 0.6714 - val\_mse: 0.6714  
Epoch 44/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6242 -  
mse: 0.6242 - val\_loss: 0.6722 - val\_mse: 0.6722  
Epoch 45/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6230 -  
mse: 0.6230 - val\_loss: 0.6893 - val\_mse: 0.6893  
Epoch 46/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6212 -  
mse: 0.6212 - val\_loss: 0.6613 - val\_mse: 0.6613  
Epoch 47/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6200 -  
mse: 0.6200 - val\_loss: 0.6632 - val\_mse: 0.6632  
Epoch 48/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6185 -  
mse: 0.6185 - val\_loss: 0.6771 - val\_mse: 0.6771

Epoch 49/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6175 -  
mse: 0.6175 - val\_loss: 0.6743 - val\_mse: 0.6743  
Epoch 50/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6161 -  
mse: 0.6161 - val\_loss: 0.6894 - val\_mse: 0.6894  
Epoch 51/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6151 -  
mse: 0.6151 - val\_loss: 0.6666 - val\_mse: 0.6666  
Epoch 52/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6143 -  
mse: 0.6143 - val\_loss: 0.6842 - val\_mse: 0.6842  
Epoch 53/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6129 -  
mse: 0.6129 - val\_loss: 0.6673 - val\_mse: 0.6673  
Epoch 54/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6119 -  
mse: 0.6119 - val\_loss: 0.6750 - val\_mse: 0.6750  
Epoch 55/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6105 -  
mse: 0.6105 - val\_loss: 0.6706 - val\_mse: 0.6706  
Epoch 56/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6096 -  
mse: 0.6096 - val\_loss: 0.6666 - val\_mse: 0.6666  
Epoch 57/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6087 -  
mse: 0.6087 - val\_loss: 0.6618 - val\_mse: 0.6618  
Epoch 58/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6079 -  
mse: 0.6079 - val\_loss: 0.6900 - val\_mse: 0.6900  
Epoch 59/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6069 -  
mse: 0.6069 - val\_loss: 0.6711 - val\_mse: 0.6711  
Epoch 60/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6053 -  
mse: 0.6053 - val\_loss: 0.6837 - val\_mse: 0.6837  
Epoch 61/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6047 -  
mse: 0.6047 - val\_loss: 0.6668 - val\_mse: 0.6668  
Epoch 62/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6040 -  
mse: 0.6040 - val\_loss: 0.6689 - val\_mse: 0.6689  
Epoch 63/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6030 -  
mse: 0.6030 - val\_loss: 0.6706 - val\_mse: 0.6706  
Epoch 64/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6021 -  
mse: 0.6021 - val\_loss: 0.6627 - val\_mse: 0.6627



Epoch 65/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6010 -  
mse: 0.6010 - val\_loss: 0.6597 - val\_mse: 0.6597  
Epoch 66/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6002 -  
mse: 0.6002 - val\_loss: 0.6719 - val\_mse: 0.6719  
Epoch 67/200  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5998 -  
mse: 0.5998 - val\_loss: 0.6640 - val\_mse: 0.6640  
Epoch 68/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5983 -  
mse: 0.5983 - val\_loss: 0.6894 - val\_mse: 0.6894  
Epoch 69/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5976 -  
mse: 0.5976 - val\_loss: 0.6662 - val\_mse: 0.6662  
Epoch 70/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5972 -  
mse: 0.5972 - val\_loss: 0.6813 - val\_mse: 0.6813  
Epoch 71/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5960 -  
mse: 0.5960 - val\_loss: 0.6685 - val\_mse: 0.6685  
Epoch 72/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5954 -  
mse: 0.5954 - val\_loss: 0.6672 - val\_mse: 0.6672  
Epoch 73/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5944 -  
mse: 0.5944 - val\_loss: 0.6680 - val\_mse: 0.6680  
Epoch 74/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5936 -  
mse: 0.5936 - val\_loss: 0.6613 - val\_mse: 0.6613  
Epoch 75/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5930 -  
mse: 0.5930 - val\_loss: 0.6774 - val\_mse: 0.6774  
Epoch 76/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5923 -  
mse: 0.5923 - val\_loss: 0.6784 - val\_mse: 0.6784  
Epoch 77/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5918 -  
mse: 0.5918 - val\_loss: 0.6797 - val\_mse: 0.6797  
Epoch 78/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5911 -  
mse: 0.5911 - val\_loss: 0.7444 - val\_mse: 0.7444  
Epoch 79/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5909 -  
mse: 0.5909 - val\_loss: 0.7095 - val\_mse: 0.7095  
Epoch 80/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5899 -  
mse: 0.5899 - val\_loss: 0.6930 - val\_mse: 0.6930

Epoch 81/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5897 -  
mse: 0.5897 - val\_loss: 0.6862 - val\_mse: 0.6862  
Epoch 82/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5889 -  
mse: 0.5889 - val\_loss: 0.7008 - val\_mse: 0.7008  
Epoch 83/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5881 -  
mse: 0.5881 - val\_loss: 0.6698 - val\_mse: 0.6698  
Epoch 84/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5878 -  
mse: 0.5878 - val\_loss: 0.6743 - val\_mse: 0.6743  
Epoch 85/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5870 -  
mse: 0.5870 - val\_loss: 0.6973 - val\_mse: 0.6973  
Epoch 86/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5863 -  
mse: 0.5863 - val\_loss: 0.6825 - val\_mse: 0.6825  
Epoch 87/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5857 -  
mse: 0.5857 - val\_loss: 0.6995 - val\_mse: 0.6995  
Epoch 88/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5852 -  
mse: 0.5852 - val\_loss: 0.6815 - val\_mse: 0.6815  
Epoch 89/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5849 -  
mse: 0.5849 - val\_loss: 0.6623 - val\_mse: 0.6623  
Epoch 90/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5840 -  
mse: 0.5840 - val\_loss: 0.7151 - val\_mse: 0.7151  
Epoch 91/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5843 -  
mse: 0.5843 - val\_loss: 0.6995 - val\_mse: 0.6995  
Epoch 92/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5833 -  
mse: 0.5833 - val\_loss: 0.7089 - val\_mse: 0.7089  
Epoch 93/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5831 -  
mse: 0.5831 - val\_loss: 0.6961 - val\_mse: 0.6961  
Epoch 94/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5821 -  
mse: 0.5821 - val\_loss: 0.7502 - val\_mse: 0.7502  
Epoch 95/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5818 -  
mse: 0.5818 - val\_loss: 0.6640 - val\_mse: 0.6640  
Epoch 96/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5812 -  
mse: 0.5812 - val\_loss: 0.6682 - val\_mse: 0.6682

Epoch 97/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5809 -  
mse: 0.5809 - val\_loss: 0.6703 - val\_mse: 0.6703  
Epoch 98/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5804 -  
mse: 0.5804 - val\_loss: 0.7103 - val\_mse: 0.7103  
Epoch 99/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5802 -  
mse: 0.5802 - val\_loss: 0.6724 - val\_mse: 0.6724  
Epoch 100/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5795 -  
mse: 0.5795 - val\_loss: 0.6724 - val\_mse: 0.6724  
Epoch 101/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5789 -  
mse: 0.5789 - val\_loss: 0.6885 - val\_mse: 0.6885  
Epoch 102/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5787 -  
mse: 0.5787 - val\_loss: 0.6716 - val\_mse: 0.6716  
Epoch 103/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5779 -  
mse: 0.5779 - val\_loss: 0.6801 - val\_mse: 0.6801  
Epoch 104/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5776 -  
mse: 0.5776 - val\_loss: 0.6953 - val\_mse: 0.6953  
Epoch 105/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5772 -  
mse: 0.5772 - val\_loss: 0.7841 - val\_mse: 0.7841  
Epoch 106/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5768 -  
mse: 0.5768 - val\_loss: 0.6844 - val\_mse: 0.6844  
Epoch 107/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5761 -  
mse: 0.5761 - val\_loss: 0.6892 - val\_mse: 0.6892  
Epoch 108/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5765 -  
mse: 0.5765 - val\_loss: 0.6972 - val\_mse: 0.6972  
Epoch 109/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5754 -  
mse: 0.5754 - val\_loss: 0.6904 - val\_mse: 0.6904  
Epoch 110/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5750 -  
mse: 0.5750 - val\_loss: 0.7070 - val\_mse: 0.7070  
Epoch 111/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5749 -  
mse: 0.5749 - val\_loss: 0.6834 - val\_mse: 0.6834  
Epoch 112/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5744 -  
mse: 0.5744 - val\_loss: 0.6970 - val\_mse: 0.6970

Epoch 113/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5744 -  
mse: 0.5744 - val\_loss: 0.6916 - val\_mse: 0.6916  
Epoch 114/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5737 -  
mse: 0.5737 - val\_loss: 0.6753 - val\_mse: 0.6753  
Epoch 115/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5730 -  
mse: 0.5730 - val\_loss: 0.7042 - val\_mse: 0.7042  
Epoch 116/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5731 -  
mse: 0.5731 - val\_loss: 0.6856 - val\_mse: 0.6856  
Epoch 117/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5726 -  
mse: 0.5726 - val\_loss: 0.6800 - val\_mse: 0.6800  
Epoch 118/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5723 -  
mse: 0.5723 - val\_loss: 0.7503 - val\_mse: 0.7503  
Epoch 119/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5721 -  
mse: 0.5721 - val\_loss: 0.7020 - val\_mse: 0.7020  
Epoch 120/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5717 -  
mse: 0.5717 - val\_loss: 0.6908 - val\_mse: 0.6908  
Epoch 121/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5711 -  
mse: 0.5711 - val\_loss: 0.6946 - val\_mse: 0.6946  
Epoch 122/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5710 -  
mse: 0.5710 - val\_loss: 0.7290 - val\_mse: 0.7290  
Epoch 123/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5706 -  
mse: 0.5706 - val\_loss: 0.7224 - val\_mse: 0.7224  
Epoch 124/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5701 -  
mse: 0.5701 - val\_loss: 0.6874 - val\_mse: 0.6874  
Epoch 125/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5702 -  
mse: 0.5702 - val\_loss: 0.7320 - val\_mse: 0.7320  
Epoch 126/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5695 -  
mse: 0.5695 - val\_loss: 0.7219 - val\_mse: 0.7219  
Epoch 127/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5691 -  
mse: 0.5691 - val\_loss: 0.7374 - val\_mse: 0.7374  
Epoch 128/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5693 -  
mse: 0.5693 - val\_loss: 0.7641 - val\_mse: 0.7641

Epoch 129/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5681 -  
mse: 0.5681 - val\_loss: 0.7138 - val\_mse: 0.7138  
Epoch 130/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5684 -  
mse: 0.5684 - val\_loss: 0.7733 - val\_mse: 0.7733  
Epoch 131/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5677 -  
mse: 0.5677 - val\_loss: 0.6774 - val\_mse: 0.6774  
Epoch 132/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5676 -  
mse: 0.5676 - val\_loss: 0.7436 - val\_mse: 0.7436  
Epoch 133/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5674 -  
mse: 0.5674 - val\_loss: 0.7675 - val\_mse: 0.7675  
Epoch 134/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5672 -  
mse: 0.5672 - val\_loss: 0.7200 - val\_mse: 0.7200  
Epoch 135/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5665 -  
mse: 0.5665 - val\_loss: 0.6719 - val\_mse: 0.6719  
Epoch 136/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5663 -  
mse: 0.5663 - val\_loss: 0.6857 - val\_mse: 0.6857  
Epoch 137/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5660 -  
mse: 0.5660 - val\_loss: 0.7677 - val\_mse: 0.7677  
Epoch 138/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5659 -  
mse: 0.5659 - val\_loss: 0.7448 - val\_mse: 0.7448  
Epoch 139/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5655 -  
mse: 0.5655 - val\_loss: 0.7023 - val\_mse: 0.7023  
Epoch 140/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5654 -  
mse: 0.5654 - val\_loss: 0.7559 - val\_mse: 0.7559  
Epoch 141/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5652 -  
mse: 0.5652 - val\_loss: 0.7455 - val\_mse: 0.7455  
Epoch 142/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5645 -  
mse: 0.5645 - val\_loss: 0.7516 - val\_mse: 0.7516  
Epoch 143/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5644 -  
mse: 0.5644 - val\_loss: 0.6782 - val\_mse: 0.6782  
Epoch 144/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5639 -  
mse: 0.5639 - val\_loss: 0.7198 - val\_mse: 0.7198

Epoch 145/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5635 -  
mse: 0.5635 - val\_loss: 0.7074 - val\_mse: 0.7074  
Epoch 146/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5636 -  
mse: 0.5636 - val\_loss: 0.6926 - val\_mse: 0.6926  
Epoch 147/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5631 -  
mse: 0.5631 - val\_loss: 0.7536 - val\_mse: 0.7536  
Epoch 148/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5630 -  
mse: 0.5630 - val\_loss: 0.7249 - val\_mse: 0.7249  
Epoch 149/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5625 -  
mse: 0.5625 - val\_loss: 0.7237 - val\_mse: 0.7237  
Epoch 150/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5621 -  
mse: 0.5621 - val\_loss: 0.7370 - val\_mse: 0.7370  
Epoch 151/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5621 -  
mse: 0.5621 - val\_loss: 0.7254 - val\_mse: 0.7254  
Epoch 152/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5624 -  
mse: 0.5624 - val\_loss: 0.7262 - val\_mse: 0.7262  
Epoch 153/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5617 -  
mse: 0.5617 - val\_loss: 0.7301 - val\_mse: 0.7301  
Epoch 154/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5612 -  
mse: 0.5612 - val\_loss: 0.7839 - val\_mse: 0.7839  
Epoch 155/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5612 -  
mse: 0.5612 - val\_loss: 0.7570 - val\_mse: 0.7570  
Epoch 156/200  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5607 -  
mse: 0.5607 - val\_loss: 0.7052 - val\_mse: 0.7052  
Epoch 157/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5607 -  
mse: 0.5607 - val\_loss: 0.7306 - val\_mse: 0.7306  
Epoch 158/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5605 -  
mse: 0.5605 - val\_loss: 0.7810 - val\_mse: 0.7810  
Epoch 159/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5604 -  
mse: 0.5604 - val\_loss: 0.7817 - val\_mse: 0.7817  
Epoch 160/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5600 -  
mse: 0.5600 - val\_loss: 0.7549 - val\_mse: 0.7549

Epoch 161/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5602 -  
mse: 0.5602 - val\_loss: 0.7438 - val\_mse: 0.7438  
Epoch 162/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5593 -  
mse: 0.5593 - val\_loss: 0.7388 - val\_mse: 0.7388  
Epoch 163/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5591 -  
mse: 0.5591 - val\_loss: 0.7598 - val\_mse: 0.7598  
Epoch 164/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5590 -  
mse: 0.5590 - val\_loss: 0.7646 - val\_mse: 0.7646  
Epoch 165/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5587 -  
mse: 0.5587 - val\_loss: 0.8349 - val\_mse: 0.8349  
Epoch 166/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5584 -  
mse: 0.5584 - val\_loss: 0.7324 - val\_mse: 0.7324  
Epoch 167/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5580 -  
mse: 0.5580 - val\_loss: 0.7280 - val\_mse: 0.7280  
Epoch 168/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5581 -  
mse: 0.5581 - val\_loss: 0.7363 - val\_mse: 0.7363  
Epoch 169/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5576 -  
mse: 0.5576 - val\_loss: 0.8205 - val\_mse: 0.8205  
Epoch 170/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5576 -  
mse: 0.5576 - val\_loss: 0.9021 - val\_mse: 0.9021  
Epoch 171/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5577 -  
mse: 0.5577 - val\_loss: 0.7860 - val\_mse: 0.7860  
Epoch 172/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5567 -  
mse: 0.5567 - val\_loss: 0.7557 - val\_mse: 0.7557  
Epoch 173/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5565 -  
mse: 0.5565 - val\_loss: 0.7832 - val\_mse: 0.7832  
Epoch 174/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5563 -  
mse: 0.5563 - val\_loss: 0.7998 - val\_mse: 0.7998  
Epoch 175/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5562 -  
mse: 0.5562 - val\_loss: 0.8392 - val\_mse: 0.8392  
Epoch 176/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5560 -  
mse: 0.5560 - val\_loss: 0.7509 - val\_mse: 0.7509

Epoch 177/200  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5556 -  
mse: 0.5556 - val\_loss: 0.7742 - val\_mse: 0.7742  
Epoch 178/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5552 -  
mse: 0.5552 - val\_loss: 0.7239 - val\_mse: 0.7239  
Epoch 179/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5550 -  
mse: 0.5550 - val\_loss: 0.7443 - val\_mse: 0.7443  
Epoch 180/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5548 -  
mse: 0.5548 - val\_loss: 0.8803 - val\_mse: 0.8803  
Epoch 181/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5547 -  
mse: 0.5547 - val\_loss: 0.7410 - val\_mse: 0.7410  
Epoch 182/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5544 -  
mse: 0.5544 - val\_loss: 0.7254 - val\_mse: 0.7254  
Epoch 183/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5544 -  
mse: 0.5544 - val\_loss: 0.7897 - val\_mse: 0.7897  
Epoch 184/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5540 -  
mse: 0.5540 - val\_loss: 0.7721 - val\_mse: 0.7721  
Epoch 185/200  
3353317/3353317 [=====] - 15s 5us/step - loss: 0.5538 -  
mse: 0.5538 - val\_loss: 0.7677 - val\_mse: 0.7677  
Epoch 186/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5537 -  
mse: 0.5537 - val\_loss: 0.7653 - val\_mse: 0.7653  
Epoch 187/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5534 -  
mse: 0.5534 - val\_loss: 0.8085 - val\_mse: 0.8085  
Epoch 188/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5531 -  
mse: 0.5531 - val\_loss: 0.8816 - val\_mse: 0.8816  
Epoch 189/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5529 -  
mse: 0.5529 - val\_loss: 0.7754 - val\_mse: 0.7754  
Epoch 190/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5530 -  
mse: 0.5530 - val\_loss: 0.7796 - val\_mse: 0.7796  
Epoch 191/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5525 -  
mse: 0.5525 - val\_loss: 0.7583 - val\_mse: 0.7583  
Epoch 192/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5523 -  
mse: 0.5523 - val\_loss: 0.7649 - val\_mse: 0.7649



Epoch 193/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5519 -  
mse: 0.5519 - val\_loss: 0.8008 - val\_mse: 0.8008  
Epoch 194/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5520 -  
mse: 0.5520 - val\_loss: 0.7725 - val\_mse: 0.7725  
Epoch 195/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5518 -  
mse: 0.5518 - val\_loss: 0.7668 - val\_mse: 0.7668  
Epoch 196/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5516 -  
mse: 0.5516 - val\_loss: 0.8545 - val\_mse: 0.8545  
Epoch 197/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5516 -  
mse: 0.5516 - val\_loss: 0.7804 - val\_mse: 0.7804  
Epoch 198/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5513 -  
mse: 0.5513 - val\_loss: 0.9249 - val\_mse: 0.9249  
Epoch 199/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5506 -  
mse: 0.5506 - val\_loss: 0.8176 - val\_mse: 0.8176  
Epoch 200/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5509 -  
mse: 0.5509 - val\_loss: 0.7920 - val\_mse: 0.7920  
1676659/1676659 [=====] - 3s 2us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7522 -  
mse: 0.7522 - val\_loss: 0.7730 - val\_mse: 0.7730  
Epoch 2/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.7069 -  
mse: 0.7069 - val\_loss: 0.7672 - val\_mse: 0.7672  
Epoch 3/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6888 -  
mse: 0.6888 - val\_loss: 0.7481 - val\_mse: 0.7481  
Epoch 4/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6765 -  
mse: 0.6765 - val\_loss: 0.7508 - val\_mse: 0.7508  
Epoch 5/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6678 -  
mse: 0.6678 - val\_loss: 0.7383 - val\_mse: 0.7383  
Epoch 6/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6615 -  
mse: 0.6615 - val\_loss: 0.7318 - val\_mse: 0.7318  
Epoch 7/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6549 -  
mse: 0.6549 - val\_loss: 0.7264 - val\_mse: 0.7264  
Epoch 8/200

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.6499 -
mse: 0.6499 - val_loss: 0.7151 - val_mse: 0.7151
Epoch 9/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6456 -
mse: 0.6456 - val_loss: 0.7162 - val_mse: 0.7162
Epoch 10/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6414 -
mse: 0.6414 - val_loss: 0.7195 - val_mse: 0.7195
Epoch 11/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6375 -
mse: 0.6375 - val_loss: 0.7154 - val_mse: 0.7154
Epoch 12/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6340 -
mse: 0.6340 - val_loss: 0.7153 - val_mse: 0.7153
Epoch 13/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6303 -
mse: 0.6303 - val_loss: 0.7125 - val_mse: 0.7125
Epoch 14/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6271 -
mse: 0.6271 - val_loss: 0.7064 - val_mse: 0.7064
Epoch 15/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6243 -
mse: 0.6243 - val_loss: 0.7011 - val_mse: 0.7011
Epoch 16/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6212 -
mse: 0.6212 - val_loss: 0.6997 - val_mse: 0.6997
Epoch 17/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6186 -
mse: 0.6186 - val_loss: 0.6902 - val_mse: 0.6902
Epoch 18/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6163 -
mse: 0.6163 - val_loss: 0.6931 - val_mse: 0.6931
Epoch 19/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6138 -
mse: 0.6138 - val_loss: 0.6977 - val_mse: 0.6977
Epoch 20/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6120 -
mse: 0.6120 - val_loss: 0.7136 - val_mse: 0.7136
Epoch 21/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6100 -
mse: 0.6100 - val_loss: 0.6994 - val_mse: 0.6994
Epoch 22/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.6078 -
mse: 0.6078 - val_loss: 0.6913 - val_mse: 0.6913
Epoch 23/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.6058 -
mse: 0.6058 - val_loss: 0.6854 - val_mse: 0.6854
Epoch 24/200

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.6041 -  
 mse: 0.6041 - val\_loss: 0.6823 - val\_mse: 0.6823  
 Epoch 25/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.6026 -  
 mse: 0.6026 - val\_loss: 0.7063 - val\_mse: 0.7063  
 Epoch 26/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.6008 -  
 mse: 0.6008 - val\_loss: 0.6851 - val\_mse: 0.6851  
 Epoch 27/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5992 -  
 mse: 0.5992 - val\_loss: 0.6801 - val\_mse: 0.6801  
 Epoch 28/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5981 -  
 mse: 0.5981 - val\_loss: 0.6964 - val\_mse: 0.6964  
 Epoch 29/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5969 -  
 mse: 0.5969 - val\_loss: 0.6827 - val\_mse: 0.6827  
 Epoch 30/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5948 -  
 mse: 0.5948 - val\_loss: 0.6869 - val\_mse: 0.6869  
 Epoch 31/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5942 -  
 mse: 0.5942 - val\_loss: 0.6773 - val\_mse: 0.6773  
 Epoch 32/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5926 -  
 mse: 0.5926 - val\_loss: 0.6787 - val\_mse: 0.6787  
 Epoch 33/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5915 -  
 mse: 0.5915 - val\_loss: 0.7085 - val\_mse: 0.7085  
 Epoch 34/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5899 -  
 mse: 0.5899 - val\_loss: 0.6935 - val\_mse: 0.6935  
 Epoch 35/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5883 -  
 mse: 0.5883 - val\_loss: 0.6890 - val\_mse: 0.6890  
 Epoch 36/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5872 -  
 mse: 0.5872 - val\_loss: 0.6792 - val\_mse: 0.6792  
 Epoch 37/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5862 -  
 mse: 0.5862 - val\_loss: 0.6952 - val\_mse: 0.6952  
 Epoch 38/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5849 -  
 mse: 0.5849 - val\_loss: 0.6841 - val\_mse: 0.6841  
 Epoch 39/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5842 -  
 mse: 0.5842 - val\_loss: 0.6878 - val\_mse: 0.6878  
 Epoch 40/200

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5827 -  
 mse: 0.5827 - val\_loss: 0.6668 - val\_mse: 0.6668  
 Epoch 41/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5820 -  
 mse: 0.5820 - val\_loss: 0.6808 - val\_mse: 0.6808  
 Epoch 42/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5809 -  
 mse: 0.5809 - val\_loss: 0.6813 - val\_mse: 0.6813  
 Epoch 43/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5798 -  
 mse: 0.5798 - val\_loss: 0.6895 - val\_mse: 0.6895  
 Epoch 44/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5789 -  
 mse: 0.5789 - val\_loss: 0.6787 - val\_mse: 0.6787  
 Epoch 45/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5780 -  
 mse: 0.5780 - val\_loss: 0.7009 - val\_mse: 0.7009  
 Epoch 46/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5771 -  
 mse: 0.5771 - val\_loss: 0.6976 - val\_mse: 0.6976  
 Epoch 47/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5760 -  
 mse: 0.5760 - val\_loss: 0.6785 - val\_mse: 0.6785  
 Epoch 48/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5750 -  
 mse: 0.5750 - val\_loss: 0.6832 - val\_mse: 0.6832  
 Epoch 49/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5743 -  
 mse: 0.5743 - val\_loss: 0.6929 - val\_mse: 0.6929  
 Epoch 50/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5732 -  
 mse: 0.5732 - val\_loss: 0.6810 - val\_mse: 0.6810  
 Epoch 51/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5726 -  
 mse: 0.5726 - val\_loss: 0.7017 - val\_mse: 0.7017  
 Epoch 52/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5716 -  
 mse: 0.5716 - val\_loss: 0.6770 - val\_mse: 0.6770  
 Epoch 53/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5707 -  
 mse: 0.5707 - val\_loss: 0.6849 - val\_mse: 0.6849  
 Epoch 54/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5696 -  
 mse: 0.5696 - val\_loss: 0.6811 - val\_mse: 0.6811  
 Epoch 55/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5696 -  
 mse: 0.5696 - val\_loss: 0.6823 - val\_mse: 0.6823  
 Epoch 56/200

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5684 -
mse: 0.5684 - val_loss: 0.6902 - val_mse: 0.6902
Epoch 57/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5677 -
mse: 0.5677 - val_loss: 0.7021 - val_mse: 0.7021
Epoch 58/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5672 -
mse: 0.5672 - val_loss: 0.6935 - val_mse: 0.6935
Epoch 59/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5663 -
mse: 0.5663 - val_loss: 0.7030 - val_mse: 0.7030
Epoch 60/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5655 -
mse: 0.5655 - val_loss: 0.6888 - val_mse: 0.6888
Epoch 61/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5646 -
mse: 0.5646 - val_loss: 0.6867 - val_mse: 0.6867
Epoch 62/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5640 -
mse: 0.5640 - val_loss: 0.6858 - val_mse: 0.6858
Epoch 63/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5634 -
mse: 0.5634 - val_loss: 0.6968 - val_mse: 0.6968
Epoch 64/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5628 -
mse: 0.5628 - val_loss: 0.6876 - val_mse: 0.6876
Epoch 65/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5620 -
mse: 0.5620 - val_loss: 0.6767 - val_mse: 0.6767
Epoch 66/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5613 -
mse: 0.5613 - val_loss: 0.6964 - val_mse: 0.6964
Epoch 67/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5605 -
mse: 0.5605 - val_loss: 0.6746 - val_mse: 0.6746
Epoch 68/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5597 -
mse: 0.5597 - val_loss: 0.6799 - val_mse: 0.6799
Epoch 69/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5594 -
mse: 0.5594 - val_loss: 0.6891 - val_mse: 0.6891
Epoch 70/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5585 -
mse: 0.5585 - val_loss: 0.6890 - val_mse: 0.6890
Epoch 71/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5578 -
mse: 0.5578 - val_loss: 0.6752 - val_mse: 0.6752
Epoch 72/200

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5571 -  
mse: 0.5571 - val\_loss: 0.6938 - val\_mse: 0.6938  
Epoch 73/200

3353317/3353317 [=====] - 17s 5us/step - loss: 0.5569 -  
mse: 0.5569 - val\_loss: 0.6845 - val\_mse: 0.6845  
Epoch 74/200

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5560 -  
mse: 0.5560 - val\_loss: 0.6999 - val\_mse: 0.6999  
Epoch 75/200

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5556 -  
mse: 0.5556 - val\_loss: 0.6970 - val\_mse: 0.6970  
Epoch 76/200

3353317/3353317 [=====] - 17s 5us/step - loss: 0.5548 -  
mse: 0.5548 - val\_loss: 0.6835 - val\_mse: 0.6835  
Epoch 77/200

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5541 -  
mse: 0.5541 - val\_loss: 0.6842 - val\_mse: 0.6842  
Epoch 78/200

3353317/3353317 [=====] - 17s 5us/step - loss: 0.5536 -  
mse: 0.5536 - val\_loss: 0.6773 - val\_mse: 0.6773  
Epoch 79/200

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5530 -  
mse: 0.5530 - val\_loss: 0.6835 - val\_mse: 0.6835  
Epoch 80/200

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5523 -  
mse: 0.5523 - val\_loss: 0.6937 - val\_mse: 0.6937  
Epoch 81/200

3353317/3353317 [=====] - 17s 5us/step - loss: 0.5519 -  
mse: 0.5519 - val\_loss: 0.6805 - val\_mse: 0.6805  
Epoch 82/200

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5514 -  
mse: 0.5514 - val\_loss: 0.7124 - val\_mse: 0.7124  
Epoch 83/200

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5507 -  
mse: 0.5507 - val\_loss: 0.6920 - val\_mse: 0.6920  
Epoch 84/200

3353317/3353317 [=====] - 17s 5us/step - loss: 0.5500 -  
mse: 0.5500 - val\_loss: 0.6877 - val\_mse: 0.6877  
Epoch 85/200

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5496 -  
mse: 0.5496 - val\_loss: 0.6977 - val\_mse: 0.6977  
Epoch 86/200

3353317/3353317 [=====] - 17s 5us/step - loss: 0.5492 -  
mse: 0.5492 - val\_loss: 0.6829 - val\_mse: 0.6829  
Epoch 87/200

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5483 -  
mse: 0.5483 - val\_loss: 0.6972 - val\_mse: 0.6972  
Epoch 88/200

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5483 -
mse: 0.5483 - val_loss: 0.7005 - val_mse: 0.7005
Epoch 89/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5475 -
mse: 0.5475 - val_loss: 0.6872 - val_mse: 0.6872
Epoch 90/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5469 -
mse: 0.5469 - val_loss: 0.6989 - val_mse: 0.6989
Epoch 91/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5465 -
mse: 0.5465 - val_loss: 0.7033 - val_mse: 0.7033
Epoch 92/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5458 -
mse: 0.5458 - val_loss: 0.6658 - val_mse: 0.6658
Epoch 93/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5453 -
mse: 0.5453 - val_loss: 0.7168 - val_mse: 0.7168
Epoch 94/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5451 -
mse: 0.5451 - val_loss: 0.6877 - val_mse: 0.6877
Epoch 95/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5443 -
mse: 0.5443 - val_loss: 0.7037 - val_mse: 0.7037
Epoch 96/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5440 -
mse: 0.5440 - val_loss: 0.6977 - val_mse: 0.6977
Epoch 97/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5431 -
mse: 0.5431 - val_loss: 0.6770 - val_mse: 0.6770
Epoch 98/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5430 -
mse: 0.5430 - val_loss: 0.7055 - val_mse: 0.7055
Epoch 99/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5423 -
mse: 0.5423 - val_loss: 0.6905 - val_mse: 0.6905
Epoch 100/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5419 -
mse: 0.5419 - val_loss: 0.6973 - val_mse: 0.6973
Epoch 101/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5411 -
mse: 0.5411 - val_loss: 0.6921 - val_mse: 0.6921
Epoch 102/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5409 -
mse: 0.5409 - val_loss: 0.6893 - val_mse: 0.6893
Epoch 103/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5401 -
mse: 0.5401 - val_loss: 0.6974 - val_mse: 0.6974
Epoch 104/200

```

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5399 -
mse: 0.5399 - val_loss: 0.6981 - val_mse: 0.6981
Epoch 105/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5394 -
mse: 0.5394 - val_loss: 0.6902 - val_mse: 0.6902
Epoch 106/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5387 -
mse: 0.5387 - val_loss: 0.6739 - val_mse: 0.6739
Epoch 107/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5383 -
mse: 0.5383 - val_loss: 0.6793 - val_mse: 0.6793
Epoch 108/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5383 -
mse: 0.5383 - val_loss: 0.6650 - val_mse: 0.6650
Epoch 109/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5378 -
mse: 0.5378 - val_loss: 0.6908 - val_mse: 0.6908
Epoch 110/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5370 -
mse: 0.5370 - val_loss: 0.6913 - val_mse: 0.6913
Epoch 111/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5368 -
mse: 0.5368 - val_loss: 0.6876 - val_mse: 0.6876
Epoch 112/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5361 -
mse: 0.5361 - val_loss: 0.6764 - val_mse: 0.6764
Epoch 113/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5356 -
mse: 0.5356 - val_loss: 0.6826 - val_mse: 0.6826
Epoch 114/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5354 -
mse: 0.5354 - val_loss: 0.6942 - val_mse: 0.6942
Epoch 115/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5351 -
mse: 0.5351 - val_loss: 0.6744 - val_mse: 0.6744
Epoch 116/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5343 -
mse: 0.5343 - val_loss: 0.6963 - val_mse: 0.6963
Epoch 117/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5344 -
mse: 0.5344 - val_loss: 0.6870 - val_mse: 0.6870
Epoch 118/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5338 -
mse: 0.5338 - val_loss: 0.7014 - val_mse: 0.7014
Epoch 119/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5336 -
mse: 0.5336 - val_loss: 0.6901 - val_mse: 0.6901
Epoch 120/200

```



```

3353317/3353317 [=====] - 17s 5us/step - loss: 0.5324 -
mse: 0.5324 - val_loss: 0.6905 - val_mse: 0.6905
Epoch 121/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5318 -
mse: 0.5318 - val_loss: 0.6845 - val_mse: 0.6845
Epoch 122/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5319 -
mse: 0.5319 - val_loss: 0.6897 - val_mse: 0.6897
Epoch 123/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5316 -
mse: 0.5316 - val_loss: 0.6689 - val_mse: 0.6689
Epoch 124/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5309 -
mse: 0.5309 - val_loss: 0.6933 - val_mse: 0.6933
Epoch 125/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5308 -
mse: 0.5308 - val_loss: 0.6774 - val_mse: 0.6774
Epoch 126/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5302 -
mse: 0.5302 - val_loss: 0.6804 - val_mse: 0.6804
Epoch 127/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5299 -
mse: 0.5299 - val_loss: 0.6933 - val_mse: 0.6933
Epoch 128/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5298 -
mse: 0.5298 - val_loss: 0.6728 - val_mse: 0.6728
Epoch 129/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5291 -
mse: 0.5291 - val_loss: 0.7018 - val_mse: 0.7018
Epoch 130/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5287 -
mse: 0.5287 - val_loss: 0.7023 - val_mse: 0.7023
Epoch 131/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5282 -
mse: 0.5282 - val_loss: 0.6842 - val_mse: 0.6842
Epoch 132/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5281 -
mse: 0.5281 - val_loss: 0.6794 - val_mse: 0.6794
Epoch 133/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5274 -
mse: 0.5274 - val_loss: 0.6897 - val_mse: 0.6897
Epoch 134/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5272 -
mse: 0.5272 - val_loss: 0.6839 - val_mse: 0.6839
Epoch 135/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5272 -
mse: 0.5272 - val_loss: 0.6906 - val_mse: 0.6906
Epoch 136/200

```

```

3353317/3353317 [=====] - 17s 5us/step - loss: 0.5265 -
mse: 0.5265 - val_loss: 0.6751 - val_mse: 0.6751
Epoch 137/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5261 -
mse: 0.5261 - val_loss: 0.6785 - val_mse: 0.6785
Epoch 138/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5259 -
mse: 0.5259 - val_loss: 0.6683 - val_mse: 0.6683
Epoch 139/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5254 -
mse: 0.5254 - val_loss: 0.6735 - val_mse: 0.6735
Epoch 140/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5248 -
mse: 0.5248 - val_loss: 0.6743 - val_mse: 0.6743
Epoch 141/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5249 -
mse: 0.5249 - val_loss: 0.6842 - val_mse: 0.6842
Epoch 142/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5244 -
mse: 0.5244 - val_loss: 0.6601 - val_mse: 0.6601
Epoch 143/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5241 -
mse: 0.5241 - val_loss: 0.7089 - val_mse: 0.7089
Epoch 144/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5236 -
mse: 0.5236 - val_loss: 0.6868 - val_mse: 0.6868
Epoch 145/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5230 -
mse: 0.5230 - val_loss: 0.6879 - val_mse: 0.6879
Epoch 146/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5227 -
mse: 0.5227 - val_loss: 0.6736 - val_mse: 0.6736
Epoch 147/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5228 -
mse: 0.5228 - val_loss: 0.6700 - val_mse: 0.6700
Epoch 148/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5225 -
mse: 0.5225 - val_loss: 0.6759 - val_mse: 0.6759
Epoch 149/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5219 -
mse: 0.5219 - val_loss: 0.6788 - val_mse: 0.6788
Epoch 150/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5215 -
mse: 0.5215 - val_loss: 0.6994 - val_mse: 0.6994
Epoch 151/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5213 -
mse: 0.5213 - val_loss: 0.6742 - val_mse: 0.6742
Epoch 152/200

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5211 -  
 mse: 0.5211 - val\_loss: 0.6848 - val\_mse: 0.6848  
 Epoch 153/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5208 -  
 mse: 0.5208 - val\_loss: 0.6799 - val\_mse: 0.6799  
 Epoch 154/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5203 -  
 mse: 0.5203 - val\_loss: 0.6927 - val\_mse: 0.6927  
 Epoch 155/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5202 -  
 mse: 0.5202 - val\_loss: 0.6874 - val\_mse: 0.6874  
 Epoch 156/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5196 -  
 mse: 0.5196 - val\_loss: 0.6811 - val\_mse: 0.6811  
 Epoch 157/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5195 -  
 mse: 0.5195 - val\_loss: 0.6561 - val\_mse: 0.6561  
 Epoch 158/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5190 -  
 mse: 0.5190 - val\_loss: 0.6637 - val\_mse: 0.6637  
 Epoch 159/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5189 -  
 mse: 0.5189 - val\_loss: 0.6619 - val\_mse: 0.6619  
 Epoch 160/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5185 -  
 mse: 0.5185 - val\_loss: 0.6747 - val\_mse: 0.6747  
 Epoch 161/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5184 -  
 mse: 0.5184 - val\_loss: 0.6727 - val\_mse: 0.6727  
 Epoch 162/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5177 -  
 mse: 0.5177 - val\_loss: 0.6932 - val\_mse: 0.6932  
 Epoch 163/200  
 3353317/3353317 [=====] - 17s 5us/step - loss: 0.5174 -  
 mse: 0.5174 - val\_loss: 0.6811 - val\_mse: 0.6811  
 Epoch 164/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5173 -  
 mse: 0.5173 - val\_loss: 0.6675 - val\_mse: 0.6675  
 Epoch 165/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5170 -  
 mse: 0.5170 - val\_loss: 0.6615 - val\_mse: 0.6615  
 Epoch 166/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5165 -  
 mse: 0.5165 - val\_loss: 0.6859 - val\_mse: 0.6859  
 Epoch 167/200  
 3353317/3353317 [=====] - 16s 5us/step - loss: 0.5164 -  
 mse: 0.5164 - val\_loss: 0.6708 - val\_mse: 0.6708  
 Epoch 168/200

3353317/3353317 [=====] - 17s 5us/step - loss: 0.5166 -  
mse: 0.5166 - val\_loss: 0.6948 - val\_mse: 0.6948  
Epoch 169/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5162 -  
mse: 0.5162 - val\_loss: 0.6825 - val\_mse: 0.6825  
Epoch 170/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5158 -  
mse: 0.5158 - val\_loss: 0.6822 - val\_mse: 0.6822  
Epoch 171/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5154 -  
mse: 0.5154 - val\_loss: 0.6547 - val\_mse: 0.6547  
Epoch 172/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5155 -  
mse: 0.5155 - val\_loss: 0.6575 - val\_mse: 0.6575  
Epoch 173/200  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5150 -  
mse: 0.5150 - val\_loss: 0.6635 - val\_mse: 0.6635  
Epoch 174/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5149 -  
mse: 0.5149 - val\_loss: 0.6779 - val\_mse: 0.6779  
Epoch 175/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5144 -  
mse: 0.5144 - val\_loss: 0.6525 - val\_mse: 0.6525  
Epoch 176/200  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5143 -  
mse: 0.5143 - val\_loss: 0.6710 - val\_mse: 0.6710  
Epoch 177/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5140 -  
mse: 0.5140 - val\_loss: 0.6858 - val\_mse: 0.6858  
Epoch 178/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5138 -  
mse: 0.5138 - val\_loss: 0.6778 - val\_mse: 0.6778  
Epoch 179/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5137 -  
mse: 0.5137 - val\_loss: 0.6565 - val\_mse: 0.6565  
Epoch 180/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5132 -  
mse: 0.5132 - val\_loss: 0.7022 - val\_mse: 0.7022  
Epoch 181/200  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5129 -  
mse: 0.5129 - val\_loss: 0.6725 - val\_mse: 0.6725  
Epoch 182/200  
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5127 -  
mse: 0.5127 - val\_loss: 0.6642 - val\_mse: 0.6642  
Epoch 183/200  
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5127 -  
mse: 0.5127 - val\_loss: 0.6676 - val\_mse: 0.6676  
Epoch 184/200

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5123 -
mse: 0.5123 - val_loss: 0.6670 - val_mse: 0.6670
Epoch 185/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5121 -
mse: 0.5121 - val_loss: 0.6606 - val_mse: 0.6606
Epoch 186/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5121 -
mse: 0.5121 - val_loss: 0.6774 - val_mse: 0.6774
Epoch 187/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5115 -
mse: 0.5115 - val_loss: 0.6710 - val_mse: 0.6710
Epoch 188/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5112 -
mse: 0.5112 - val_loss: 0.6722 - val_mse: 0.6722
Epoch 189/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5109 -
mse: 0.5109 - val_loss: 0.6580 - val_mse: 0.6580
Epoch 190/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5110 -
mse: 0.5110 - val_loss: 0.6677 - val_mse: 0.6677
Epoch 191/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5104 -
mse: 0.5104 - val_loss: 0.6710 - val_mse: 0.6710
Epoch 192/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5104 -
mse: 0.5104 - val_loss: 0.6671 - val_mse: 0.6671
Epoch 193/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5102 -
mse: 0.5102 - val_loss: 0.6765 - val_mse: 0.6765
Epoch 194/200
3353317/3353317 [=====] - 17s 5us/step - loss: 0.5101 -
mse: 0.5101 - val_loss: 0.6958 - val_mse: 0.6958
Epoch 195/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5098 -
mse: 0.5098 - val_loss: 0.6650 - val_mse: 0.6650
Epoch 196/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5096 -
mse: 0.5096 - val_loss: 0.6625 - val_mse: 0.6625
Epoch 197/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5093 -
mse: 0.5093 - val_loss: 0.6577 - val_mse: 0.6577
Epoch 198/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5092 -
mse: 0.5092 - val_loss: 0.6611 - val_mse: 0.6611
Epoch 199/200
3353317/3353317 [=====] - 16s 5us/step - loss: 0.5091 -
mse: 0.5091 - val_loss: 0.6688 - val_mse: 0.6688
Epoch 200/200

```

```

3353317/3353317 [=====] - 16s 5us/step - loss: 0.5092 -
mse: 0.5092 - val_loss: 0.6942 - val_mse: 0.6942
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.8598 -
mse: 0.8598 - val_loss: 0.8350 - val_mse: 0.8350
Epoch 2/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.8030 -
mse: 0.8030 - val_loss: 0.8252 - val_mse: 0.8252
Epoch 3/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7820 -
mse: 0.7820 - val_loss: 0.7891 - val_mse: 0.7891
Epoch 4/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7675 -
mse: 0.7675 - val_loss: 0.7894 - val_mse: 0.7894
Epoch 5/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7586 -
mse: 0.7586 - val_loss: 0.7594 - val_mse: 0.7594
Epoch 6/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7510 -
mse: 0.7510 - val_loss: 0.7529 - val_mse: 0.7529
Epoch 7/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7453 -
mse: 0.7453 - val_loss: 0.7463 - val_mse: 0.7463
Epoch 8/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7403 -
mse: 0.7403 - val_loss: 0.7595 - val_mse: 0.7595
Epoch 9/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7358 -
mse: 0.7358 - val_loss: 0.7572 - val_mse: 0.7572
Epoch 10/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7306 -
mse: 0.7306 - val_loss: 0.7394 - val_mse: 0.7394
Epoch 11/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7266 -
mse: 0.7266 - val_loss: 0.7477 - val_mse: 0.7477
Epoch 12/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7225 -
mse: 0.7225 - val_loss: 0.7454 - val_mse: 0.7454
Epoch 13/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7189 -
mse: 0.7189 - val_loss: 0.7521 - val_mse: 0.7521
Epoch 14/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7155 -
mse: 0.7155 - val_loss: 0.7620 - val_mse: 0.7620
Epoch 15/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7123 -

```

```

mse: 0.7123 - val_loss: 0.7341 - val_mse: 0.7341
Epoch 16/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7090 -
mse: 0.7090 - val_loss: 0.7447 - val_mse: 0.7447
Epoch 17/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7060 -
mse: 0.7060 - val_loss: 0.7431 - val_mse: 0.7431
Epoch 18/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7035 -
mse: 0.7035 - val_loss: 0.7513 - val_mse: 0.7513
Epoch 19/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.7002 -
mse: 0.7002 - val_loss: 0.7354 - val_mse: 0.7354
Epoch 20/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6980 -
mse: 0.6980 - val_loss: 0.7629 - val_mse: 0.7629
Epoch 21/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6957 -
mse: 0.6957 - val_loss: 0.7464 - val_mse: 0.7464
Epoch 22/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6929 -
mse: 0.6929 - val_loss: 0.7386 - val_mse: 0.7386
Epoch 23/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6906 -
mse: 0.6906 - val_loss: 0.7663 - val_mse: 0.7663
Epoch 24/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6886 -
mse: 0.6886 - val_loss: 0.7488 - val_mse: 0.7488
Epoch 25/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6868 -
mse: 0.6868 - val_loss: 0.7567 - val_mse: 0.7567
Epoch 26/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6840 -
mse: 0.6840 - val_loss: 0.7730 - val_mse: 0.7730
Epoch 27/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6822 -
mse: 0.6822 - val_loss: 0.7730 - val_mse: 0.7730
Epoch 28/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6805 -
mse: 0.6805 - val_loss: 0.7606 - val_mse: 0.7606
Epoch 29/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6785 -
mse: 0.6785 - val_loss: 0.7494 - val_mse: 0.7494
Epoch 30/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6768 -
mse: 0.6768 - val_loss: 0.7737 - val_mse: 0.7737
Epoch 31/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6748 -

```

```

mse: 0.6748 - val_loss: 0.7535 - val_mse: 0.7535
Epoch 32/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6731 -
mse: 0.6731 - val_loss: 0.7697 - val_mse: 0.7697
Epoch 33/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6715 -
mse: 0.6715 - val_loss: 0.7532 - val_mse: 0.7532
Epoch 34/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6698 -
mse: 0.6698 - val_loss: 0.7743 - val_mse: 0.7743
Epoch 35/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6681 -
mse: 0.6681 - val_loss: 0.7516 - val_mse: 0.7516
Epoch 36/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6664 -
mse: 0.6664 - val_loss: 0.7641 - val_mse: 0.7641
Epoch 37/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6650 -
mse: 0.6650 - val_loss: 0.7701 - val_mse: 0.7701
Epoch 38/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6634 -
mse: 0.6634 - val_loss: 0.7565 - val_mse: 0.7565
Epoch 39/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6615 -
mse: 0.6615 - val_loss: 0.7700 - val_mse: 0.7700
Epoch 40/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6603 -
mse: 0.6603 - val_loss: 0.7574 - val_mse: 0.7574
Epoch 41/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6586 -
mse: 0.6586 - val_loss: 0.7560 - val_mse: 0.7560
Epoch 42/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6573 -
mse: 0.6573 - val_loss: 0.7770 - val_mse: 0.7770
Epoch 43/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6561 -
mse: 0.6561 - val_loss: 0.7830 - val_mse: 0.7830
Epoch 44/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6543 -
mse: 0.6543 - val_loss: 0.7817 - val_mse: 0.7817
Epoch 45/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6528 -
mse: 0.6528 - val_loss: 0.7628 - val_mse: 0.7628
Epoch 46/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6519 -
mse: 0.6519 - val_loss: 0.7832 - val_mse: 0.7832
Epoch 47/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6502 -

```



```

mse: 0.6502 - val_loss: 0.7767 - val_mse: 0.7767
Epoch 48/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6492 -
mse: 0.6492 - val_loss: 0.7776 - val_mse: 0.7776
Epoch 49/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6476 -
mse: 0.6476 - val_loss: 0.7714 - val_mse: 0.7714
Epoch 50/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6460 -
mse: 0.6460 - val_loss: 0.7930 - val_mse: 0.7930
Epoch 51/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6453 -
mse: 0.6453 - val_loss: 0.7968 - val_mse: 0.7968
Epoch 52/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6439 -
mse: 0.6439 - val_loss: 0.8219 - val_mse: 0.8219
Epoch 53/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6429 -
mse: 0.6429 - val_loss: 0.8036 - val_mse: 0.8036
Epoch 54/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6422 -
mse: 0.6422 - val_loss: 0.7918 - val_mse: 0.7918
Epoch 55/200
3353318/3353318 [=====] - 17s 5us/step - loss: 0.6408 -
mse: 0.6408 - val_loss: 0.7811 - val_mse: 0.7811
Epoch 56/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6398 -
mse: 0.6398 - val_loss: 0.8199 - val_mse: 0.8199
Epoch 57/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6384 -
mse: 0.6384 - val_loss: 0.7753 - val_mse: 0.7753
Epoch 58/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6382 -
mse: 0.6382 - val_loss: 0.7729 - val_mse: 0.7729
Epoch 59/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6366 -
mse: 0.6366 - val_loss: 0.7984 - val_mse: 0.7984
Epoch 60/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6354 -
mse: 0.6354 - val_loss: 0.8104 - val_mse: 0.8104
Epoch 61/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6349 -
mse: 0.6349 - val_loss: 0.8527 - val_mse: 0.8527
Epoch 62/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6337 -
mse: 0.6337 - val_loss: 0.8189 - val_mse: 0.8189
Epoch 63/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6328 -

```

```

mse: 0.6328 - val_loss: 0.8119 - val_mse: 0.8119
Epoch 64/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6316 -
mse: 0.6316 - val_loss: 0.7880 - val_mse: 0.7880
Epoch 65/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6311 -
mse: 0.6311 - val_loss: 0.8574 - val_mse: 0.8574
Epoch 66/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6304 -
mse: 0.6304 - val_loss: 0.8113 - val_mse: 0.8113
Epoch 67/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6296 -
mse: 0.6296 - val_loss: 0.8358 - val_mse: 0.8358
Epoch 68/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6288 -
mse: 0.6288 - val_loss: 0.8707 - val_mse: 0.8707
Epoch 69/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6278 -
mse: 0.6278 - val_loss: 0.8063 - val_mse: 0.8063
Epoch 70/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6269 -
mse: 0.6269 - val_loss: 0.7747 - val_mse: 0.7747
Epoch 71/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6265 -
mse: 0.6265 - val_loss: 0.8886 - val_mse: 0.8886
Epoch 72/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6254 -
mse: 0.6254 - val_loss: 0.8223 - val_mse: 0.8223
Epoch 73/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6249 -
mse: 0.6249 - val_loss: 0.8733 - val_mse: 0.8733
Epoch 74/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6242 -
mse: 0.6242 - val_loss: 0.8915 - val_mse: 0.8915
Epoch 75/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6230 -
mse: 0.6230 - val_loss: 0.7994 - val_mse: 0.7994
Epoch 76/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6225 -
mse: 0.6225 - val_loss: 0.8012 - val_mse: 0.8012
Epoch 77/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6218 -
mse: 0.6218 - val_loss: 0.8325 - val_mse: 0.8325
Epoch 78/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6214 -
mse: 0.6214 - val_loss: 0.8464 - val_mse: 0.8464
Epoch 79/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6207 -

```

```

mse: 0.6207 - val_loss: 0.8491 - val_mse: 0.8491
Epoch 80/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6200 -
mse: 0.6200 - val_loss: 0.9192 - val_mse: 0.9192
Epoch 81/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6192 -
mse: 0.6192 - val_loss: 0.7999 - val_mse: 0.7999
Epoch 82/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6188 -
mse: 0.6188 - val_loss: 0.8098 - val_mse: 0.8098
Epoch 83/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6179 -
mse: 0.6179 - val_loss: 0.7908 - val_mse: 0.7908
Epoch 84/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6172 -
mse: 0.6172 - val_loss: 0.8275 - val_mse: 0.8275
Epoch 85/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6168 -
mse: 0.6168 - val_loss: 0.8418 - val_mse: 0.8418
Epoch 86/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6163 -
mse: 0.6163 - val_loss: 0.8673 - val_mse: 0.8673
Epoch 87/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6154 -
mse: 0.6154 - val_loss: 0.8639 - val_mse: 0.8639
Epoch 88/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6150 -
mse: 0.6150 - val_loss: 0.9004 - val_mse: 0.9004
Epoch 89/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6146 -
mse: 0.6146 - val_loss: 0.8382 - val_mse: 0.8382
Epoch 90/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6141 -
mse: 0.6141 - val_loss: 0.8722 - val_mse: 0.8722
Epoch 91/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6138 -
mse: 0.6138 - val_loss: 0.8043 - val_mse: 0.8043
Epoch 92/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6130 -
mse: 0.6130 - val_loss: 0.8553 - val_mse: 0.8553
Epoch 93/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6126 -
mse: 0.6126 - val_loss: 0.9539 - val_mse: 0.9539
Epoch 94/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6118 -
mse: 0.6118 - val_loss: 0.8288 - val_mse: 0.8288
Epoch 95/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6113 -

```

```

mse: 0.6113 - val_loss: 0.9395 - val_mse: 0.9395
Epoch 96/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6105 -
mse: 0.6105 - val_loss: 0.8659 - val_mse: 0.8659
Epoch 97/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6099 -
mse: 0.6099 - val_loss: 0.9074 - val_mse: 0.9074
Epoch 98/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6097 -
mse: 0.6097 - val_loss: 0.8608 - val_mse: 0.8608
Epoch 99/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6093 -
mse: 0.6093 - val_loss: 1.0009 - val_mse: 1.0009
Epoch 100/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6087 -
mse: 0.6087 - val_loss: 0.9156 - val_mse: 0.9156
Epoch 101/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6084 -
mse: 0.6084 - val_loss: 0.8759 - val_mse: 0.8759
Epoch 102/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6078 -
mse: 0.6078 - val_loss: 0.9808 - val_mse: 0.9808
Epoch 103/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6073 -
mse: 0.6073 - val_loss: 0.8616 - val_mse: 0.8616
Epoch 104/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6067 -
mse: 0.6067 - val_loss: 0.8888 - val_mse: 0.8888
Epoch 105/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6065 -
mse: 0.6065 - val_loss: 0.8966 - val_mse: 0.8966
Epoch 106/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6056 -
mse: 0.6056 - val_loss: 0.9259 - val_mse: 0.9259
Epoch 107/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6049 -
mse: 0.6049 - val_loss: 0.9819 - val_mse: 0.9819
Epoch 108/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6047 -
mse: 0.6047 - val_loss: 0.8955 - val_mse: 0.8955
Epoch 109/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6045 -
mse: 0.6045 - val_loss: 0.9770 - val_mse: 0.9770
Epoch 110/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6040 -
mse: 0.6040 - val_loss: 0.8692 - val_mse: 0.8692
Epoch 111/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6033 -

```

```

mse: 0.6033 - val_loss: 0.9800 - val_mse: 0.9800
Epoch 112/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6032 -
mse: 0.6032 - val_loss: 0.9972 - val_mse: 0.9972
Epoch 113/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6027 -
mse: 0.6027 - val_loss: 1.0747 - val_mse: 1.0747
Epoch 114/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6021 -
mse: 0.6021 - val_loss: 0.9271 - val_mse: 0.9271
Epoch 115/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6020 -
mse: 0.6020 - val_loss: 0.8459 - val_mse: 0.8459
Epoch 116/200
3353318/3353318 [=====] - 17s 5us/step - loss: 0.6011 -
mse: 0.6011 - val_loss: 0.9001 - val_mse: 0.9001
Epoch 117/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6007 -
mse: 0.6007 - val_loss: 0.9134 - val_mse: 0.9134
Epoch 118/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6004 -
mse: 0.6004 - val_loss: 1.0394 - val_mse: 1.0394
Epoch 119/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.6000 -
mse: 0.6000 - val_loss: 0.9567 - val_mse: 0.9567
Epoch 120/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5999 -
mse: 0.5999 - val_loss: 0.9045 - val_mse: 0.9045
Epoch 121/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5994 -
mse: 0.5994 - val_loss: 0.8672 - val_mse: 0.8672
Epoch 122/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5988 -
mse: 0.5988 - val_loss: 0.8760 - val_mse: 0.8760
Epoch 123/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5985 -
mse: 0.5985 - val_loss: 1.0263 - val_mse: 1.0263
Epoch 124/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5985 -
mse: 0.5985 - val_loss: 1.0645 - val_mse: 1.0645
Epoch 125/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5978 -
mse: 0.5978 - val_loss: 0.9281 - val_mse: 0.9281
Epoch 126/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5974 -
mse: 0.5974 - val_loss: 0.9610 - val_mse: 0.9610
Epoch 127/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5970 -

```

```

mse: 0.5970 - val_loss: 0.9683 - val_mse: 0.9683
Epoch 128/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5968 -
mse: 0.5968 - val_loss: 0.9489 - val_mse: 0.9489
Epoch 129/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5967 -
mse: 0.5967 - val_loss: 0.8925 - val_mse: 0.8925
Epoch 130/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5963 -
mse: 0.5963 - val_loss: 0.9068 - val_mse: 0.9068
Epoch 131/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5959 -
mse: 0.5959 - val_loss: 1.0331 - val_mse: 1.0331
Epoch 132/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5955 -
mse: 0.5955 - val_loss: 0.9131 - val_mse: 0.9131
Epoch 133/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5955 -
mse: 0.5955 - val_loss: 0.9297 - val_mse: 0.9297
Epoch 134/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5947 -
mse: 0.5947 - val_loss: 0.8507 - val_mse: 0.8507
Epoch 135/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5944 -
mse: 0.5944 - val_loss: 0.9780 - val_mse: 0.9780
Epoch 136/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5940 -
mse: 0.5940 - val_loss: 0.8764 - val_mse: 0.8764
Epoch 137/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5940 -
mse: 0.5940 - val_loss: 0.8612 - val_mse: 0.8612
Epoch 138/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5936 -
mse: 0.5936 - val_loss: 0.8873 - val_mse: 0.8873
Epoch 139/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5929 -
mse: 0.5929 - val_loss: 1.0259 - val_mse: 1.0259
Epoch 140/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5927 -
mse: 0.5927 - val_loss: 0.9877 - val_mse: 0.9877
Epoch 141/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5927 -
mse: 0.5927 - val_loss: 0.8830 - val_mse: 0.8830
Epoch 142/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5918 -
mse: 0.5918 - val_loss: 0.9930 - val_mse: 0.9930
Epoch 143/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5916 -

```

```

mse: 0.5916 - val_loss: 0.9755 - val_mse: 0.9755
Epoch 144/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5922 -
mse: 0.5922 - val_loss: 0.9069 - val_mse: 0.9069
Epoch 145/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5913 -
mse: 0.5913 - val_loss: 0.9360 - val_mse: 0.9360
Epoch 146/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5911 -
mse: 0.5911 - val_loss: 0.9257 - val_mse: 0.9257
Epoch 147/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5908 -
mse: 0.5908 - val_loss: 0.8695 - val_mse: 0.8695
Epoch 148/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5904 -
mse: 0.5904 - val_loss: 0.9350 - val_mse: 0.9350
Epoch 149/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5902 -
mse: 0.5902 - val_loss: 0.9218 - val_mse: 0.9218
Epoch 150/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5898 -
mse: 0.5898 - val_loss: 1.0588 - val_mse: 1.0588
Epoch 151/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5896 -
mse: 0.5896 - val_loss: 0.9349 - val_mse: 0.9349
Epoch 152/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5896 -
mse: 0.5896 - val_loss: 0.9401 - val_mse: 0.9401
Epoch 153/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5893 -
mse: 0.5893 - val_loss: 0.8895 - val_mse: 0.8895
Epoch 154/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5887 -
mse: 0.5887 - val_loss: 0.9513 - val_mse: 0.9513
Epoch 155/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5885 -
mse: 0.5885 - val_loss: 1.0042 - val_mse: 1.0042
Epoch 156/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5880 -
mse: 0.5880 - val_loss: 0.9147 - val_mse: 0.9147
Epoch 157/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5881 -
mse: 0.5881 - val_loss: 0.9396 - val_mse: 0.9396
Epoch 158/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5880 -
mse: 0.5880 - val_loss: 0.9092 - val_mse: 0.9092
Epoch 159/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5876 -

```

```

mse: 0.5876 - val_loss: 0.8941 - val_mse: 0.8941
Epoch 160/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5872 -
mse: 0.5872 - val_loss: 1.0028 - val_mse: 1.0028
Epoch 161/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5872 -
mse: 0.5872 - val_loss: 0.9749 - val_mse: 0.9749
Epoch 162/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5864 -
mse: 0.5864 - val_loss: 0.8004 - val_mse: 0.8004
Epoch 163/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5869 -
mse: 0.5869 - val_loss: 1.0097 - val_mse: 1.0097
Epoch 164/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5863 -
mse: 0.5863 - val_loss: 0.9231 - val_mse: 0.9231
Epoch 165/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5860 -
mse: 0.5860 - val_loss: 0.9473 - val_mse: 0.9473
Epoch 166/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5855 -
mse: 0.5855 - val_loss: 0.9818 - val_mse: 0.9818
Epoch 167/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5852 -
mse: 0.5852 - val_loss: 0.9627 - val_mse: 0.9627
Epoch 168/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5852 -
mse: 0.5852 - val_loss: 0.9202 - val_mse: 0.9202
Epoch 169/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5847 -
mse: 0.5847 - val_loss: 1.0588 - val_mse: 1.0588
Epoch 170/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5845 -
mse: 0.5845 - val_loss: 1.0029 - val_mse: 1.0029
Epoch 171/200
3353318/3353318 [=====] - 17s 5us/step - loss: 0.5845 -
mse: 0.5845 - val_loss: 1.0336 - val_mse: 1.0336
Epoch 172/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5843 -
mse: 0.5843 - val_loss: 0.9738 - val_mse: 0.9738
Epoch 173/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5841 -
mse: 0.5841 - val_loss: 0.9599 - val_mse: 0.9599
Epoch 174/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5837 -
mse: 0.5837 - val_loss: 0.9671 - val_mse: 0.9671
Epoch 175/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5836 -

```



```

mse: 0.5836 - val_loss: 0.9217 - val_mse: 0.9217
Epoch 176/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5834 -
mse: 0.5834 - val_loss: 1.0157 - val_mse: 1.0157
Epoch 177/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5831 -
mse: 0.5831 - val_loss: 0.9150 - val_mse: 0.9150
Epoch 178/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5831 -
mse: 0.5831 - val_loss: 1.0103 - val_mse: 1.0103
Epoch 179/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5828 -
mse: 0.5828 - val_loss: 1.0547 - val_mse: 1.0547
Epoch 180/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5828 -
mse: 0.5828 - val_loss: 1.0473 - val_mse: 1.0473
Epoch 181/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5823 -
mse: 0.5823 - val_loss: 0.9579 - val_mse: 0.9579
Epoch 182/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5818 -
mse: 0.5818 - val_loss: 1.0381 - val_mse: 1.0381
Epoch 183/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5816 -
mse: 0.5816 - val_loss: 1.1099 - val_mse: 1.1099
Epoch 184/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5817 -
mse: 0.5817 - val_loss: 0.9819 - val_mse: 0.9819
Epoch 185/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5813 -
mse: 0.5813 - val_loss: 0.9634 - val_mse: 0.9634
Epoch 186/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5809 -
mse: 0.5809 - val_loss: 1.0196 - val_mse: 1.0196
Epoch 187/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5814 -
mse: 0.5814 - val_loss: 0.9791 - val_mse: 0.9791
Epoch 188/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5805 -
mse: 0.5805 - val_loss: 1.1193 - val_mse: 1.1193
Epoch 189/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5807 -
mse: 0.5807 - val_loss: 1.0530 - val_mse: 1.0530
Epoch 190/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5805 -
mse: 0.5805 - val_loss: 0.9880 - val_mse: 0.9880
Epoch 191/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5804 -

```

```

mse: 0.5804 - val_loss: 1.1044 - val_mse: 1.1044
Epoch 192/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5802 -
mse: 0.5802 - val_loss: 1.1939 - val_mse: 1.1939
Epoch 193/200
3353318/3353318 [=====] - 17s 5us/step - loss: 0.5800 -
mse: 0.5800 - val_loss: 0.9939 - val_mse: 0.9939
Epoch 194/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5795 -
mse: 0.5795 - val_loss: 1.1503 - val_mse: 1.1503
Epoch 195/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5792 -
mse: 0.5792 - val_loss: 0.9843 - val_mse: 0.9843
Epoch 196/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5792 -
mse: 0.5792 - val_loss: 1.0435 - val_mse: 1.0435
Epoch 197/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5790 -
mse: 0.5790 - val_loss: 1.0578 - val_mse: 1.0578
Epoch 198/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5785 -
mse: 0.5785 - val_loss: 1.0657 - val_mse: 1.0657
Epoch 199/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5788 -
mse: 0.5788 - val_loss: 1.0224 - val_mse: 1.0224
Epoch 200/200
3353318/3353318 [=====] - 16s 5us/step - loss: 0.5782 -
mse: 0.5782 - val_loss: 1.0513 - val_mse: 1.0513
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9038 -
mse: 0.9038 - val_loss: 0.7977 - val_mse: 0.7977
Epoch 2/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8260 -
mse: 0.8260 - val_loss: 0.7688 - val_mse: 0.7688
Epoch 3/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8068 -
mse: 0.8068 - val_loss: 0.7686 - val_mse: 0.7686
Epoch 4/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7926 -
mse: 0.7926 - val_loss: 0.7501 - val_mse: 0.7501
Epoch 5/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7794 -
mse: 0.7794 - val_loss: 0.7596 - val_mse: 0.7596
1676659/1676659 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.8255 -
mse: 0.8255 - val_loss: 0.7929 - val_mse: 0.7929
Epoch 2/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7470 -
mse: 0.7470 - val_loss: 0.7881 - val_mse: 0.7881
Epoch 3/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7356 -
mse: 0.7356 - val_loss: 0.7806 - val_mse: 0.7806
Epoch 4/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7255 -
mse: 0.7255 - val_loss: 0.7745 - val_mse: 0.7745
Epoch 5/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7171 -
mse: 0.7171 - val_loss: 0.7737 - val_mse: 0.7737
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9373 -
mse: 0.9373 - val_loss: 0.8129 - val_mse: 0.8129
Epoch 2/5
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8388 -
mse: 0.8388 - val_loss: 0.8333 - val_mse: 0.8333
Epoch 3/5
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8200 -
mse: 0.8200 - val_loss: 0.8302 - val_mse: 0.8302
Epoch 4/5
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8070 -
mse: 0.8070 - val_loss: 0.8271 - val_mse: 0.8271
Epoch 5/5
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7956 -
mse: 0.7956 - val_loss: 0.8014 - val_mse: 0.8014
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/10
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9047 -
mse: 0.9047 - val_loss: 0.7844 - val_mse: 0.7844
Epoch 2/10
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8244 -
mse: 0.8244 - val_loss: 0.7636 - val_mse: 0.7636
Epoch 3/10
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8050 -
mse: 0.8050 - val_loss: 0.8098 - val_mse: 0.8098
Epoch 4/10
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7906 -
mse: 0.7906 - val_loss: 0.7684 - val_mse: 0.7684
Epoch 5/10
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7783 -
mse: 0.7783 - val_loss: 0.7581 - val_mse: 0.7581

```

Epoch 6/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7668 -  
mse: 0.7668 - val\_loss: 0.7475 - val\_mse: 0.7475  
Epoch 7/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7578 -  
mse: 0.7578 - val\_loss: 0.7418 - val\_mse: 0.7418  
Epoch 8/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7500 -  
mse: 0.7500 - val\_loss: 0.7415 - val\_mse: 0.7415  
Epoch 9/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7434 -  
mse: 0.7434 - val\_loss: 0.7338 - val\_mse: 0.7338  
Epoch 10/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7385 -  
mse: 0.7385 - val\_loss: 0.7664 - val\_mse: 0.7664  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7955 -  
mse: 0.7955 - val\_loss: 0.7786 - val\_mse: 0.7786  
Epoch 2/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7291 -  
mse: 0.7291 - val\_loss: 0.7663 - val\_mse: 0.7663  
Epoch 3/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7155 -  
mse: 0.7155 - val\_loss: 0.7658 - val\_mse: 0.7658  
Epoch 4/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7046 -  
mse: 0.7046 - val\_loss: 0.7537 - val\_mse: 0.7537  
Epoch 5/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6953 -  
mse: 0.6953 - val\_loss: 0.7515 - val\_mse: 0.7515  
Epoch 6/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6880 -  
mse: 0.6880 - val\_loss: 0.7469 - val\_mse: 0.7469  
Epoch 7/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6813 -  
mse: 0.6813 - val\_loss: 0.7425 - val\_mse: 0.7425  
Epoch 8/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6762 -  
mse: 0.6762 - val\_loss: 0.7441 - val\_mse: 0.7441  
Epoch 9/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6715 -  
mse: 0.6715 - val\_loss: 0.7381 - val\_mse: 0.7381  
Epoch 10/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6675 -  
mse: 0.6675 - val\_loss: 0.7371 - val\_mse: 0.7371  
1676659/1676659 [=====] - 2s 1us/step

Train on 3353318 samples, validate on 221802 samples

Epoch 1/10  
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9314 -  
mse: 0.9314 - val\_loss: 0.8226 - val\_mse: 0.8226

Epoch 2/10  
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8389 -  
mse: 0.8389 - val\_loss: 0.8391 - val\_mse: 0.8391

Epoch 3/10  
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8195 -  
mse: 0.8195 - val\_loss: 0.8324 - val\_mse: 0.8324

Epoch 4/10  
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8060 -  
mse: 0.8060 - val\_loss: 0.8126 - val\_mse: 0.8126

Epoch 5/10  
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7943 -  
mse: 0.7943 - val\_loss: 0.8044 - val\_mse: 0.8044

Epoch 6/10  
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7856 -  
mse: 0.7856 - val\_loss: 0.7924 - val\_mse: 0.7924

Epoch 7/10  
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7780 -  
mse: 0.7780 - val\_loss: 0.7825 - val\_mse: 0.7825

Epoch 8/10  
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7722 -  
mse: 0.7722 - val\_loss: 0.7835 - val\_mse: 0.7835

Epoch 9/10  
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7674 -  
mse: 0.7674 - val\_loss: 0.7739 - val\_mse: 0.7739

Epoch 10/10  
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7628 -  
mse: 0.7628 - val\_loss: 0.7829 - val\_mse: 0.7829  
1676658/1676658 [=====] - 2s 1us/step

Train on 3353317 samples, validate on 221802 samples

Epoch 1/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9169 -  
mse: 0.9169 - val\_loss: 0.7718 - val\_mse: 0.7718

Epoch 2/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8264 -  
mse: 0.8264 - val\_loss: 0.7682 - val\_mse: 0.7682

Epoch 3/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8065 -  
mse: 0.8065 - val\_loss: 0.7632 - val\_mse: 0.7632

Epoch 4/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7917 -  
mse: 0.7917 - val\_loss: 0.7612 - val\_mse: 0.7612

Epoch 5/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7788 -  
mse: 0.7788 - val\_loss: 0.7504 - val\_mse: 0.7504

Epoch 6/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7675 -  
mse: 0.7675 - val\_loss: 0.7452 - val\_mse: 0.7452  
Epoch 7/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7574 -  
mse: 0.7574 - val\_loss: 0.7429 - val\_mse: 0.7429  
Epoch 8/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7490 -  
mse: 0.7490 - val\_loss: 0.7394 - val\_mse: 0.7394  
Epoch 9/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7424 -  
mse: 0.7424 - val\_loss: 0.7456 - val\_mse: 0.7456  
Epoch 10/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7363 -  
mse: 0.7363 - val\_loss: 0.7366 - val\_mse: 0.7366  
Epoch 11/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7318 -  
mse: 0.7318 - val\_loss: 0.7299 - val\_mse: 0.7299  
Epoch 12/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7273 -  
mse: 0.7273 - val\_loss: 0.7226 - val\_mse: 0.7226  
Epoch 13/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7238 -  
mse: 0.7238 - val\_loss: 0.7237 - val\_mse: 0.7237  
Epoch 14/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7204 -  
mse: 0.7204 - val\_loss: 0.7158 - val\_mse: 0.7158  
Epoch 15/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7185 -  
mse: 0.7185 - val\_loss: 0.7148 - val\_mse: 0.7148  
Epoch 16/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7152 -  
mse: 0.7152 - val\_loss: 0.7126 - val\_mse: 0.7126  
Epoch 17/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7128 -  
mse: 0.7128 - val\_loss: 0.7106 - val\_mse: 0.7106  
Epoch 18/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7104 -  
mse: 0.7104 - val\_loss: 0.7096 - val\_mse: 0.7096  
Epoch 19/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7085 -  
mse: 0.7085 - val\_loss: 0.7127 - val\_mse: 0.7127  
Epoch 20/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7062 -  
mse: 0.7062 - val\_loss: 0.7050 - val\_mse: 0.7050  
Epoch 21/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7037 -  
mse: 0.7037 - val\_loss: 0.7188 - val\_mse: 0.7188

Epoch 22/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7016 -  
mse: 0.7016 - val\_loss: 0.7008 - val\_mse: 0.7008  
Epoch 23/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7001 -  
mse: 0.7001 - val\_loss: 0.7004 - val\_mse: 0.7004  
Epoch 24/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6983 -  
mse: 0.6983 - val\_loss: 0.7126 - val\_mse: 0.7126  
Epoch 25/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6967 -  
mse: 0.6967 - val\_loss: 0.7059 - val\_mse: 0.7059  
Epoch 26/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6951 -  
mse: 0.6951 - val\_loss: 0.7025 - val\_mse: 0.7025  
Epoch 27/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6930 -  
mse: 0.6930 - val\_loss: 0.7001 - val\_mse: 0.7001  
Epoch 28/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6917 -  
mse: 0.6917 - val\_loss: 0.7016 - val\_mse: 0.7016  
Epoch 29/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6895 -  
mse: 0.6895 - val\_loss: 0.7035 - val\_mse: 0.7035  
Epoch 30/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6883 -  
mse: 0.6883 - val\_loss: 0.6918 - val\_mse: 0.6918  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8074 -  
mse: 0.8074 - val\_loss: 0.8025 - val\_mse: 0.8025  
Epoch 2/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7435 -  
mse: 0.7435 - val\_loss: 0.7864 - val\_mse: 0.7864  
Epoch 3/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7332 -  
mse: 0.7332 - val\_loss: 0.7840 - val\_mse: 0.7840  
Epoch 4/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7231 -  
mse: 0.7231 - val\_loss: 0.7782 - val\_mse: 0.7782  
Epoch 5/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7146 -  
mse: 0.7146 - val\_loss: 0.7732 - val\_mse: 0.7732  
Epoch 6/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7072 -  
mse: 0.7072 - val\_loss: 0.7640 - val\_mse: 0.7640  
Epoch 7/30

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.7011 -
mse: 0.7011 - val_loss: 0.7712 - val_mse: 0.7712
Epoch 8/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6956 -
mse: 0.6956 - val_loss: 0.7598 - val_mse: 0.7598
Epoch 9/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6912 -
mse: 0.6912 - val_loss: 0.7609 - val_mse: 0.7609
Epoch 10/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6880 -
mse: 0.6880 - val_loss: 0.7534 - val_mse: 0.7534
Epoch 11/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6851 -
mse: 0.6851 - val_loss: 0.7579 - val_mse: 0.7579
Epoch 12/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6825 -
mse: 0.6825 - val_loss: 0.7565 - val_mse: 0.7565
Epoch 13/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6805 -
mse: 0.6805 - val_loss: 0.7543 - val_mse: 0.7543
Epoch 14/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6778 -
mse: 0.6778 - val_loss: 0.7503 - val_mse: 0.7503
Epoch 15/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6765 -
mse: 0.6765 - val_loss: 0.7522 - val_mse: 0.7522
Epoch 16/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6742 -
mse: 0.6742 - val_loss: 0.7509 - val_mse: 0.7509
Epoch 17/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6731 -
mse: 0.6731 - val_loss: 0.7465 - val_mse: 0.7465
Epoch 18/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6709 -
mse: 0.6709 - val_loss: 0.7427 - val_mse: 0.7427
Epoch 19/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6701 -
mse: 0.6701 - val_loss: 0.7424 - val_mse: 0.7424
Epoch 20/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6687 -
mse: 0.6687 - val_loss: 0.7495 - val_mse: 0.7495
Epoch 21/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6669 -
mse: 0.6669 - val_loss: 0.7525 - val_mse: 0.7525
Epoch 22/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6661 -
mse: 0.6661 - val_loss: 0.7355 - val_mse: 0.7355
Epoch 23/30

```



```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6640 -
mse: 0.6640 - val_loss: 0.7659 - val_mse: 0.7659
Epoch 24/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6637 -
mse: 0.6637 - val_loss: 0.7347 - val_mse: 0.7347
Epoch 25/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6628 -
mse: 0.6628 - val_loss: 0.7385 - val_mse: 0.7385
Epoch 26/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6608 -
mse: 0.6608 - val_loss: 0.7327 - val_mse: 0.7327
Epoch 27/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6602 -
mse: 0.6602 - val_loss: 0.7327 - val_mse: 0.7327
Epoch 28/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6592 -
mse: 0.6592 - val_loss: 0.7373 - val_mse: 0.7373
Epoch 29/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6578 -
mse: 0.6578 - val_loss: 0.7272 - val_mse: 0.7272
Epoch 30/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6570 -
mse: 0.6570 - val_loss: 0.7313 - val_mse: 0.7313
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9297 -
mse: 0.9297 - val_loss: 0.8215 - val_mse: 0.8215
Epoch 2/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8368 -
mse: 0.8368 - val_loss: 0.8341 - val_mse: 0.8341
Epoch 3/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8191 -
mse: 0.8191 - val_loss: 0.8279 - val_mse: 0.8279
Epoch 4/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8059 -
mse: 0.8059 - val_loss: 0.8183 - val_mse: 0.8183
Epoch 5/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7944 -
mse: 0.7944 - val_loss: 0.8018 - val_mse: 0.8018
Epoch 6/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7849 -
mse: 0.7849 - val_loss: 0.8064 - val_mse: 0.8064
Epoch 7/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7781 -
mse: 0.7781 - val_loss: 0.7962 - val_mse: 0.7962
Epoch 8/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7711 -

```

```

mse: 0.7711 - val_loss: 0.7846 - val_mse: 0.7846
Epoch 9/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7664 -
mse: 0.7664 - val_loss: 0.7768 - val_mse: 0.7768
Epoch 10/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7618 -
mse: 0.7618 - val_loss: 0.7763 - val_mse: 0.7763
Epoch 11/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7573 -
mse: 0.7573 - val_loss: 0.7672 - val_mse: 0.7672
Epoch 12/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7545 -
mse: 0.7545 - val_loss: 0.7672 - val_mse: 0.7672
Epoch 13/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7507 -
mse: 0.7507 - val_loss: 0.7671 - val_mse: 0.7671
Epoch 14/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7482 -
mse: 0.7482 - val_loss: 0.7604 - val_mse: 0.7604
Epoch 15/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7459 -
mse: 0.7459 - val_loss: 0.7646 - val_mse: 0.7646
Epoch 16/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7430 -
mse: 0.7430 - val_loss: 0.7574 - val_mse: 0.7574
Epoch 17/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7411 -
mse: 0.7411 - val_loss: 0.7571 - val_mse: 0.7571
Epoch 18/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7393 -
mse: 0.7393 - val_loss: 0.7583 - val_mse: 0.7583
Epoch 19/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7367 -
mse: 0.7367 - val_loss: 0.7520 - val_mse: 0.7520
Epoch 20/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7358 -
mse: 0.7358 - val_loss: 0.7641 - val_mse: 0.7641
Epoch 21/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7329 -
mse: 0.7329 - val_loss: 0.7494 - val_mse: 0.7494
Epoch 22/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7319 -
mse: 0.7319 - val_loss: 0.7509 - val_mse: 0.7509
Epoch 23/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7297 -
mse: 0.7297 - val_loss: 0.7493 - val_mse: 0.7493
Epoch 24/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7283 -

```

```

mse: 0.7283 - val_loss: 0.7467 - val_mse: 0.7467
Epoch 25/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7264 -
mse: 0.7264 - val_loss: 0.7464 - val_mse: 0.7464
Epoch 26/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7254 -
mse: 0.7254 - val_loss: 0.7427 - val_mse: 0.7427
Epoch 27/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7237 -
mse: 0.7237 - val_loss: 0.7435 - val_mse: 0.7435
Epoch 28/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7223 -
mse: 0.7223 - val_loss: 0.7514 - val_mse: 0.7514
Epoch 29/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7209 -
mse: 0.7209 - val_loss: 0.7487 - val_mse: 0.7487
Epoch 30/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7195 -
mse: 0.7195 - val_loss: 0.7500 - val_mse: 0.7500
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9123 -
mse: 0.9123 - val_loss: 0.7773 - val_mse: 0.7773
Epoch 2/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8281 -
mse: 0.8281 - val_loss: 0.7695 - val_mse: 0.7695
Epoch 3/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8076 -
mse: 0.8076 - val_loss: 0.7574 - val_mse: 0.7574
Epoch 4/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7917 -
mse: 0.7917 - val_loss: 0.7554 - val_mse: 0.7554
Epoch 5/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7776 -
mse: 0.7776 - val_loss: 0.7692 - val_mse: 0.7692
Epoch 6/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7660 -
mse: 0.7660 - val_loss: 0.7891 - val_mse: 0.7891
Epoch 7/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7561 -
mse: 0.7561 - val_loss: 0.7393 - val_mse: 0.7393
Epoch 8/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7479 -
mse: 0.7479 - val_loss: 0.7335 - val_mse: 0.7335
Epoch 9/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7413 -
mse: 0.7413 - val_loss: 0.7397 - val_mse: 0.7397

```

Epoch 10/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7364 -  
 mse: 0.7364 - val\_loss: 0.7376 - val\_mse: 0.7376

Epoch 11/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7312 -  
 mse: 0.7312 - val\_loss: 0.7263 - val\_mse: 0.7263

Epoch 12/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7275 -  
 mse: 0.7275 - val\_loss: 0.7538 - val\_mse: 0.7538

Epoch 13/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7242 -  
 mse: 0.7242 - val\_loss: 0.7240 - val\_mse: 0.7240

Epoch 14/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7209 -  
 mse: 0.7209 - val\_loss: 0.7404 - val\_mse: 0.7404

Epoch 15/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7181 -  
 mse: 0.7181 - val\_loss: 0.7157 - val\_mse: 0.7157

Epoch 16/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7162 -  
 mse: 0.7162 - val\_loss: 0.7221 - val\_mse: 0.7221

Epoch 17/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7135 -  
 mse: 0.7135 - val\_loss: 0.7227 - val\_mse: 0.7227

Epoch 18/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7108 -  
 mse: 0.7108 - val\_loss: 0.7173 - val\_mse: 0.7173

Epoch 19/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7091 -  
 mse: 0.7091 - val\_loss: 0.7308 - val\_mse: 0.7308

Epoch 20/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7067 -  
 mse: 0.7067 - val\_loss: 0.7133 - val\_mse: 0.7133

Epoch 21/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7050 -  
 mse: 0.7050 - val\_loss: 0.7275 - val\_mse: 0.7275

Epoch 22/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7027 -  
 mse: 0.7027 - val\_loss: 0.7089 - val\_mse: 0.7089

Epoch 23/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7011 -  
 mse: 0.7011 - val\_loss: 0.7181 - val\_mse: 0.7181

Epoch 24/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6993 -  
 mse: 0.6993 - val\_loss: 0.7044 - val\_mse: 0.7044

Epoch 25/50  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6982 -  
 mse: 0.6982 - val\_loss: 0.6994 - val\_mse: 0.6994

Epoch 26/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6960 -  
mse: 0.6960 - val\_loss: 0.7094 - val\_mse: 0.7094  
Epoch 27/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6946 -  
mse: 0.6946 - val\_loss: 0.7195 - val\_mse: 0.7195  
Epoch 28/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6926 -  
mse: 0.6926 - val\_loss: 0.7151 - val\_mse: 0.7151  
Epoch 29/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6914 -  
mse: 0.6914 - val\_loss: 0.7066 - val\_mse: 0.7066  
Epoch 30/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6900 -  
mse: 0.6900 - val\_loss: 0.7036 - val\_mse: 0.7036  
Epoch 31/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6881 -  
mse: 0.6881 - val\_loss: 0.7023 - val\_mse: 0.7023  
Epoch 32/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6870 -  
mse: 0.6870 - val\_loss: 0.6946 - val\_mse: 0.6946  
Epoch 33/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6851 -  
mse: 0.6851 - val\_loss: 0.6926 - val\_mse: 0.6926  
Epoch 34/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6841 -  
mse: 0.6841 - val\_loss: 0.6972 - val\_mse: 0.6972  
Epoch 35/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6826 -  
mse: 0.6826 - val\_loss: 0.7020 - val\_mse: 0.7020  
Epoch 36/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6814 -  
mse: 0.6814 - val\_loss: 0.6947 - val\_mse: 0.6947  
Epoch 37/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6802 -  
mse: 0.6802 - val\_loss: 0.6928 - val\_mse: 0.6928  
Epoch 38/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6789 -  
mse: 0.6789 - val\_loss: 0.6880 - val\_mse: 0.6880  
Epoch 39/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6780 -  
mse: 0.6780 - val\_loss: 0.6888 - val\_mse: 0.6888  
Epoch 40/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6764 -  
mse: 0.6764 - val\_loss: 0.6895 - val\_mse: 0.6895  
Epoch 41/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6755 -  
mse: 0.6755 - val\_loss: 0.6919 - val\_mse: 0.6919

Epoch 42/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6746 -  
mse: 0.6746 - val\_loss: 0.6915 - val\_mse: 0.6915  
Epoch 43/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6730 -  
mse: 0.6730 - val\_loss: 0.6906 - val\_mse: 0.6906  
Epoch 44/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6717 -  
mse: 0.6717 - val\_loss: 0.7073 - val\_mse: 0.7073  
Epoch 45/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6712 -  
mse: 0.6712 - val\_loss: 0.6861 - val\_mse: 0.6861  
Epoch 46/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6700 -  
mse: 0.6700 - val\_loss: 0.6869 - val\_mse: 0.6869  
Epoch 47/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6688 -  
mse: 0.6688 - val\_loss: 0.6850 - val\_mse: 0.6850  
Epoch 48/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6672 -  
mse: 0.6672 - val\_loss: 0.6836 - val\_mse: 0.6836  
Epoch 49/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6667 -  
mse: 0.6667 - val\_loss: 0.7075 - val\_mse: 0.7075  
Epoch 50/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6659 -  
mse: 0.6659 - val\_loss: 0.6920 - val\_mse: 0.6920  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7943 -  
mse: 0.7943 - val\_loss: 0.7707 - val\_mse: 0.7707  
Epoch 2/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7295 -  
mse: 0.7295 - val\_loss: 0.7653 - val\_mse: 0.7653  
Epoch 3/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7163 -  
mse: 0.7163 - val\_loss: 0.7617 - val\_mse: 0.7617  
Epoch 4/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7059 -  
mse: 0.7059 - val\_loss: 0.7558 - val\_mse: 0.7558  
Epoch 5/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6971 -  
mse: 0.6971 - val\_loss: 0.7498 - val\_mse: 0.7498  
Epoch 6/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6896 -  
mse: 0.6896 - val\_loss: 0.7487 - val\_mse: 0.7487  
Epoch 7/50

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6839 -
mse: 0.6839 - val_loss: 0.7488 - val_mse: 0.7488
Epoch 8/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6780 -
mse: 0.6780 - val_loss: 0.7478 - val_mse: 0.7478
Epoch 9/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6738 -
mse: 0.6738 - val_loss: 0.7442 - val_mse: 0.7442
Epoch 10/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6698 -
mse: 0.6698 - val_loss: 0.7361 - val_mse: 0.7361
Epoch 11/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6659 -
mse: 0.6659 - val_loss: 0.7411 - val_mse: 0.7411
Epoch 12/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6634 -
mse: 0.6634 - val_loss: 0.7299 - val_mse: 0.7299
Epoch 13/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6603 -
mse: 0.6603 - val_loss: 0.7349 - val_mse: 0.7349
Epoch 14/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6576 -
mse: 0.6576 - val_loss: 0.7331 - val_mse: 0.7331
Epoch 15/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6553 -
mse: 0.6553 - val_loss: 0.7254 - val_mse: 0.7254
Epoch 16/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6534 -
mse: 0.6534 - val_loss: 0.7210 - val_mse: 0.7210
Epoch 17/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6512 -
mse: 0.6512 - val_loss: 0.7207 - val_mse: 0.7207
Epoch 18/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6493 -
mse: 0.6493 - val_loss: 0.7240 - val_mse: 0.7240
Epoch 19/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6473 -
mse: 0.6473 - val_loss: 0.7192 - val_mse: 0.7192
Epoch 20/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6456 -
mse: 0.6456 - val_loss: 0.7196 - val_mse: 0.7196
Epoch 21/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6441 -
mse: 0.6441 - val_loss: 0.7167 - val_mse: 0.7167
Epoch 22/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6418 -
mse: 0.6418 - val_loss: 0.7160 - val_mse: 0.7160
Epoch 23/50

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6415 -
mse: 0.6415 - val_loss: 0.7130 - val_mse: 0.7130
Epoch 24/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6396 -
mse: 0.6396 - val_loss: 0.7138 - val_mse: 0.7138
Epoch 25/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6384 -
mse: 0.6384 - val_loss: 0.7115 - val_mse: 0.7115
Epoch 26/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6368 -
mse: 0.6368 - val_loss: 0.7043 - val_mse: 0.7043
Epoch 27/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6350 -
mse: 0.6350 - val_loss: 0.7081 - val_mse: 0.7081
Epoch 28/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6344 -
mse: 0.6344 - val_loss: 0.7107 - val_mse: 0.7107
Epoch 29/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6328 -
mse: 0.6328 - val_loss: 0.7058 - val_mse: 0.7058
Epoch 30/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6312 -
mse: 0.6312 - val_loss: 0.7048 - val_mse: 0.7048
Epoch 31/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6304 -
mse: 0.6304 - val_loss: 0.7048 - val_mse: 0.7048
Epoch 32/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6289 -
mse: 0.6289 - val_loss: 0.7034 - val_mse: 0.7034
Epoch 33/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6283 -
mse: 0.6283 - val_loss: 0.7066 - val_mse: 0.7066
Epoch 34/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6263 -
mse: 0.6263 - val_loss: 0.7012 - val_mse: 0.7012
Epoch 35/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6255 -
mse: 0.6255 - val_loss: 0.7041 - val_mse: 0.7041
Epoch 36/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6245 -
mse: 0.6245 - val_loss: 0.7030 - val_mse: 0.7030
Epoch 37/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6233 -
mse: 0.6233 - val_loss: 0.6984 - val_mse: 0.6984
Epoch 38/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6223 -
mse: 0.6223 - val_loss: 0.7043 - val_mse: 0.7043
Epoch 39/50

```



```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6211 -
mse: 0.6211 - val_loss: 0.7003 - val_mse: 0.7003
Epoch 40/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6201 -
mse: 0.6201 - val_loss: 0.6988 - val_mse: 0.6988
Epoch 41/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6196 -
mse: 0.6196 - val_loss: 0.7023 - val_mse: 0.7023
Epoch 42/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6181 -
mse: 0.6181 - val_loss: 0.6968 - val_mse: 0.6968
Epoch 43/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6175 -
mse: 0.6175 - val_loss: 0.7028 - val_mse: 0.7028
Epoch 44/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6164 -
mse: 0.6164 - val_loss: 0.6934 - val_mse: 0.6934
Epoch 45/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6158 -
mse: 0.6158 - val_loss: 0.6963 - val_mse: 0.6963
Epoch 46/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6148 -
mse: 0.6148 - val_loss: 0.6915 - val_mse: 0.6915
Epoch 47/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6137 -
mse: 0.6137 - val_loss: 0.6927 - val_mse: 0.6927
Epoch 48/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6128 -
mse: 0.6128 - val_loss: 0.6952 - val_mse: 0.6952
Epoch 49/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6119 -
mse: 0.6119 - val_loss: 0.6952 - val_mse: 0.6952
Epoch 50/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6110 -
mse: 0.6110 - val_loss: 0.6966 - val_mse: 0.6966
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9340 -
mse: 0.9340 - val_loss: 0.8238 - val_mse: 0.8238
Epoch 2/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8368 -
mse: 0.8368 - val_loss: 0.8261 - val_mse: 0.8261
Epoch 3/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8176 -
mse: 0.8176 - val_loss: 0.8320 - val_mse: 0.8320
Epoch 4/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8040 -

```

```

mse: 0.8040 - val_loss: 0.8132 - val_mse: 0.8132
Epoch 5/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7924 -
mse: 0.7924 - val_loss: 0.8070 - val_mse: 0.8070
Epoch 6/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7837 -
mse: 0.7837 - val_loss: 0.8105 - val_mse: 0.8105
Epoch 7/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7756 -
mse: 0.7756 - val_loss: 0.7999 - val_mse: 0.7999
Epoch 8/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7695 -
mse: 0.7695 - val_loss: 0.7911 - val_mse: 0.7911
Epoch 9/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7641 -
mse: 0.7641 - val_loss: 0.7856 - val_mse: 0.7856
Epoch 10/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7600 -
mse: 0.7600 - val_loss: 0.7726 - val_mse: 0.7726
Epoch 11/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7565 -
mse: 0.7565 - val_loss: 0.7683 - val_mse: 0.7683
Epoch 12/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7523 -
mse: 0.7523 - val_loss: 0.7760 - val_mse: 0.7760
Epoch 13/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7497 -
mse: 0.7497 - val_loss: 0.7569 - val_mse: 0.7569
Epoch 14/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7467 -
mse: 0.7467 - val_loss: 0.7549 - val_mse: 0.7549
Epoch 15/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7447 -
mse: 0.7447 - val_loss: 0.7595 - val_mse: 0.7595
Epoch 16/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7421 -
mse: 0.7421 - val_loss: 0.7610 - val_mse: 0.7610
Epoch 17/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7393 -
mse: 0.7393 - val_loss: 0.7439 - val_mse: 0.7439
Epoch 18/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7380 -
mse: 0.7380 - val_loss: 0.7444 - val_mse: 0.7444
Epoch 19/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7354 -
mse: 0.7354 - val_loss: 0.7416 - val_mse: 0.7416
Epoch 20/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7337 -

```

```

mse: 0.7337 - val_loss: 0.7420 - val_mse: 0.7420
Epoch 21/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7320 -
mse: 0.7320 - val_loss: 0.7407 - val_mse: 0.7407
Epoch 22/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7302 -
mse: 0.7302 - val_loss: 0.7423 - val_mse: 0.7423
Epoch 23/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7288 -
mse: 0.7288 - val_loss: 0.7471 - val_mse: 0.7471
Epoch 24/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7270 -
mse: 0.7270 - val_loss: 0.7441 - val_mse: 0.7441
Epoch 25/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7251 -
mse: 0.7251 - val_loss: 0.7399 - val_mse: 0.7399
Epoch 26/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7235 -
mse: 0.7235 - val_loss: 0.7552 - val_mse: 0.7552
Epoch 27/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7223 -
mse: 0.7223 - val_loss: 0.7367 - val_mse: 0.7367
Epoch 28/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7205 -
mse: 0.7205 - val_loss: 0.7350 - val_mse: 0.7350
Epoch 29/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7188 -
mse: 0.7188 - val_loss: 0.7404 - val_mse: 0.7404
Epoch 30/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7176 -
mse: 0.7176 - val_loss: 0.7400 - val_mse: 0.7400
Epoch 31/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7163 -
mse: 0.7163 - val_loss: 0.7353 - val_mse: 0.7353
Epoch 32/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7153 -
mse: 0.7153 - val_loss: 0.7455 - val_mse: 0.7455
Epoch 33/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7138 -
mse: 0.7138 - val_loss: 0.7343 - val_mse: 0.7343
Epoch 34/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7124 -
mse: 0.7124 - val_loss: 0.7291 - val_mse: 0.7291
Epoch 35/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7109 -
mse: 0.7109 - val_loss: 0.7308 - val_mse: 0.7308
Epoch 36/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7098 -

```

```

mse: 0.7098 - val_loss: 0.7291 - val_mse: 0.7291
Epoch 37/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7089 -
mse: 0.7089 - val_loss: 0.7340 - val_mse: 0.7340
Epoch 38/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7078 -
mse: 0.7078 - val_loss: 0.7385 - val_mse: 0.7385
Epoch 39/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7067 -
mse: 0.7067 - val_loss: 0.7251 - val_mse: 0.7251
Epoch 40/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7049 -
mse: 0.7049 - val_loss: 0.7295 - val_mse: 0.7295
Epoch 41/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7045 -
mse: 0.7045 - val_loss: 0.7360 - val_mse: 0.7360
Epoch 42/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7027 -
mse: 0.7027 - val_loss: 0.7334 - val_mse: 0.7334
Epoch 43/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7025 -
mse: 0.7025 - val_loss: 0.7275 - val_mse: 0.7275
Epoch 44/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7011 -
mse: 0.7011 - val_loss: 0.7365 - val_mse: 0.7365
Epoch 45/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6999 -
mse: 0.6999 - val_loss: 0.7237 - val_mse: 0.7237
Epoch 46/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6986 -
mse: 0.6986 - val_loss: 0.7257 - val_mse: 0.7257
Epoch 47/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6977 -
mse: 0.6977 - val_loss: 0.7281 - val_mse: 0.7281
Epoch 48/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6969 -
mse: 0.6969 - val_loss: 0.7309 - val_mse: 0.7309
Epoch 49/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6957 -
mse: 0.6957 - val_loss: 0.7332 - val_mse: 0.7332
Epoch 50/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6942 -
mse: 0.6942 - val_loss: 0.7333 - val_mse: 0.7333
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9211 -
mse: 0.9211 - val_loss: 0.7726 - val_mse: 0.7726

```

Epoch 2/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8277 -  
mse: 0.8277 - val\_loss: 0.7769 - val\_mse: 0.7769

Epoch 3/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8076 -  
mse: 0.8076 - val\_loss: 0.7755 - val\_mse: 0.7755

Epoch 4/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7911 -  
mse: 0.7911 - val\_loss: 0.7562 - val\_mse: 0.7562

Epoch 5/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7779 -  
mse: 0.7779 - val\_loss: 0.7546 - val\_mse: 0.7546

Epoch 6/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7659 -  
mse: 0.7659 - val\_loss: 0.7530 - val\_mse: 0.7530

Epoch 7/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7566 -  
mse: 0.7566 - val\_loss: 0.7496 - val\_mse: 0.7496

Epoch 8/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7486 -  
mse: 0.7486 - val\_loss: 0.7397 - val\_mse: 0.7397

Epoch 9/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7412 -  
mse: 0.7412 - val\_loss: 0.7464 - val\_mse: 0.7464

Epoch 10/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7357 -  
mse: 0.7357 - val\_loss: 0.7390 - val\_mse: 0.7390

Epoch 11/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7310 -  
mse: 0.7310 - val\_loss: 0.7244 - val\_mse: 0.7244

Epoch 12/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7265 -  
mse: 0.7265 - val\_loss: 0.7286 - val\_mse: 0.7286

Epoch 13/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7230 -  
mse: 0.7230 - val\_loss: 0.7244 - val\_mse: 0.7244

Epoch 14/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7201 -  
mse: 0.7201 - val\_loss: 0.7226 - val\_mse: 0.7226

Epoch 15/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7174 -  
mse: 0.7174 - val\_loss: 0.7117 - val\_mse: 0.7117

Epoch 16/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7144 -  
mse: 0.7144 - val\_loss: 0.7179 - val\_mse: 0.7179

Epoch 17/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7121 -  
mse: 0.7121 - val\_loss: 0.7265 - val\_mse: 0.7265

Epoch 18/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7096 -  
 mse: 0.7096 - val\_loss: 0.7238 - val\_mse: 0.7238  
 Epoch 19/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7083 -  
 mse: 0.7083 - val\_loss: 0.7103 - val\_mse: 0.7103  
 Epoch 20/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7061 -  
 mse: 0.7061 - val\_loss: 0.7311 - val\_mse: 0.7311  
 Epoch 21/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7036 -  
 mse: 0.7036 - val\_loss: 0.7192 - val\_mse: 0.7192  
 Epoch 22/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7023 -  
 mse: 0.7023 - val\_loss: 0.7039 - val\_mse: 0.7039  
 Epoch 23/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6993 -  
 mse: 0.6993 - val\_loss: 0.7134 - val\_mse: 0.7134  
 Epoch 24/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6978 -  
 mse: 0.6978 - val\_loss: 0.7108 - val\_mse: 0.7108  
 Epoch 25/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6963 -  
 mse: 0.6963 - val\_loss: 0.6982 - val\_mse: 0.6982  
 Epoch 26/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6944 -  
 mse: 0.6944 - val\_loss: 0.7018 - val\_mse: 0.7018  
 Epoch 27/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6929 -  
 mse: 0.6929 - val\_loss: 0.6987 - val\_mse: 0.6987  
 Epoch 28/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6907 -  
 mse: 0.6907 - val\_loss: 0.6995 - val\_mse: 0.6995  
 Epoch 29/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6893 -  
 mse: 0.6893 - val\_loss: 0.7078 - val\_mse: 0.7078  
 Epoch 30/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6880 -  
 mse: 0.6880 - val\_loss: 0.7014 - val\_mse: 0.7014  
 Epoch 31/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6860 -  
 mse: 0.6860 - val\_loss: 0.7126 - val\_mse: 0.7126  
 Epoch 32/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6847 -  
 mse: 0.6847 - val\_loss: 0.7108 - val\_mse: 0.7108  
 Epoch 33/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6834 -  
 mse: 0.6834 - val\_loss: 0.6930 - val\_mse: 0.6930

Epoch 34/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6820 -  
mse: 0.6820 - val\_loss: 0.6895 - val\_mse: 0.6895  
Epoch 35/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6806 -  
mse: 0.6806 - val\_loss: 0.6956 - val\_mse: 0.6956  
Epoch 36/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6793 -  
mse: 0.6793 - val\_loss: 0.6929 - val\_mse: 0.6929  
Epoch 37/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6783 -  
mse: 0.6783 - val\_loss: 0.6922 - val\_mse: 0.6922  
Epoch 38/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6771 -  
mse: 0.6771 - val\_loss: 0.7295 - val\_mse: 0.7295  
Epoch 39/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6757 -  
mse: 0.6757 - val\_loss: 0.7092 - val\_mse: 0.7092  
Epoch 40/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6746 -  
mse: 0.6746 - val\_loss: 0.7066 - val\_mse: 0.7066  
Epoch 41/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6736 -  
mse: 0.6736 - val\_loss: 0.6903 - val\_mse: 0.6903  
Epoch 42/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6724 -  
mse: 0.6724 - val\_loss: 0.6903 - val\_mse: 0.6903  
Epoch 43/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6719 -  
mse: 0.6719 - val\_loss: 0.6981 - val\_mse: 0.6981  
Epoch 44/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6704 -  
mse: 0.6704 - val\_loss: 0.6993 - val\_mse: 0.6993  
Epoch 45/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6691 -  
mse: 0.6691 - val\_loss: 0.6881 - val\_mse: 0.6881  
Epoch 46/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6685 -  
mse: 0.6685 - val\_loss: 0.6911 - val\_mse: 0.6911  
Epoch 47/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6672 -  
mse: 0.6672 - val\_loss: 0.6949 - val\_mse: 0.6949  
Epoch 48/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6663 -  
mse: 0.6663 - val\_loss: 0.6951 - val\_mse: 0.6951  
Epoch 49/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6652 -  
mse: 0.6652 - val\_loss: 0.6813 - val\_mse: 0.6813

Epoch 50/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6644 -  
mse: 0.6644 - val\_loss: 0.7024 - val\_mse: 0.7024  
Epoch 51/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6636 -  
mse: 0.6636 - val\_loss: 0.6877 - val\_mse: 0.6877  
Epoch 52/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6623 -  
mse: 0.6623 - val\_loss: 0.6840 - val\_mse: 0.6840  
Epoch 53/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6614 -  
mse: 0.6614 - val\_loss: 0.6936 - val\_mse: 0.6936  
Epoch 54/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6608 -  
mse: 0.6608 - val\_loss: 0.6809 - val\_mse: 0.6809  
Epoch 55/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6595 -  
mse: 0.6595 - val\_loss: 0.6787 - val\_mse: 0.6787  
Epoch 56/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6592 -  
mse: 0.6592 - val\_loss: 0.6904 - val\_mse: 0.6904  
Epoch 57/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6577 -  
mse: 0.6577 - val\_loss: 0.6830 - val\_mse: 0.6830  
Epoch 58/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6569 -  
mse: 0.6569 - val\_loss: 0.6879 - val\_mse: 0.6879  
Epoch 59/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6562 -  
mse: 0.6562 - val\_loss: 0.6816 - val\_mse: 0.6816  
Epoch 60/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6553 -  
mse: 0.6553 - val\_loss: 0.6894 - val\_mse: 0.6894  
Epoch 61/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6544 -  
mse: 0.6544 - val\_loss: 0.7008 - val\_mse: 0.7008  
Epoch 62/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6533 -  
mse: 0.6533 - val\_loss: 0.6951 - val\_mse: 0.6951  
Epoch 63/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6528 -  
mse: 0.6528 - val\_loss: 0.6806 - val\_mse: 0.6806  
Epoch 64/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6516 -  
mse: 0.6516 - val\_loss: 0.6797 - val\_mse: 0.6797  
Epoch 65/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6518 -  
mse: 0.6518 - val\_loss: 0.6871 - val\_mse: 0.6871



Epoch 66/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6505 -  
mse: 0.6505 - val\_loss: 0.6808 - val\_mse: 0.6808  
Epoch 67/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6497 -  
mse: 0.6497 - val\_loss: 0.6900 - val\_mse: 0.6900  
Epoch 68/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6490 -  
mse: 0.6490 - val\_loss: 0.6794 - val\_mse: 0.6794  
Epoch 69/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6482 -  
mse: 0.6482 - val\_loss: 0.6858 - val\_mse: 0.6858  
Epoch 70/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6470 -  
mse: 0.6470 - val\_loss: 0.6791 - val\_mse: 0.6791  
Epoch 71/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6467 -  
mse: 0.6467 - val\_loss: 0.6809 - val\_mse: 0.6809  
Epoch 72/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6462 -  
mse: 0.6462 - val\_loss: 0.7064 - val\_mse: 0.7064  
Epoch 73/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6456 -  
mse: 0.6456 - val\_loss: 0.6813 - val\_mse: 0.6813  
Epoch 74/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6446 -  
mse: 0.6446 - val\_loss: 0.6897 - val\_mse: 0.6897  
Epoch 75/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6433 -  
mse: 0.6433 - val\_loss: 0.6992 - val\_mse: 0.6992  
Epoch 76/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6430 -  
mse: 0.6430 - val\_loss: 0.6904 - val\_mse: 0.6904  
Epoch 77/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6430 -  
mse: 0.6430 - val\_loss: 0.6845 - val\_mse: 0.6845  
Epoch 78/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6417 -  
mse: 0.6417 - val\_loss: 0.6808 - val\_mse: 0.6808  
Epoch 79/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6409 -  
mse: 0.6409 - val\_loss: 0.6937 - val\_mse: 0.6937  
Epoch 80/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6401 -  
mse: 0.6401 - val\_loss: 0.6927 - val\_mse: 0.6927  
Epoch 81/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6397 -  
mse: 0.6397 - val\_loss: 0.6765 - val\_mse: 0.6765

Epoch 82/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6390 -  
 mse: 0.6390 - val\_loss: 0.6736 - val\_mse: 0.6736  
 Epoch 83/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6381 -  
 mse: 0.6381 - val\_loss: 0.6896 - val\_mse: 0.6896  
 Epoch 84/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6376 -  
 mse: 0.6376 - val\_loss: 0.6800 - val\_mse: 0.6800  
 Epoch 85/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6369 -  
 mse: 0.6369 - val\_loss: 0.6920 - val\_mse: 0.6920  
 Epoch 86/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6357 -  
 mse: 0.6357 - val\_loss: 0.6757 - val\_mse: 0.6757  
 Epoch 87/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6354 -  
 mse: 0.6354 - val\_loss: 0.6927 - val\_mse: 0.6927  
 Epoch 88/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6347 -  
 mse: 0.6347 - val\_loss: 0.6759 - val\_mse: 0.6759  
 Epoch 89/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6346 -  
 mse: 0.6346 - val\_loss: 0.6781 - val\_mse: 0.6781  
 Epoch 90/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6334 -  
 mse: 0.6334 - val\_loss: 0.6765 - val\_mse: 0.6765  
 Epoch 91/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6331 -  
 mse: 0.6331 - val\_loss: 0.6798 - val\_mse: 0.6798  
 Epoch 92/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6327 -  
 mse: 0.6327 - val\_loss: 0.6824 - val\_mse: 0.6824  
 Epoch 93/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6318 -  
 mse: 0.6318 - val\_loss: 0.6855 - val\_mse: 0.6855  
 Epoch 94/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6312 -  
 mse: 0.6312 - val\_loss: 0.6732 - val\_mse: 0.6732  
 Epoch 95/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6302 -  
 mse: 0.6302 - val\_loss: 0.6749 - val\_mse: 0.6749  
 Epoch 96/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6303 -  
 mse: 0.6303 - val\_loss: 0.6958 - val\_mse: 0.6958  
 Epoch 97/100  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6294 -  
 mse: 0.6294 - val\_loss: 0.6931 - val\_mse: 0.6931

Epoch 98/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6288 -  
mse: 0.6288 - val\_loss: 0.6772 - val\_mse: 0.6772  
Epoch 99/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6282 -  
mse: 0.6282 - val\_loss: 0.6865 - val\_mse: 0.6865  
Epoch 100/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6274 -  
mse: 0.6274 - val\_loss: 0.6987 - val\_mse: 0.6987  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7969 -  
mse: 0.7969 - val\_loss: 0.7710 - val\_mse: 0.7710  
Epoch 2/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7285 -  
mse: 0.7285 - val\_loss: 0.7637 - val\_mse: 0.7637  
Epoch 3/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7158 -  
mse: 0.7158 - val\_loss: 0.7610 - val\_mse: 0.7610  
Epoch 4/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7062 -  
mse: 0.7062 - val\_loss: 0.7527 - val\_mse: 0.7527  
Epoch 5/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6983 -  
mse: 0.6983 - val\_loss: 0.7538 - val\_mse: 0.7538  
Epoch 6/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6910 -  
mse: 0.6910 - val\_loss: 0.7513 - val\_mse: 0.7513  
Epoch 7/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6851 -  
mse: 0.6851 - val\_loss: 0.7456 - val\_mse: 0.7456  
Epoch 8/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6805 -  
mse: 0.6805 - val\_loss: 0.7442 - val\_mse: 0.7442  
Epoch 9/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6751 -  
mse: 0.6751 - val\_loss: 0.7408 - val\_mse: 0.7408  
Epoch 10/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6713 -  
mse: 0.6713 - val\_loss: 0.7436 - val\_mse: 0.7436  
Epoch 11/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6682 -  
mse: 0.6682 - val\_loss: 0.7457 - val\_mse: 0.7457  
Epoch 12/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6650 -  
mse: 0.6650 - val\_loss: 0.7360 - val\_mse: 0.7360  
Epoch 13/100

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6622 -
mse: 0.6622 - val_loss: 0.7338 - val_mse: 0.7338
Epoch 14/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6600 -
mse: 0.6600 - val_loss: 0.7369 - val_mse: 0.7369
Epoch 15/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6574 -
mse: 0.6574 - val_loss: 0.7540 - val_mse: 0.7540
Epoch 16/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6555 -
mse: 0.6555 - val_loss: 0.7332 - val_mse: 0.7332
Epoch 17/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6531 -
mse: 0.6531 - val_loss: 0.7283 - val_mse: 0.7283
Epoch 18/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6517 -
mse: 0.6517 - val_loss: 0.7297 - val_mse: 0.7297
Epoch 19/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6499 -
mse: 0.6499 - val_loss: 0.7274 - val_mse: 0.7274
Epoch 20/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6477 -
mse: 0.6477 - val_loss: 0.7238 - val_mse: 0.7238
Epoch 21/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6466 -
mse: 0.6466 - val_loss: 0.7357 - val_mse: 0.7357
Epoch 22/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6447 -
mse: 0.6447 - val_loss: 0.7170 - val_mse: 0.7170
Epoch 23/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6434 -
mse: 0.6434 - val_loss: 0.7163 - val_mse: 0.7163
Epoch 24/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6414 -
mse: 0.6414 - val_loss: 0.7093 - val_mse: 0.7093
Epoch 25/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6406 -
mse: 0.6406 - val_loss: 0.7189 - val_mse: 0.7189
Epoch 26/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6384 -
mse: 0.6384 - val_loss: 0.7106 - val_mse: 0.7106
Epoch 27/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6376 -
mse: 0.6376 - val_loss: 0.7125 - val_mse: 0.7125
Epoch 28/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6355 -
mse: 0.6355 - val_loss: 0.7054 - val_mse: 0.7054
Epoch 29/100

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6349 -
mse: 0.6349 - val_loss: 0.7153 - val_mse: 0.7153
Epoch 30/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6332 -
mse: 0.6332 - val_loss: 0.7037 - val_mse: 0.7037
Epoch 31/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6315 -
mse: 0.6315 - val_loss: 0.7047 - val_mse: 0.7047
Epoch 32/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6306 -
mse: 0.6306 - val_loss: 0.7043 - val_mse: 0.7043
Epoch 33/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6292 -
mse: 0.6292 - val_loss: 0.7044 - val_mse: 0.7044
Epoch 34/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6283 -
mse: 0.6283 - val_loss: 0.7045 - val_mse: 0.7045
Epoch 35/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6274 -
mse: 0.6274 - val_loss: 0.7178 - val_mse: 0.7178
Epoch 36/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6261 -
mse: 0.6261 - val_loss: 0.7041 - val_mse: 0.7041
Epoch 37/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6246 -
mse: 0.6246 - val_loss: 0.7107 - val_mse: 0.7107
Epoch 38/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6235 -
mse: 0.6235 - val_loss: 0.7021 - val_mse: 0.7021
Epoch 39/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6227 -
mse: 0.6227 - val_loss: 0.7018 - val_mse: 0.7018
Epoch 40/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6221 -
mse: 0.6221 - val_loss: 0.6998 - val_mse: 0.6998
Epoch 41/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6203 -
mse: 0.6203 - val_loss: 0.7051 - val_mse: 0.7051
Epoch 42/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6192 -
mse: 0.6192 - val_loss: 0.7060 - val_mse: 0.7060
Epoch 43/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6182 -
mse: 0.6182 - val_loss: 0.6966 - val_mse: 0.6966
Epoch 44/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6177 -
mse: 0.6177 - val_loss: 0.6942 - val_mse: 0.6942
Epoch 45/100

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6164 -
mse: 0.6164 - val_loss: 0.7094 - val_mse: 0.7094
Epoch 46/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6161 -
mse: 0.6161 - val_loss: 0.7114 - val_mse: 0.7114
Epoch 47/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6143 -
mse: 0.6143 - val_loss: 0.6970 - val_mse: 0.6970
Epoch 48/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6136 -
mse: 0.6136 - val_loss: 0.7028 - val_mse: 0.7028
Epoch 49/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6133 -
mse: 0.6133 - val_loss: 0.6990 - val_mse: 0.6990
Epoch 50/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6115 -
mse: 0.6115 - val_loss: 0.6968 - val_mse: 0.6968
Epoch 51/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6113 -
mse: 0.6113 - val_loss: 0.6984 - val_mse: 0.6984
Epoch 52/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6101 -
mse: 0.6101 - val_loss: 0.6970 - val_mse: 0.6970
Epoch 53/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6095 -
mse: 0.6095 - val_loss: 0.6898 - val_mse: 0.6898
Epoch 54/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6089 -
mse: 0.6089 - val_loss: 0.6942 - val_mse: 0.6942
Epoch 55/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6081 -
mse: 0.6081 - val_loss: 0.6941 - val_mse: 0.6941
Epoch 56/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6072 -
mse: 0.6072 - val_loss: 0.6992 - val_mse: 0.6992
Epoch 57/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6065 -
mse: 0.6065 - val_loss: 0.6942 - val_mse: 0.6942
Epoch 58/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6058 -
mse: 0.6058 - val_loss: 0.6871 - val_mse: 0.6871
Epoch 59/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6047 -
mse: 0.6047 - val_loss: 0.6960 - val_mse: 0.6960
Epoch 60/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6039 -
mse: 0.6039 - val_loss: 0.6988 - val_mse: 0.6988
Epoch 61/100

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6034 -
mse: 0.6034 - val_loss: 0.6983 - val_mse: 0.6983
Epoch 62/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6031 -
mse: 0.6031 - val_loss: 0.6877 - val_mse: 0.6877
Epoch 63/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6024 -
mse: 0.6024 - val_loss: 0.6888 - val_mse: 0.6888
Epoch 64/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6013 -
mse: 0.6013 - val_loss: 0.6913 - val_mse: 0.6913
Epoch 65/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6005 -
mse: 0.6005 - val_loss: 0.6838 - val_mse: 0.6838
Epoch 66/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6001 -
mse: 0.6001 - val_loss: 0.6885 - val_mse: 0.6885
Epoch 67/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5998 -
mse: 0.5998 - val_loss: 0.7007 - val_mse: 0.7007
Epoch 68/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5990 -
mse: 0.5990 - val_loss: 0.6995 - val_mse: 0.6995
Epoch 69/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5984 -
mse: 0.5984 - val_loss: 0.6984 - val_mse: 0.6984
Epoch 70/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5979 -
mse: 0.5979 - val_loss: 0.6876 - val_mse: 0.6876
Epoch 71/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5974 -
mse: 0.5974 - val_loss: 0.6829 - val_mse: 0.6829
Epoch 72/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5967 -
mse: 0.5967 - val_loss: 0.6959 - val_mse: 0.6959
Epoch 73/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5958 -
mse: 0.5958 - val_loss: 0.6791 - val_mse: 0.6791
Epoch 74/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5954 -
mse: 0.5954 - val_loss: 0.6891 - val_mse: 0.6891
Epoch 75/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5947 -
mse: 0.5947 - val_loss: 0.6787 - val_mse: 0.6787
Epoch 76/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5944 -
mse: 0.5944 - val_loss: 0.6825 - val_mse: 0.6825
Epoch 77/100

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.5934 -
mse: 0.5934 - val_loss: 0.6818 - val_mse: 0.6818
Epoch 78/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5930 -
mse: 0.5930 - val_loss: 0.6841 - val_mse: 0.6841
Epoch 79/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5928 -
mse: 0.5928 - val_loss: 0.6917 - val_mse: 0.6917
Epoch 80/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5919 -
mse: 0.5919 - val_loss: 0.6907 - val_mse: 0.6907
Epoch 81/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5918 -
mse: 0.5918 - val_loss: 0.6918 - val_mse: 0.6918
Epoch 82/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5910 -
mse: 0.5910 - val_loss: 0.6847 - val_mse: 0.6847
Epoch 83/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5910 -
mse: 0.5910 - val_loss: 0.6819 - val_mse: 0.6819
Epoch 84/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5900 -
mse: 0.5900 - val_loss: 0.6825 - val_mse: 0.6825
Epoch 85/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5897 -
mse: 0.5897 - val_loss: 0.6878 - val_mse: 0.6878
Epoch 86/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5888 -
mse: 0.5888 - val_loss: 0.6843 - val_mse: 0.6843
Epoch 87/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5891 -
mse: 0.5891 - val_loss: 0.6858 - val_mse: 0.6858
Epoch 88/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5883 -
mse: 0.5883 - val_loss: 0.6890 - val_mse: 0.6890
Epoch 89/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5875 -
mse: 0.5875 - val_loss: 0.6843 - val_mse: 0.6843
Epoch 90/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5873 -
mse: 0.5873 - val_loss: 0.6909 - val_mse: 0.6909
Epoch 91/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5870 -
mse: 0.5870 - val_loss: 0.6809 - val_mse: 0.6809
Epoch 92/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5862 -
mse: 0.5862 - val_loss: 0.6902 - val_mse: 0.6902
Epoch 93/100

```



```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.5861 -
mse: 0.5861 - val_loss: 0.6829 - val_mse: 0.6829
Epoch 94/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5855 -
mse: 0.5855 - val_loss: 0.6901 - val_mse: 0.6901
Epoch 95/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5849 -
mse: 0.5849 - val_loss: 0.6813 - val_mse: 0.6813
Epoch 96/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5843 -
mse: 0.5843 - val_loss: 0.6809 - val_mse: 0.6809
Epoch 97/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5844 -
mse: 0.5844 - val_loss: 0.6891 - val_mse: 0.6891
Epoch 98/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5839 -
mse: 0.5839 - val_loss: 0.6855 - val_mse: 0.6855
Epoch 99/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5834 -
mse: 0.5834 - val_loss: 0.6861 - val_mse: 0.6861
Epoch 100/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5830 -
mse: 0.5830 - val_loss: 0.6937 - val_mse: 0.6937
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9243 -
mse: 0.9243 - val_loss: 0.8163 - val_mse: 0.8163
Epoch 2/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8368 -
mse: 0.8368 - val_loss: 0.8155 - val_mse: 0.8155
Epoch 3/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8183 -
mse: 0.8183 - val_loss: 0.8325 - val_mse: 0.8325
Epoch 4/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8047 -
mse: 0.8047 - val_loss: 0.8285 - val_mse: 0.8285
Epoch 5/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7933 -
mse: 0.7934 - val_loss: 0.8172 - val_mse: 0.8172
Epoch 6/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7844 -
mse: 0.7844 - val_loss: 0.7982 - val_mse: 0.7982
Epoch 7/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7760 -
mse: 0.7760 - val_loss: 0.8021 - val_mse: 0.8021
Epoch 8/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7703 -

```

```

mse: 0.7703 - val_loss: 0.7832 - val_mse: 0.7832
Epoch 9/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7654 -
mse: 0.7654 - val_loss: 0.7799 - val_mse: 0.7799
Epoch 10/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7608 -
mse: 0.7608 - val_loss: 0.7751 - val_mse: 0.7751
Epoch 11/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7571 -
mse: 0.7571 - val_loss: 0.7739 - val_mse: 0.7739
Epoch 12/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7539 -
mse: 0.7539 - val_loss: 0.7621 - val_mse: 0.7621
Epoch 13/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7508 -
mse: 0.7508 - val_loss: 0.7636 - val_mse: 0.7636
Epoch 14/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7487 -
mse: 0.7487 - val_loss: 0.7550 - val_mse: 0.7550
Epoch 15/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7456 -
mse: 0.7456 - val_loss: 0.7591 - val_mse: 0.7591
Epoch 16/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7437 -
mse: 0.7437 - val_loss: 0.7583 - val_mse: 0.7583
Epoch 17/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7419 -
mse: 0.7419 - val_loss: 0.7537 - val_mse: 0.7537
Epoch 18/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7390 -
mse: 0.7390 - val_loss: 0.7519 - val_mse: 0.7519
Epoch 19/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7373 -
mse: 0.7373 - val_loss: 0.7516 - val_mse: 0.7516
Epoch 20/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7355 -
mse: 0.7355 - val_loss: 0.7659 - val_mse: 0.7659
Epoch 21/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7336 -
mse: 0.7336 - val_loss: 0.7643 - val_mse: 0.7643
Epoch 22/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7323 -
mse: 0.7323 - val_loss: 0.7482 - val_mse: 0.7482
Epoch 23/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7302 -
mse: 0.7302 - val_loss: 0.7547 - val_mse: 0.7547
Epoch 24/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7295 -

```

```

mse: 0.7295 - val_loss: 0.7470 - val_mse: 0.7470
Epoch 25/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7273 -
mse: 0.7273 - val_loss: 0.7473 - val_mse: 0.7473
Epoch 26/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7260 -
mse: 0.7260 - val_loss: 0.7493 - val_mse: 0.7493
Epoch 27/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7250 -
mse: 0.7250 - val_loss: 0.7488 - val_mse: 0.7488
Epoch 28/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7228 -
mse: 0.7228 - val_loss: 0.7521 - val_mse: 0.7521
Epoch 29/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7215 -
mse: 0.7215 - val_loss: 0.7470 - val_mse: 0.7470
Epoch 30/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7198 -
mse: 0.7198 - val_loss: 0.7444 - val_mse: 0.7444
Epoch 31/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7189 -
mse: 0.7189 - val_loss: 0.7437 - val_mse: 0.7437
Epoch 32/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7174 -
mse: 0.7174 - val_loss: 0.7479 - val_mse: 0.7479
Epoch 33/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7157 -
mse: 0.7157 - val_loss: 0.7483 - val_mse: 0.7483
Epoch 34/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7149 -
mse: 0.7149 - val_loss: 0.7421 - val_mse: 0.7421
Epoch 35/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7128 -
mse: 0.7128 - val_loss: 0.7421 - val_mse: 0.7421
Epoch 36/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7120 -
mse: 0.7120 - val_loss: 0.7459 - val_mse: 0.7459
Epoch 37/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7107 -
mse: 0.7107 - val_loss: 0.7503 - val_mse: 0.7503
Epoch 38/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7101 -
mse: 0.7101 - val_loss: 0.7469 - val_mse: 0.7469
Epoch 39/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7082 -
mse: 0.7082 - val_loss: 0.7531 - val_mse: 0.7531
Epoch 40/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7073 -

```

```

mse: 0.7073 - val_loss: 0.7487 - val_mse: 0.7487
Epoch 41/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7062 -
mse: 0.7062 - val_loss: 0.7460 - val_mse: 0.7460
Epoch 42/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7050 -
mse: 0.7050 - val_loss: 0.7555 - val_mse: 0.7555
Epoch 43/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7038 -
mse: 0.7038 - val_loss: 0.7420 - val_mse: 0.7420
Epoch 44/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7028 -
mse: 0.7028 - val_loss: 0.7490 - val_mse: 0.7490
Epoch 45/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7024 -
mse: 0.7024 - val_loss: 0.7533 - val_mse: 0.7533
Epoch 46/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7009 -
mse: 0.7009 - val_loss: 0.7581 - val_mse: 0.7581
Epoch 47/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7001 -
mse: 0.7001 - val_loss: 0.7503 - val_mse: 0.7503
Epoch 48/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6988 -
mse: 0.6988 - val_loss: 0.7581 - val_mse: 0.7581
Epoch 49/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6978 -
mse: 0.6978 - val_loss: 0.7501 - val_mse: 0.7501
Epoch 50/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6975 -
mse: 0.6975 - val_loss: 0.7534 - val_mse: 0.7534
Epoch 51/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6961 -
mse: 0.6961 - val_loss: 0.7505 - val_mse: 0.7505
Epoch 52/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6952 -
mse: 0.6952 - val_loss: 0.7547 - val_mse: 0.7547
Epoch 53/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6947 -
mse: 0.6947 - val_loss: 0.7567 - val_mse: 0.7567
Epoch 54/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6938 -
mse: 0.6938 - val_loss: 0.7575 - val_mse: 0.7575
Epoch 55/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6926 -
mse: 0.6926 - val_loss: 0.7580 - val_mse: 0.7580
Epoch 56/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6924 -

```

```

mse: 0.6924 - val_loss: 0.7578 - val_mse: 0.7578
Epoch 57/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6916 -
mse: 0.6916 - val_loss: 0.7623 - val_mse: 0.7623
Epoch 58/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6896 -
mse: 0.6896 - val_loss: 0.7649 - val_mse: 0.7649
Epoch 59/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6890 -
mse: 0.6890 - val_loss: 0.7530 - val_mse: 0.7530
Epoch 60/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6887 -
mse: 0.6887 - val_loss: 0.7683 - val_mse: 0.7683
Epoch 61/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6875 -
mse: 0.6875 - val_loss: 0.7612 - val_mse: 0.7612
Epoch 62/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6868 -
mse: 0.6868 - val_loss: 0.7597 - val_mse: 0.7597
Epoch 63/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6859 -
mse: 0.6859 - val_loss: 0.7567 - val_mse: 0.7567
Epoch 64/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6850 -
mse: 0.6850 - val_loss: 0.7684 - val_mse: 0.7684
Epoch 65/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6845 -
mse: 0.6845 - val_loss: 0.7595 - val_mse: 0.7595
Epoch 66/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6835 -
mse: 0.6835 - val_loss: 0.7550 - val_mse: 0.7550
Epoch 67/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6829 -
mse: 0.6829 - val_loss: 0.7652 - val_mse: 0.7652
Epoch 68/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6817 -
mse: 0.6817 - val_loss: 0.7689 - val_mse: 0.7689
Epoch 69/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6816 -
mse: 0.6816 - val_loss: 0.7672 - val_mse: 0.7672
Epoch 70/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6805 -
mse: 0.6805 - val_loss: 0.7602 - val_mse: 0.7602
Epoch 71/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6793 -
mse: 0.6793 - val_loss: 0.7618 - val_mse: 0.7618
Epoch 72/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6792 -

```

```

mse: 0.6792 - val_loss: 0.7727 - val_mse: 0.7727
Epoch 73/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6781 -
mse: 0.6781 - val_loss: 0.7618 - val_mse: 0.7618
Epoch 74/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6772 -
mse: 0.6772 - val_loss: 0.7694 - val_mse: 0.7694
Epoch 75/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6769 -
mse: 0.6769 - val_loss: 0.7678 - val_mse: 0.7678
Epoch 76/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6760 -
mse: 0.6760 - val_loss: 0.7667 - val_mse: 0.7667
Epoch 77/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6749 -
mse: 0.6749 - val_loss: 0.7748 - val_mse: 0.7748
Epoch 78/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6742 -
mse: 0.6742 - val_loss: 0.7798 - val_mse: 0.7798
Epoch 79/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6736 -
mse: 0.6736 - val_loss: 0.7811 - val_mse: 0.7811
Epoch 80/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6733 -
mse: 0.6733 - val_loss: 0.7677 - val_mse: 0.7677
Epoch 81/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6719 -
mse: 0.6719 - val_loss: 0.7719 - val_mse: 0.7719
Epoch 82/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6719 -
mse: 0.6719 - val_loss: 0.7730 - val_mse: 0.7730
Epoch 83/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6707 -
mse: 0.6707 - val_loss: 0.7787 - val_mse: 0.7787
Epoch 84/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6703 -
mse: 0.6703 - val_loss: 0.7689 - val_mse: 0.7689
Epoch 85/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6694 -
mse: 0.6694 - val_loss: 0.7770 - val_mse: 0.7770
Epoch 86/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6688 -
mse: 0.6688 - val_loss: 0.7649 - val_mse: 0.7649
Epoch 87/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6679 -
mse: 0.6679 - val_loss: 0.7708 - val_mse: 0.7708
Epoch 88/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6676 -

```

```

mse: 0.6676 - val_loss: 0.7692 - val_mse: 0.7692
Epoch 89/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6665 -
mse: 0.6665 - val_loss: 0.7688 - val_mse: 0.7688
Epoch 90/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6657 -
mse: 0.6657 - val_loss: 0.7700 - val_mse: 0.7700
Epoch 91/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6651 -
mse: 0.6651 - val_loss: 0.7858 - val_mse: 0.7858
Epoch 92/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6650 -
mse: 0.6650 - val_loss: 0.7775 - val_mse: 0.7775
Epoch 93/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6645 -
mse: 0.6645 - val_loss: 0.7717 - val_mse: 0.7717
Epoch 94/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6636 -
mse: 0.6636 - val_loss: 0.7893 - val_mse: 0.7893
Epoch 95/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6630 -
mse: 0.6630 - val_loss: 0.7736 - val_mse: 0.7736
Epoch 96/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6621 -
mse: 0.6621 - val_loss: 0.7791 - val_mse: 0.7791
Epoch 97/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6613 -
mse: 0.6613 - val_loss: 0.7924 - val_mse: 0.7924
Epoch 98/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6611 -
mse: 0.6611 - val_loss: 0.7887 - val_mse: 0.7887
Epoch 99/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6603 -
mse: 0.6603 - val_loss: 0.7850 - val_mse: 0.7850
Epoch 100/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6595 -
mse: 0.6595 - val_loss: 0.7779 - val_mse: 0.7779
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9059 -
mse: 0.9059 - val_loss: 0.7783 - val_mse: 0.7783
Epoch 2/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8255 -
mse: 0.8255 - val_loss: 0.7617 - val_mse: 0.7617
Epoch 3/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8060 -
mse: 0.8060 - val_loss: 0.7742 - val_mse: 0.7742

```

Epoch 4/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7914 -  
mse: 0.7914 - val\_loss: 0.7606 - val\_mse: 0.7606  
Epoch 5/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7797 -  
mse: 0.7797 - val\_loss: 0.7567 - val\_mse: 0.7567  
Epoch 6/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7687 -  
mse: 0.7687 - val\_loss: 0.7498 - val\_mse: 0.7498  
Epoch 7/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7598 -  
mse: 0.7598 - val\_loss: 0.7566 - val\_mse: 0.7566  
Epoch 8/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7511 -  
mse: 0.7511 - val\_loss: 0.7514 - val\_mse: 0.7514  
Epoch 9/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7449 -  
mse: 0.7449 - val\_loss: 0.7474 - val\_mse: 0.7474  
Epoch 10/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7392 -  
mse: 0.7392 - val\_loss: 0.7331 - val\_mse: 0.7331  
Epoch 11/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7340 -  
mse: 0.7340 - val\_loss: 0.7309 - val\_mse: 0.7309  
Epoch 12/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7298 -  
mse: 0.7298 - val\_loss: 0.7281 - val\_mse: 0.7281  
Epoch 13/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7262 -  
mse: 0.7262 - val\_loss: 0.7259 - val\_mse: 0.7259  
Epoch 14/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7229 -  
mse: 0.7229 - val\_loss: 0.7608 - val\_mse: 0.7608  
Epoch 15/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7197 -  
mse: 0.7197 - val\_loss: 0.7172 - val\_mse: 0.7172  
Epoch 16/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7175 -  
mse: 0.7175 - val\_loss: 0.7200 - val\_mse: 0.7200  
Epoch 17/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7146 -  
mse: 0.7146 - val\_loss: 0.7143 - val\_mse: 0.7143  
Epoch 18/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7119 -  
mse: 0.7119 - val\_loss: 0.7094 - val\_mse: 0.7094  
Epoch 19/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7101 -  
mse: 0.7101 - val\_loss: 0.7111 - val\_mse: 0.7111



Epoch 20/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7079 -  
mse: 0.7079 - val\_loss: 0.7046 - val\_mse: 0.7046

Epoch 21/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7052 -  
mse: 0.7052 - val\_loss: 0.7149 - val\_mse: 0.7149

Epoch 22/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7039 -  
mse: 0.7039 - val\_loss: 0.7058 - val\_mse: 0.7058

Epoch 23/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7012 -  
mse: 0.7012 - val\_loss: 0.7033 - val\_mse: 0.7033

Epoch 24/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7003 -  
mse: 0.7003 - val\_loss: 0.7105 - val\_mse: 0.7105

Epoch 25/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6981 -  
mse: 0.6981 - val\_loss: 0.6989 - val\_mse: 0.6989

Epoch 26/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6964 -  
mse: 0.6964 - val\_loss: 0.7011 - val\_mse: 0.7011

Epoch 27/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6951 -  
mse: 0.6951 - val\_loss: 0.6976 - val\_mse: 0.6976

Epoch 28/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6925 -  
mse: 0.6925 - val\_loss: 0.6996 - val\_mse: 0.6996

Epoch 29/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6920 -  
mse: 0.6920 - val\_loss: 0.7123 - val\_mse: 0.7123

Epoch 30/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6899 -  
mse: 0.6899 - val\_loss: 0.6954 - val\_mse: 0.6954

Epoch 31/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6884 -  
mse: 0.6884 - val\_loss: 0.6953 - val\_mse: 0.6953

Epoch 32/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6867 -  
mse: 0.6867 - val\_loss: 0.7100 - val\_mse: 0.7100

Epoch 33/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6860 -  
mse: 0.6860 - val\_loss: 0.7132 - val\_mse: 0.7132

Epoch 34/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6840 -  
mse: 0.6840 - val\_loss: 0.6942 - val\_mse: 0.6942

Epoch 35/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6825 -  
mse: 0.6825 - val\_loss: 0.7046 - val\_mse: 0.7046

Epoch 36/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6814 -  
 mse: 0.6814 - val\_loss: 0.6921 - val\_mse: 0.6921

Epoch 37/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6800 -  
 mse: 0.6800 - val\_loss: 0.7030 - val\_mse: 0.7030

Epoch 38/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6784 -  
 mse: 0.6784 - val\_loss: 0.6886 - val\_mse: 0.6886

Epoch 39/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6773 -  
 mse: 0.6773 - val\_loss: 0.7057 - val\_mse: 0.7057

Epoch 40/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6763 -  
 mse: 0.6763 - val\_loss: 0.6866 - val\_mse: 0.6866

Epoch 41/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6756 -  
 mse: 0.6756 - val\_loss: 0.7004 - val\_mse: 0.7004

Epoch 42/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6735 -  
 mse: 0.6735 - val\_loss: 0.6921 - val\_mse: 0.6921

Epoch 43/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6723 -  
 mse: 0.6723 - val\_loss: 0.6903 - val\_mse: 0.6903

Epoch 44/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6718 -  
 mse: 0.6718 - val\_loss: 0.6862 - val\_mse: 0.6862

Epoch 45/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6704 -  
 mse: 0.6704 - val\_loss: 0.6855 - val\_mse: 0.6855

Epoch 46/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6692 -  
 mse: 0.6692 - val\_loss: 0.6938 - val\_mse: 0.6938

Epoch 47/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6683 -  
 mse: 0.6683 - val\_loss: 0.6820 - val\_mse: 0.6820

Epoch 48/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6673 -  
 mse: 0.6673 - val\_loss: 0.6838 - val\_mse: 0.6838

Epoch 49/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6657 -  
 mse: 0.6657 - val\_loss: 0.6825 - val\_mse: 0.6825

Epoch 50/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6649 -  
 mse: 0.6649 - val\_loss: 0.6848 - val\_mse: 0.6848

Epoch 51/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6639 -  
 mse: 0.6639 - val\_loss: 0.6852 - val\_mse: 0.6852

Epoch 52/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6631 -  
mse: 0.6631 - val\_loss: 0.6925 - val\_mse: 0.6925  
Epoch 53/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6621 -  
mse: 0.6621 - val\_loss: 0.6810 - val\_mse: 0.6810  
Epoch 54/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6606 -  
mse: 0.6606 - val\_loss: 0.6782 - val\_mse: 0.6782  
Epoch 55/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6598 -  
mse: 0.6598 - val\_loss: 0.6937 - val\_mse: 0.6937  
Epoch 56/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6592 -  
mse: 0.6592 - val\_loss: 0.7346 - val\_mse: 0.7346  
Epoch 57/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6582 -  
mse: 0.6582 - val\_loss: 0.6845 - val\_mse: 0.6845  
Epoch 58/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6573 -  
mse: 0.6573 - val\_loss: 0.6802 - val\_mse: 0.6802  
Epoch 59/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6558 -  
mse: 0.6558 - val\_loss: 0.6873 - val\_mse: 0.6873  
Epoch 60/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6553 -  
mse: 0.6553 - val\_loss: 0.6838 - val\_mse: 0.6838  
Epoch 61/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6547 -  
mse: 0.6547 - val\_loss: 0.6816 - val\_mse: 0.6816  
Epoch 62/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6536 -  
mse: 0.6536 - val\_loss: 0.6853 - val\_mse: 0.6853  
Epoch 63/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6530 -  
mse: 0.6530 - val\_loss: 0.6847 - val\_mse: 0.6847  
Epoch 64/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6519 -  
mse: 0.6519 - val\_loss: 0.6759 - val\_mse: 0.6759  
Epoch 65/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6517 -  
mse: 0.6517 - val\_loss: 0.6760 - val\_mse: 0.6760  
Epoch 66/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6502 -  
mse: 0.6502 - val\_loss: 0.6835 - val\_mse: 0.6835  
Epoch 67/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6496 -  
mse: 0.6496 - val\_loss: 0.6745 - val\_mse: 0.6745

Epoch 68/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6483 -  
mse: 0.6483 - val\_loss: 0.6747 - val\_mse: 0.6747  
Epoch 69/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6475 -  
mse: 0.6475 - val\_loss: 0.6753 - val\_mse: 0.6753  
Epoch 70/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6471 -  
mse: 0.6471 - val\_loss: 0.7129 - val\_mse: 0.7129  
Epoch 71/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6464 -  
mse: 0.6464 - val\_loss: 0.6773 - val\_mse: 0.6773  
Epoch 72/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6454 -  
mse: 0.6454 - val\_loss: 0.6715 - val\_mse: 0.6715  
Epoch 73/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6442 -  
mse: 0.6442 - val\_loss: 0.6791 - val\_mse: 0.6791  
Epoch 74/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6447 -  
mse: 0.6447 - val\_loss: 0.6763 - val\_mse: 0.6763  
Epoch 75/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6426 -  
mse: 0.6426 - val\_loss: 0.6703 - val\_mse: 0.6703  
Epoch 76/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6426 -  
mse: 0.6426 - val\_loss: 0.6899 - val\_mse: 0.6899  
Epoch 77/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6417 -  
mse: 0.6417 - val\_loss: 0.6782 - val\_mse: 0.6782  
Epoch 78/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6411 -  
mse: 0.6411 - val\_loss: 0.6816 - val\_mse: 0.6816  
Epoch 79/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6409 -  
mse: 0.6409 - val\_loss: 0.6744 - val\_mse: 0.6744  
Epoch 80/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6396 -  
mse: 0.6396 - val\_loss: 0.6815 - val\_mse: 0.6815  
Epoch 81/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6389 -  
mse: 0.6389 - val\_loss: 0.6822 - val\_mse: 0.6822  
Epoch 82/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6382 -  
mse: 0.6382 - val\_loss: 0.6745 - val\_mse: 0.6745  
Epoch 83/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6380 -  
mse: 0.6380 - val\_loss: 0.6898 - val\_mse: 0.6898

Epoch 84/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6377 -  
mse: 0.6377 - val\_loss: 0.6801 - val\_mse: 0.6801

Epoch 85/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6364 -  
mse: 0.6364 - val\_loss: 0.6722 - val\_mse: 0.6722

Epoch 86/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6357 -  
mse: 0.6357 - val\_loss: 0.6743 - val\_mse: 0.6743

Epoch 87/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6355 -  
mse: 0.6355 - val\_loss: 0.6656 - val\_mse: 0.6656

Epoch 88/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6346 -  
mse: 0.6346 - val\_loss: 0.6725 - val\_mse: 0.6725

Epoch 89/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6340 -  
mse: 0.6340 - val\_loss: 0.6779 - val\_mse: 0.6779

Epoch 90/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6330 -  
mse: 0.6330 - val\_loss: 0.6736 - val\_mse: 0.6736

Epoch 91/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6325 -  
mse: 0.6325 - val\_loss: 0.6686 - val\_mse: 0.6686

Epoch 92/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6320 -  
mse: 0.6320 - val\_loss: 0.6730 - val\_mse: 0.6730

Epoch 93/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6314 -  
mse: 0.6314 - val\_loss: 0.6725 - val\_mse: 0.6725

Epoch 94/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6306 -  
mse: 0.6306 - val\_loss: 0.6720 - val\_mse: 0.6720

Epoch 95/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6302 -  
mse: 0.6302 - val\_loss: 0.6748 - val\_mse: 0.6748

Epoch 96/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6299 -  
mse: 0.6299 - val\_loss: 0.6758 - val\_mse: 0.6758

Epoch 97/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6293 -  
mse: 0.6293 - val\_loss: 0.6708 - val\_mse: 0.6708

Epoch 98/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6286 -  
mse: 0.6286 - val\_loss: 0.6713 - val\_mse: 0.6713

Epoch 99/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6278 -  
mse: 0.6278 - val\_loss: 0.6690 - val\_mse: 0.6690

Epoch 100/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6272 -  
mse: 0.6272 - val\_loss: 0.6821 - val\_mse: 0.6821  
Epoch 101/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6269 -  
mse: 0.6269 - val\_loss: 0.6574 - val\_mse: 0.6574  
Epoch 102/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6262 -  
mse: 0.6262 - val\_loss: 0.6780 - val\_mse: 0.6780  
Epoch 103/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6256 -  
mse: 0.6256 - val\_loss: 0.6736 - val\_mse: 0.6736  
Epoch 104/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6257 -  
mse: 0.6257 - val\_loss: 0.6826 - val\_mse: 0.6826  
Epoch 105/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6245 -  
mse: 0.6245 - val\_loss: 0.6772 - val\_mse: 0.6772  
Epoch 106/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6240 -  
mse: 0.6240 - val\_loss: 0.6706 - val\_mse: 0.6706  
Epoch 107/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6237 -  
mse: 0.6237 - val\_loss: 0.6738 - val\_mse: 0.6738  
Epoch 108/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6231 -  
mse: 0.6231 - val\_loss: 0.6557 - val\_mse: 0.6557  
Epoch 109/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6226 -  
mse: 0.6226 - val\_loss: 0.6700 - val\_mse: 0.6700  
Epoch 110/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6224 -  
mse: 0.6224 - val\_loss: 0.6592 - val\_mse: 0.6592  
Epoch 111/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6216 -  
mse: 0.6216 - val\_loss: 0.6576 - val\_mse: 0.6576  
Epoch 112/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6213 -  
mse: 0.6213 - val\_loss: 0.6655 - val\_mse: 0.6655  
Epoch 113/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6208 -  
mse: 0.6208 - val\_loss: 0.6716 - val\_mse: 0.6716  
Epoch 114/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6205 -  
mse: 0.6205 - val\_loss: 0.6615 - val\_mse: 0.6615  
Epoch 115/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6203 -  
mse: 0.6203 - val\_loss: 0.6662 - val\_mse: 0.6662

Epoch 116/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6196 -  
mse: 0.6196 - val\_loss: 0.6687 - val\_mse: 0.6687  
Epoch 117/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6186 -  
mse: 0.6186 - val\_loss: 0.6705 - val\_mse: 0.6705  
Epoch 118/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6183 -  
mse: 0.6183 - val\_loss: 0.6640 - val\_mse: 0.6640  
Epoch 119/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6181 -  
mse: 0.6181 - val\_loss: 0.6652 - val\_mse: 0.6652  
Epoch 120/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6171 -  
mse: 0.6171 - val\_loss: 0.6571 - val\_mse: 0.6571  
Epoch 121/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6169 -  
mse: 0.6169 - val\_loss: 0.6630 - val\_mse: 0.6630  
Epoch 122/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6166 -  
mse: 0.6166 - val\_loss: 0.6705 - val\_mse: 0.6705  
Epoch 123/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6158 -  
mse: 0.6158 - val\_loss: 0.6685 - val\_mse: 0.6685  
Epoch 124/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6159 -  
mse: 0.6159 - val\_loss: 0.6534 - val\_mse: 0.6534  
Epoch 125/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6152 -  
mse: 0.6152 - val\_loss: 0.6651 - val\_mse: 0.6651  
Epoch 126/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6150 -  
mse: 0.6150 - val\_loss: 0.6679 - val\_mse: 0.6679  
Epoch 127/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6146 -  
mse: 0.6146 - val\_loss: 0.6541 - val\_mse: 0.6541  
Epoch 128/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6143 -  
mse: 0.6143 - val\_loss: 0.6817 - val\_mse: 0.6817  
Epoch 129/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6142 -  
mse: 0.6142 - val\_loss: 0.6943 - val\_mse: 0.6943  
Epoch 130/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6127 -  
mse: 0.6127 - val\_loss: 0.6710 - val\_mse: 0.6710  
Epoch 131/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6129 -  
mse: 0.6129 - val\_loss: 0.6529 - val\_mse: 0.6529

Epoch 132/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6123 -  
mse: 0.6123 - val\_loss: 0.6773 - val\_mse: 0.6773  
Epoch 133/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6118 -  
mse: 0.6118 - val\_loss: 0.6666 - val\_mse: 0.6666  
Epoch 134/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6113 -  
mse: 0.6113 - val\_loss: 0.6580 - val\_mse: 0.6580  
Epoch 135/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6114 -  
mse: 0.6114 - val\_loss: 0.6689 - val\_mse: 0.6689  
Epoch 136/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6104 -  
mse: 0.6104 - val\_loss: 0.6585 - val\_mse: 0.6585  
Epoch 137/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6101 -  
mse: 0.6101 - val\_loss: 0.6651 - val\_mse: 0.6651  
Epoch 138/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6103 -  
mse: 0.6103 - val\_loss: 0.6589 - val\_mse: 0.6589  
Epoch 139/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6094 -  
mse: 0.6094 - val\_loss: 0.6621 - val\_mse: 0.6621  
Epoch 140/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6091 -  
mse: 0.6091 - val\_loss: 0.6663 - val\_mse: 0.6663  
Epoch 141/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6088 -  
mse: 0.6088 - val\_loss: 0.6774 - val\_mse: 0.6774  
Epoch 142/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6080 -  
mse: 0.6080 - val\_loss: 0.6566 - val\_mse: 0.6566  
Epoch 143/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6080 -  
mse: 0.6080 - val\_loss: 0.6581 - val\_mse: 0.6581  
Epoch 144/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6074 -  
mse: 0.6074 - val\_loss: 0.6557 - val\_mse: 0.6557  
Epoch 145/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6076 -  
mse: 0.6076 - val\_loss: 0.6547 - val\_mse: 0.6547  
Epoch 146/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6063 -  
mse: 0.6063 - val\_loss: 0.6624 - val\_mse: 0.6624  
Epoch 147/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6064 -  
mse: 0.6064 - val\_loss: 0.6558 - val\_mse: 0.6558



Epoch 148/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6062 -  
mse: 0.6062 - val\_loss: 0.6965 - val\_mse: 0.6965  
Epoch 149/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6059 -  
mse: 0.6059 - val\_loss: 0.6642 - val\_mse: 0.6642  
Epoch 150/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6054 -  
mse: 0.6054 - val\_loss: 0.6581 - val\_mse: 0.6581  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7929 -  
mse: 0.7929 - val\_loss: 0.7731 - val\_mse: 0.7731  
Epoch 2/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7282 -  
mse: 0.7282 - val\_loss: 0.7677 - val\_mse: 0.7677  
Epoch 3/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7153 -  
mse: 0.7153 - val\_loss: 0.7575 - val\_mse: 0.7575  
Epoch 4/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7056 -  
mse: 0.7056 - val\_loss: 0.7542 - val\_mse: 0.7542  
Epoch 5/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6972 -  
mse: 0.6972 - val\_loss: 0.7513 - val\_mse: 0.7513  
Epoch 6/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6896 -  
mse: 0.6896 - val\_loss: 0.7469 - val\_mse: 0.7469  
Epoch 7/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6833 -  
mse: 0.6833 - val\_loss: 0.7470 - val\_mse: 0.7470  
Epoch 8/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6779 -  
mse: 0.6779 - val\_loss: 0.7418 - val\_mse: 0.7418  
Epoch 9/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6729 -  
mse: 0.6729 - val\_loss: 0.7444 - val\_mse: 0.7444  
Epoch 10/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6689 -  
mse: 0.6689 - val\_loss: 0.7386 - val\_mse: 0.7386  
Epoch 11/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6651 -  
mse: 0.6651 - val\_loss: 0.7364 - val\_mse: 0.7364  
Epoch 12/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6619 -  
mse: 0.6619 - val\_loss: 0.7334 - val\_mse: 0.7334  
Epoch 13/150

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6588 -
mse: 0.6588 - val_loss: 0.7322 - val_mse: 0.7322
Epoch 14/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6565 -
mse: 0.6565 - val_loss: 0.7271 - val_mse: 0.7271
Epoch 15/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6544 -
mse: 0.6544 - val_loss: 0.7284 - val_mse: 0.7284
Epoch 16/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6514 -
mse: 0.6514 - val_loss: 0.7248 - val_mse: 0.7248
Epoch 17/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6501 -
mse: 0.6501 - val_loss: 0.7222 - val_mse: 0.7222
Epoch 18/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6479 -
mse: 0.6479 - val_loss: 0.7191 - val_mse: 0.7191
Epoch 19/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6466 -
mse: 0.6466 - val_loss: 0.7231 - val_mse: 0.7231
Epoch 20/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6442 -
mse: 0.6442 - val_loss: 0.7182 - val_mse: 0.7182
Epoch 21/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6432 -
mse: 0.6432 - val_loss: 0.7117 - val_mse: 0.7117
Epoch 22/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6414 -
mse: 0.6414 - val_loss: 0.7124 - val_mse: 0.7124
Epoch 23/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6397 -
mse: 0.6397 - val_loss: 0.7082 - val_mse: 0.7082
Epoch 24/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6381 -
mse: 0.6381 - val_loss: 0.7071 - val_mse: 0.7071
Epoch 25/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6369 -
mse: 0.6369 - val_loss: 0.7079 - val_mse: 0.7079
Epoch 26/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6353 -
mse: 0.6353 - val_loss: 0.7113 - val_mse: 0.7113
Epoch 27/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6342 -
mse: 0.6342 - val_loss: 0.7066 - val_mse: 0.7066
Epoch 28/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6330 -
mse: 0.6330 - val_loss: 0.7036 - val_mse: 0.7036
Epoch 29/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6318 -
mse: 0.6318 - val_loss: 0.7081 - val_mse: 0.7081
Epoch 30/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6304 -
mse: 0.6304 - val_loss: 0.7090 - val_mse: 0.7090
Epoch 31/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6290 -
mse: 0.6290 - val_loss: 0.7034 - val_mse: 0.7034
Epoch 32/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6277 -
mse: 0.6277 - val_loss: 0.6983 - val_mse: 0.6983
Epoch 33/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6263 -
mse: 0.6263 - val_loss: 0.7120 - val_mse: 0.7120
Epoch 34/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6255 -
mse: 0.6255 - val_loss: 0.6974 - val_mse: 0.6974
Epoch 35/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6236 -
mse: 0.6236 - val_loss: 0.7036 - val_mse: 0.7036
Epoch 36/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6235 -
mse: 0.6235 - val_loss: 0.6994 - val_mse: 0.6994
Epoch 37/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6222 -
mse: 0.6222 - val_loss: 0.6988 - val_mse: 0.6988
Epoch 38/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6206 -
mse: 0.6206 - val_loss: 0.6957 - val_mse: 0.6957
Epoch 39/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6200 -
mse: 0.6200 - val_loss: 0.7059 - val_mse: 0.7059
Epoch 40/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6189 -
mse: 0.6189 - val_loss: 0.6950 - val_mse: 0.6950
Epoch 41/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6180 -
mse: 0.6180 - val_loss: 0.6979 - val_mse: 0.6979
Epoch 42/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6165 -
mse: 0.6165 - val_loss: 0.7134 - val_mse: 0.7134
Epoch 43/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6161 -
mse: 0.6161 - val_loss: 0.7046 - val_mse: 0.7046
Epoch 44/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6152 -
mse: 0.6152 - val_loss: 0.6922 - val_mse: 0.6922
Epoch 45/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6143 -
mse: 0.6143 - val_loss: 0.6946 - val_mse: 0.6946
Epoch 46/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6131 -
mse: 0.6131 - val_loss: 0.6963 - val_mse: 0.6963
Epoch 47/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6123 -
mse: 0.6123 - val_loss: 0.6943 - val_mse: 0.6943
Epoch 48/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6115 -
mse: 0.6115 - val_loss: 0.6935 - val_mse: 0.6935
Epoch 49/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6103 -
mse: 0.6103 - val_loss: 0.6874 - val_mse: 0.6874
Epoch 50/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6100 -
mse: 0.6100 - val_loss: 0.6973 - val_mse: 0.6973
Epoch 51/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6086 -
mse: 0.6086 - val_loss: 0.6951 - val_mse: 0.6951
Epoch 52/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6082 -
mse: 0.6082 - val_loss: 0.6891 - val_mse: 0.6891
Epoch 53/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6077 -
mse: 0.6077 - val_loss: 0.6895 - val_mse: 0.6895
Epoch 54/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6068 -
mse: 0.6068 - val_loss: 0.6891 - val_mse: 0.6891
Epoch 55/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6058 -
mse: 0.6058 - val_loss: 0.6910 - val_mse: 0.6910
Epoch 56/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6049 -
mse: 0.6049 - val_loss: 0.6898 - val_mse: 0.6898
Epoch 57/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6045 -
mse: 0.6045 - val_loss: 0.6951 - val_mse: 0.6951
Epoch 58/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6036 -
mse: 0.6036 - val_loss: 0.6869 - val_mse: 0.6869
Epoch 59/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6031 -
mse: 0.6031 - val_loss: 0.6799 - val_mse: 0.6799
Epoch 60/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6020 -
mse: 0.6020 - val_loss: 0.6846 - val_mse: 0.6846
Epoch 61/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6022 -
mse: 0.6022 - val_loss: 0.6853 - val_mse: 0.6853
Epoch 62/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6007 -
mse: 0.6007 - val_loss: 0.6851 - val_mse: 0.6851
Epoch 63/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6007 -
mse: 0.6007 - val_loss: 0.6897 - val_mse: 0.6897
Epoch 64/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5992 -
mse: 0.5992 - val_loss: 0.6865 - val_mse: 0.6865
Epoch 65/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5991 -
mse: 0.5991 - val_loss: 0.6860 - val_mse: 0.6860
Epoch 66/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5991 -
mse: 0.5991 - val_loss: 0.6806 - val_mse: 0.6806
Epoch 67/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5976 -
mse: 0.5976 - val_loss: 0.6938 - val_mse: 0.6938
Epoch 68/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5969 -
mse: 0.5969 - val_loss: 0.6820 - val_mse: 0.6820
Epoch 69/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5962 -
mse: 0.5962 - val_loss: 0.6820 - val_mse: 0.6820
Epoch 70/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5957 -
mse: 0.5957 - val_loss: 0.6792 - val_mse: 0.6792
Epoch 71/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5953 -
mse: 0.5953 - val_loss: 0.6802 - val_mse: 0.6802
Epoch 72/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5948 -
mse: 0.5948 - val_loss: 0.6748 - val_mse: 0.6748
Epoch 73/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5942 -
mse: 0.5942 - val_loss: 0.6813 - val_mse: 0.6813
Epoch 74/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5935 -
mse: 0.5935 - val_loss: 0.7012 - val_mse: 0.7012
Epoch 75/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5930 -
mse: 0.5930 - val_loss: 0.6764 - val_mse: 0.6764
Epoch 76/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5924 -
mse: 0.5924 - val_loss: 0.6813 - val_mse: 0.6813
Epoch 77/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.5921 -
mse: 0.5921 - val_loss: 0.6779 - val_mse: 0.6779
Epoch 78/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5914 -
mse: 0.5914 - val_loss: 0.6795 - val_mse: 0.6795
Epoch 79/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5909 -
mse: 0.5909 - val_loss: 0.6749 - val_mse: 0.6749
Epoch 80/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5902 -
mse: 0.5902 - val_loss: 0.6806 - val_mse: 0.6806
Epoch 81/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5897 -
mse: 0.5897 - val_loss: 0.6782 - val_mse: 0.6782
Epoch 82/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5892 -
mse: 0.5892 - val_loss: 0.6750 - val_mse: 0.6750
Epoch 83/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5885 -
mse: 0.5885 - val_loss: 0.6763 - val_mse: 0.6763
Epoch 84/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5886 -
mse: 0.5886 - val_loss: 0.6822 - val_mse: 0.6822
Epoch 85/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5884 -
mse: 0.5884 - val_loss: 0.6741 - val_mse: 0.6741
Epoch 86/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5870 -
mse: 0.5870 - val_loss: 0.6814 - val_mse: 0.6814
Epoch 87/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5869 -
mse: 0.5869 - val_loss: 0.6818 - val_mse: 0.6818
Epoch 88/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5865 -
mse: 0.5865 - val_loss: 0.6713 - val_mse: 0.6713
Epoch 89/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5855 -
mse: 0.5855 - val_loss: 0.6794 - val_mse: 0.6794
Epoch 90/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5854 -
mse: 0.5854 - val_loss: 0.6795 - val_mse: 0.6795
Epoch 91/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5854 -
mse: 0.5854 - val_loss: 0.6809 - val_mse: 0.6809
Epoch 92/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5849 -
mse: 0.5849 - val_loss: 0.6803 - val_mse: 0.6803
Epoch 93/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.5836 -
mse: 0.5836 - val_loss: 0.6768 - val_mse: 0.6768
Epoch 94/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5837 -
mse: 0.5837 - val_loss: 0.6736 - val_mse: 0.6736
Epoch 95/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5830 -
mse: 0.5830 - val_loss: 0.6769 - val_mse: 0.6769
Epoch 96/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5830 -
mse: 0.5830 - val_loss: 0.6776 - val_mse: 0.6776
Epoch 97/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5821 -
mse: 0.5821 - val_loss: 0.6728 - val_mse: 0.6728
Epoch 98/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5818 -
mse: 0.5818 - val_loss: 0.6768 - val_mse: 0.6768
Epoch 99/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5815 -
mse: 0.5815 - val_loss: 0.6759 - val_mse: 0.6759
Epoch 100/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5812 -
mse: 0.5812 - val_loss: 0.6852 - val_mse: 0.6852
Epoch 101/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5806 -
mse: 0.5806 - val_loss: 0.6830 - val_mse: 0.6830
Epoch 102/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5799 -
mse: 0.5799 - val_loss: 0.6784 - val_mse: 0.6784
Epoch 103/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5794 -
mse: 0.5794 - val_loss: 0.6689 - val_mse: 0.6689
Epoch 104/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5788 -
mse: 0.5788 - val_loss: 0.6752 - val_mse: 0.6752
Epoch 105/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5788 -
mse: 0.5788 - val_loss: 0.6773 - val_mse: 0.6773
Epoch 106/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5784 -
mse: 0.5784 - val_loss: 0.6816 - val_mse: 0.6816
Epoch 107/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5775 -
mse: 0.5775 - val_loss: 0.6784 - val_mse: 0.6784
Epoch 108/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5782 -
mse: 0.5782 - val_loss: 0.6717 - val_mse: 0.6717
Epoch 109/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.5772 -
mse: 0.5772 - val_loss: 0.6836 - val_mse: 0.6836
Epoch 110/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5768 -
mse: 0.5768 - val_loss: 0.6758 - val_mse: 0.6758
Epoch 111/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5767 -
mse: 0.5767 - val_loss: 0.6740 - val_mse: 0.6740
Epoch 112/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5760 -
mse: 0.5760 - val_loss: 0.6760 - val_mse: 0.6760
Epoch 113/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5754 -
mse: 0.5754 - val_loss: 0.6695 - val_mse: 0.6695
Epoch 114/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5749 -
mse: 0.5749 - val_loss: 0.6703 - val_mse: 0.6703
Epoch 115/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5744 -
mse: 0.5744 - val_loss: 0.6739 - val_mse: 0.6739
Epoch 116/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5741 -
mse: 0.5741 - val_loss: 0.6715 - val_mse: 0.6715
Epoch 117/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5736 -
mse: 0.5736 - val_loss: 0.6724 - val_mse: 0.6724
Epoch 118/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5733 -
mse: 0.5733 - val_loss: 0.6680 - val_mse: 0.6680
Epoch 119/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5730 -
mse: 0.5730 - val_loss: 0.6709 - val_mse: 0.6709
Epoch 120/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5724 -
mse: 0.5724 - val_loss: 0.6650 - val_mse: 0.6650
Epoch 121/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5722 -
mse: 0.5722 - val_loss: 0.6766 - val_mse: 0.6766
Epoch 122/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5723 -
mse: 0.5723 - val_loss: 0.6774 - val_mse: 0.6774
Epoch 123/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5713 -
mse: 0.5713 - val_loss: 0.6726 - val_mse: 0.6726
Epoch 124/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5709 -
mse: 0.5709 - val_loss: 0.6707 - val_mse: 0.6707
Epoch 125/150

```



3353317/3353317 [=====] - 8s 2us/step - loss: 0.5705 -  
mse: 0.5705 - val\_loss: 0.6717 - val\_mse: 0.6717  
Epoch 126/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5704 -  
mse: 0.5704 - val\_loss: 0.6706 - val\_mse: 0.6706  
Epoch 127/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5696 -  
mse: 0.5696 - val\_loss: 0.6692 - val\_mse: 0.6692  
Epoch 128/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5696 -  
mse: 0.5696 - val\_loss: 0.6732 - val\_mse: 0.6732  
Epoch 129/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5692 -  
mse: 0.5692 - val\_loss: 0.6686 - val\_mse: 0.6686  
Epoch 130/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5684 -  
mse: 0.5684 - val\_loss: 0.6744 - val\_mse: 0.6744  
Epoch 131/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5680 -  
mse: 0.5680 - val\_loss: 0.6663 - val\_mse: 0.6663  
Epoch 132/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5678 -  
mse: 0.5678 - val\_loss: 0.6781 - val\_mse: 0.6781  
Epoch 133/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5677 -  
mse: 0.5677 - val\_loss: 0.6754 - val\_mse: 0.6754  
Epoch 134/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5669 -  
mse: 0.5669 - val\_loss: 0.6655 - val\_mse: 0.6655  
Epoch 135/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5668 -  
mse: 0.5668 - val\_loss: 0.6686 - val\_mse: 0.6686  
Epoch 136/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5661 -  
mse: 0.5661 - val\_loss: 0.6732 - val\_mse: 0.6732  
Epoch 137/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5661 -  
mse: 0.5661 - val\_loss: 0.6730 - val\_mse: 0.6730  
Epoch 138/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5653 -  
mse: 0.5653 - val\_loss: 0.6744 - val\_mse: 0.6744  
Epoch 139/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5650 -  
mse: 0.5650 - val\_loss: 0.6663 - val\_mse: 0.6663  
Epoch 140/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5645 -  
mse: 0.5645 - val\_loss: 0.6686 - val\_mse: 0.6686  
Epoch 141/150

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.5648 -
mse: 0.5648 - val_loss: 0.6765 - val_mse: 0.6765
Epoch 142/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5641 -
mse: 0.5641 - val_loss: 0.6873 - val_mse: 0.6873
Epoch 143/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5636 -
mse: 0.5636 - val_loss: 0.6677 - val_mse: 0.6677
Epoch 144/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5633 -
mse: 0.5633 - val_loss: 0.6720 - val_mse: 0.6720
Epoch 145/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5628 -
mse: 0.5628 - val_loss: 0.6686 - val_mse: 0.6686
Epoch 146/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5625 -
mse: 0.5625 - val_loss: 0.6665 - val_mse: 0.6665
Epoch 147/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5624 -
mse: 0.5624 - val_loss: 0.6630 - val_mse: 0.6630
Epoch 148/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5624 -
mse: 0.5624 - val_loss: 0.6608 - val_mse: 0.6608
Epoch 149/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5617 -
mse: 0.5617 - val_loss: 0.6700 - val_mse: 0.6700
Epoch 150/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5612 -
mse: 0.5612 - val_loss: 0.6687 - val_mse: 0.6687
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9310 -
mse: 0.9310 - val_loss: 0.8140 - val_mse: 0.8140
Epoch 2/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8372 -
mse: 0.8372 - val_loss: 0.8349 - val_mse: 0.8349
Epoch 3/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8181 -
mse: 0.8181 - val_loss: 0.8316 - val_mse: 0.8316
Epoch 4/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8045 -
mse: 0.8045 - val_loss: 0.8743 - val_mse: 0.8743
Epoch 5/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7936 -
mse: 0.7936 - val_loss: 0.8116 - val_mse: 0.8116
Epoch 6/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7843 -

```

```

mse: 0.7843 - val_loss: 0.8001 - val_mse: 0.8001
Epoch 7/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7773 -
mse: 0.7773 - val_loss: 0.7916 - val_mse: 0.7916
Epoch 8/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7712 -
mse: 0.7712 - val_loss: 0.7920 - val_mse: 0.7920
Epoch 9/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7660 -
mse: 0.7660 - val_loss: 0.7826 - val_mse: 0.7826
Epoch 10/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7618 -
mse: 0.7618 - val_loss: 0.7844 - val_mse: 0.7844
Epoch 11/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7576 -
mse: 0.7576 - val_loss: 0.7828 - val_mse: 0.7828
Epoch 12/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7541 -
mse: 0.7541 - val_loss: 0.7627 - val_mse: 0.7627
Epoch 13/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7513 -
mse: 0.7513 - val_loss: 0.7739 - val_mse: 0.7739
Epoch 14/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7483 -
mse: 0.7483 - val_loss: 0.8007 - val_mse: 0.8007
Epoch 15/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7458 -
mse: 0.7458 - val_loss: 0.7585 - val_mse: 0.7585
Epoch 16/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7425 -
mse: 0.7425 - val_loss: 0.7661 - val_mse: 0.7661
Epoch 17/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7405 -
mse: 0.7405 - val_loss: 0.7483 - val_mse: 0.7483
Epoch 18/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7390 -
mse: 0.7390 - val_loss: 0.7601 - val_mse: 0.7601
Epoch 19/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7363 -
mse: 0.7363 - val_loss: 0.7473 - val_mse: 0.7473
Epoch 20/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7348 -
mse: 0.7348 - val_loss: 0.7670 - val_mse: 0.7670
Epoch 21/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7324 -
mse: 0.7324 - val_loss: 0.7649 - val_mse: 0.7649
Epoch 22/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7311 -

```

```

mse: 0.7311 - val_loss: 0.7474 - val_mse: 0.7474
Epoch 23/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7292 -
mse: 0.7292 - val_loss: 0.7432 - val_mse: 0.7432
Epoch 24/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7270 -
mse: 0.7270 - val_loss: 0.7451 - val_mse: 0.7451
Epoch 25/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7256 -
mse: 0.7256 - val_loss: 0.7476 - val_mse: 0.7476
Epoch 26/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7238 -
mse: 0.7238 - val_loss: 0.7463 - val_mse: 0.7463
Epoch 27/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7224 -
mse: 0.7224 - val_loss: 0.7380 - val_mse: 0.7380
Epoch 28/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7206 -
mse: 0.7206 - val_loss: 0.7351 - val_mse: 0.7351
Epoch 29/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7192 -
mse: 0.7192 - val_loss: 0.7412 - val_mse: 0.7412
Epoch 30/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7176 -
mse: 0.7176 - val_loss: 0.7417 - val_mse: 0.7417
Epoch 31/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7167 -
mse: 0.7167 - val_loss: 0.7331 - val_mse: 0.7331
Epoch 32/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7152 -
mse: 0.7152 - val_loss: 0.7337 - val_mse: 0.7337
Epoch 33/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7138 -
mse: 0.7138 - val_loss: 0.7368 - val_mse: 0.7368
Epoch 34/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7125 -
mse: 0.7125 - val_loss: 0.7419 - val_mse: 0.7419
Epoch 35/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7107 -
mse: 0.7107 - val_loss: 0.7341 - val_mse: 0.7341
Epoch 36/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7096 -
mse: 0.7096 - val_loss: 0.7315 - val_mse: 0.7315
Epoch 37/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7083 -
mse: 0.7083 - val_loss: 0.7330 - val_mse: 0.7330
Epoch 38/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7067 -

```

```

mse: 0.7067 - val_loss: 0.7389 - val_mse: 0.7389
Epoch 39/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7062 -
mse: 0.7062 - val_loss: 0.7331 - val_mse: 0.7331
Epoch 40/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7044 -
mse: 0.7044 - val_loss: 0.7329 - val_mse: 0.7329
Epoch 41/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7033 -
mse: 0.7033 - val_loss: 0.7311 - val_mse: 0.7311
Epoch 42/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7020 -
mse: 0.7020 - val_loss: 0.7316 - val_mse: 0.7316
Epoch 43/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7007 -
mse: 0.7007 - val_loss: 0.7292 - val_mse: 0.7292
Epoch 44/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6995 -
mse: 0.6995 - val_loss: 0.7364 - val_mse: 0.7364
Epoch 45/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6983 -
mse: 0.6983 - val_loss: 0.7330 - val_mse: 0.7330
Epoch 46/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6973 -
mse: 0.6973 - val_loss: 0.7337 - val_mse: 0.7337
Epoch 47/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6963 -
mse: 0.6963 - val_loss: 0.7306 - val_mse: 0.7306
Epoch 48/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6949 -
mse: 0.6949 - val_loss: 0.7373 - val_mse: 0.7373
Epoch 49/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6943 -
mse: 0.6943 - val_loss: 0.7298 - val_mse: 0.7298
Epoch 50/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6928 -
mse: 0.6928 - val_loss: 0.7316 - val_mse: 0.7316
Epoch 51/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6925 -
mse: 0.6925 - val_loss: 0.7323 - val_mse: 0.7323
Epoch 52/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6909 -
mse: 0.6909 - val_loss: 0.7285 - val_mse: 0.7285
Epoch 53/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6897 -
mse: 0.6897 - val_loss: 0.7330 - val_mse: 0.7330
Epoch 54/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6892 -

```

```

mse: 0.6892 - val_loss: 0.7362 - val_mse: 0.7362
Epoch 55/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6876 -
mse: 0.6876 - val_loss: 0.7270 - val_mse: 0.7270
Epoch 56/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6877 -
mse: 0.6877 - val_loss: 0.7330 - val_mse: 0.7330
Epoch 57/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6857 -
mse: 0.6857 - val_loss: 0.7265 - val_mse: 0.7265
Epoch 58/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6850 -
mse: 0.6850 - val_loss: 0.7326 - val_mse: 0.7326
Epoch 59/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6844 -
mse: 0.6844 - val_loss: 0.7355 - val_mse: 0.7355
Epoch 60/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6831 -
mse: 0.6831 - val_loss: 0.7339 - val_mse: 0.7339
Epoch 61/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6824 -
mse: 0.6824 - val_loss: 0.7320 - val_mse: 0.7320
Epoch 62/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6815 -
mse: 0.6815 - val_loss: 0.7337 - val_mse: 0.7337
Epoch 63/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6805 -
mse: 0.6805 - val_loss: 0.7328 - val_mse: 0.7328
Epoch 64/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6798 -
mse: 0.6798 - val_loss: 0.7376 - val_mse: 0.7376
Epoch 65/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6791 -
mse: 0.6791 - val_loss: 0.7341 - val_mse: 0.7341
Epoch 66/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6783 -
mse: 0.6783 - val_loss: 0.7349 - val_mse: 0.7349
Epoch 67/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6770 -
mse: 0.6770 - val_loss: 0.7341 - val_mse: 0.7341
Epoch 68/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6763 -
mse: 0.6763 - val_loss: 0.7277 - val_mse: 0.7277
Epoch 69/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6760 -
mse: 0.6760 - val_loss: 0.7342 - val_mse: 0.7342
Epoch 70/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6758 -

```

```

mse: 0.6758 - val_loss: 0.7351 - val_mse: 0.7351
Epoch 71/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6743 -
mse: 0.6743 - val_loss: 0.7348 - val_mse: 0.7348
Epoch 72/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6738 -
mse: 0.6738 - val_loss: 0.7356 - val_mse: 0.7356
Epoch 73/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6724 -
mse: 0.6724 - val_loss: 0.7321 - val_mse: 0.7321
Epoch 74/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6718 -
mse: 0.6718 - val_loss: 0.7325 - val_mse: 0.7325
Epoch 75/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6714 -
mse: 0.6714 - val_loss: 0.7389 - val_mse: 0.7389
Epoch 76/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6700 -
mse: 0.6700 - val_loss: 0.7367 - val_mse: 0.7367
Epoch 77/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6696 -
mse: 0.6696 - val_loss: 0.7348 - val_mse: 0.7348
Epoch 78/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6687 -
mse: 0.6687 - val_loss: 0.7357 - val_mse: 0.7357
Epoch 79/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6683 -
mse: 0.6683 - val_loss: 0.7296 - val_mse: 0.7296
Epoch 80/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6676 -
mse: 0.6676 - val_loss: 0.7353 - val_mse: 0.7353
Epoch 81/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6666 -
mse: 0.6666 - val_loss: 0.7419 - val_mse: 0.7419
Epoch 82/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6658 -
mse: 0.6658 - val_loss: 0.7367 - val_mse: 0.7367
Epoch 83/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6659 -
mse: 0.6659 - val_loss: 0.7398 - val_mse: 0.7398
Epoch 84/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6647 -
mse: 0.6647 - val_loss: 0.7401 - val_mse: 0.7401
Epoch 85/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6645 -
mse: 0.6645 - val_loss: 0.7371 - val_mse: 0.7371
Epoch 86/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6634 -

```

```

mse: 0.6634 - val_loss: 0.7349 - val_mse: 0.7349
Epoch 87/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6629 -
mse: 0.6629 - val_loss: 0.7490 - val_mse: 0.7490
Epoch 88/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6620 -
mse: 0.6620 - val_loss: 0.7379 - val_mse: 0.7379
Epoch 89/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6615 -
mse: 0.6615 - val_loss: 0.7388 - val_mse: 0.7388
Epoch 90/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6606 -
mse: 0.6606 - val_loss: 0.7265 - val_mse: 0.7265
Epoch 91/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6601 -
mse: 0.6601 - val_loss: 0.7531 - val_mse: 0.7531
Epoch 92/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6598 -
mse: 0.6598 - val_loss: 0.7365 - val_mse: 0.7365
Epoch 93/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6590 -
mse: 0.6590 - val_loss: 0.7340 - val_mse: 0.7340
Epoch 94/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6579 -
mse: 0.6579 - val_loss: 0.7362 - val_mse: 0.7362
Epoch 95/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6577 -
mse: 0.6577 - val_loss: 0.7430 - val_mse: 0.7430
Epoch 96/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6567 -
mse: 0.6567 - val_loss: 0.7442 - val_mse: 0.7442
Epoch 97/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6565 -
mse: 0.6565 - val_loss: 0.7491 - val_mse: 0.7491
Epoch 98/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6561 -
mse: 0.6561 - val_loss: 0.7468 - val_mse: 0.7468
Epoch 99/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6552 -
mse: 0.6552 - val_loss: 0.7612 - val_mse: 0.7612
Epoch 100/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6550 -
mse: 0.6550 - val_loss: 0.7450 - val_mse: 0.7450
Epoch 101/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6539 -
mse: 0.6539 - val_loss: 0.7696 - val_mse: 0.7696
Epoch 102/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6534 -

```



```

mse: 0.6534 - val_loss: 0.7487 - val_mse: 0.7487
Epoch 103/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6529 -
mse: 0.6529 - val_loss: 0.7339 - val_mse: 0.7339
Epoch 104/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6520 -
mse: 0.6520 - val_loss: 0.7560 - val_mse: 0.7560
Epoch 105/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6522 -
mse: 0.6522 - val_loss: 0.7418 - val_mse: 0.7418
Epoch 106/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6511 -
mse: 0.6511 - val_loss: 0.7650 - val_mse: 0.7650
Epoch 107/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6511 -
mse: 0.6511 - val_loss: 0.7394 - val_mse: 0.7394
Epoch 108/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6502 -
mse: 0.6502 - val_loss: 0.7366 - val_mse: 0.7366
Epoch 109/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6496 -
mse: 0.6496 - val_loss: 0.7584 - val_mse: 0.7584
Epoch 110/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6486 -
mse: 0.6486 - val_loss: 0.7553 - val_mse: 0.7553
Epoch 111/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6488 -
mse: 0.6488 - val_loss: 0.7933 - val_mse: 0.7933
Epoch 112/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6479 -
mse: 0.6479 - val_loss: 0.7420 - val_mse: 0.7420
Epoch 113/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6475 -
mse: 0.6475 - val_loss: 0.7576 - val_mse: 0.7576
Epoch 114/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6477 -
mse: 0.6477 - val_loss: 0.7574 - val_mse: 0.7574
Epoch 115/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6470 -
mse: 0.6470 - val_loss: 0.7730 - val_mse: 0.7730
Epoch 116/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6458 -
mse: 0.6458 - val_loss: 0.7362 - val_mse: 0.7362
Epoch 117/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6455 -
mse: 0.6455 - val_loss: 0.7796 - val_mse: 0.7796
Epoch 118/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6451 -

```

```

mse: 0.6451 - val_loss: 0.7658 - val_mse: 0.7658
Epoch 119/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6444 -
mse: 0.6444 - val_loss: 0.7456 - val_mse: 0.7456
Epoch 120/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6447 -
mse: 0.6447 - val_loss: 0.7876 - val_mse: 0.7876
Epoch 121/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6435 -
mse: 0.6435 - val_loss: 0.8176 - val_mse: 0.8176
Epoch 122/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6428 -
mse: 0.6428 - val_loss: 0.8108 - val_mse: 0.8108
Epoch 123/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6421 -
mse: 0.6421 - val_loss: 0.8320 - val_mse: 0.8320
Epoch 124/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6421 -
mse: 0.6421 - val_loss: 0.8434 - val_mse: 0.8434
Epoch 125/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6416 -
mse: 0.6416 - val_loss: 0.8091 - val_mse: 0.8091
Epoch 126/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6410 -
mse: 0.6410 - val_loss: 0.8827 - val_mse: 0.8827
Epoch 127/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6408 -
mse: 0.6408 - val_loss: 0.8028 - val_mse: 0.8028
Epoch 128/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6401 -
mse: 0.6401 - val_loss: 0.7954 - val_mse: 0.7954
Epoch 129/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6401 -
mse: 0.6401 - val_loss: 0.8271 - val_mse: 0.8271
Epoch 130/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6398 -
mse: 0.6398 - val_loss: 0.8914 - val_mse: 0.8914
Epoch 131/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6386 -
mse: 0.6386 - val_loss: 0.8500 - val_mse: 0.8500
Epoch 132/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6387 -
mse: 0.6387 - val_loss: 0.8789 - val_mse: 0.8789
Epoch 133/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6384 -
mse: 0.6384 - val_loss: 0.7978 - val_mse: 0.7978
Epoch 134/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6372 -

```

```

mse: 0.6372 - val_loss: 0.7995 - val_mse: 0.7995
Epoch 135/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6372 -
mse: 0.6372 - val_loss: 0.8462 - val_mse: 0.8462
Epoch 136/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6364 -
mse: 0.6364 - val_loss: 0.7984 - val_mse: 0.7984
Epoch 137/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6356 -
mse: 0.6356 - val_loss: 0.8506 - val_mse: 0.8506
Epoch 138/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6353 -
mse: 0.6353 - val_loss: 0.9568 - val_mse: 0.9568
Epoch 139/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6356 -
mse: 0.6356 - val_loss: 0.8579 - val_mse: 0.8579
Epoch 140/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6347 -
mse: 0.6347 - val_loss: 0.8988 - val_mse: 0.8988
Epoch 141/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6341 -
mse: 0.6341 - val_loss: 1.0043 - val_mse: 1.0043
Epoch 142/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6342 -
mse: 0.6342 - val_loss: 0.9113 - val_mse: 0.9113
Epoch 143/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6332 -
mse: 0.6332 - val_loss: 0.9696 - val_mse: 0.9696
Epoch 144/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6332 -
mse: 0.6332 - val_loss: 0.8809 - val_mse: 0.8809
Epoch 145/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6322 -
mse: 0.6322 - val_loss: 1.0698 - val_mse: 1.0698
Epoch 146/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6319 -
mse: 0.6319 - val_loss: 1.0112 - val_mse: 1.0112
Epoch 147/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6320 -
mse: 0.6320 - val_loss: 0.9231 - val_mse: 0.9231
Epoch 148/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6314 -
mse: 0.6314 - val_loss: 1.0451 - val_mse: 1.0451
Epoch 149/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6315 -
mse: 0.6315 - val_loss: 0.9380 - val_mse: 0.9380
Epoch 150/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6301 -

```

```

mse: 0.6301 - val_loss: 1.0189 - val_mse: 1.0189
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9030 -
mse: 0.9030 - val_loss: 0.7815 - val_mse: 0.7815
Epoch 2/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8251 -
mse: 0.8251 - val_loss: 0.7702 - val_mse: 0.7702
Epoch 3/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8056 -
mse: 0.8056 - val_loss: 0.7619 - val_mse: 0.7619
Epoch 4/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7906 -
mse: 0.7906 - val_loss: 0.7700 - val_mse: 0.7700
Epoch 5/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7772 -
mse: 0.7772 - val_loss: 0.7578 - val_mse: 0.7578
Epoch 6/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7658 -
mse: 0.7658 - val_loss: 0.7607 - val_mse: 0.7607
Epoch 7/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7563 -
mse: 0.7563 - val_loss: 0.7414 - val_mse: 0.7414
Epoch 8/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7495 -
mse: 0.7495 - val_loss: 0.7414 - val_mse: 0.7414
Epoch 9/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7429 -
mse: 0.7429 - val_loss: 0.7310 - val_mse: 0.7310
Epoch 10/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7379 -
mse: 0.7379 - val_loss: 0.7524 - val_mse: 0.7524
Epoch 11/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7342 -
mse: 0.7342 - val_loss: 0.7411 - val_mse: 0.7411
Epoch 12/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7301 -
mse: 0.7301 - val_loss: 0.7284 - val_mse: 0.7284
Epoch 13/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7267 -
mse: 0.7267 - val_loss: 0.7217 - val_mse: 0.7217
Epoch 14/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7234 -
mse: 0.7234 - val_loss: 0.7229 - val_mse: 0.7229
Epoch 15/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7207 -
mse: 0.7207 - val_loss: 0.7174 - val_mse: 0.7174

```

Epoch 16/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7182 -  
mse: 0.7182 - val\_loss: 0.7148 - val\_mse: 0.7148  
Epoch 17/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7154 -  
mse: 0.7154 - val\_loss: 0.7167 - val\_mse: 0.7167  
Epoch 18/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7130 -  
mse: 0.7130 - val\_loss: 0.7172 - val\_mse: 0.7172  
Epoch 19/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7109 -  
mse: 0.7109 - val\_loss: 0.7150 - val\_mse: 0.7150  
Epoch 20/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7092 -  
mse: 0.7092 - val\_loss: 0.7116 - val\_mse: 0.7116  
Epoch 21/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7070 -  
mse: 0.7070 - val\_loss: 0.7112 - val\_mse: 0.7112  
Epoch 22/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7053 -  
mse: 0.7053 - val\_loss: 0.7132 - val\_mse: 0.7132  
Epoch 23/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7036 -  
mse: 0.7036 - val\_loss: 0.7069 - val\_mse: 0.7069  
Epoch 24/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7016 -  
mse: 0.7016 - val\_loss: 0.7177 - val\_mse: 0.7177  
Epoch 25/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6990 -  
mse: 0.6990 - val\_loss: 0.7095 - val\_mse: 0.7095  
Epoch 26/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6980 -  
mse: 0.6980 - val\_loss: 0.7028 - val\_mse: 0.7028  
Epoch 27/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6964 -  
mse: 0.6964 - val\_loss: 0.7009 - val\_mse: 0.7009  
Epoch 28/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6945 -  
mse: 0.6945 - val\_loss: 0.6946 - val\_mse: 0.6946  
Epoch 29/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6937 -  
mse: 0.6937 - val\_loss: 0.7020 - val\_mse: 0.7020  
Epoch 30/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6912 -  
mse: 0.6912 - val\_loss: 0.6968 - val\_mse: 0.6968  
Epoch 31/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6904 -  
mse: 0.6904 - val\_loss: 0.7021 - val\_mse: 0.7021

Epoch 32/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6886 -  
mse: 0.6886 - val\_loss: 0.7127 - val\_mse: 0.7127  
Epoch 33/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6870 -  
mse: 0.6870 - val\_loss: 0.6946 - val\_mse: 0.6946  
Epoch 34/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6863 -  
mse: 0.6863 - val\_loss: 0.6903 - val\_mse: 0.6903  
Epoch 35/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6842 -  
mse: 0.6842 - val\_loss: 0.7015 - val\_mse: 0.7015  
Epoch 36/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6834 -  
mse: 0.6834 - val\_loss: 0.7002 - val\_mse: 0.7002  
Epoch 37/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6816 -  
mse: 0.6816 - val\_loss: 0.7013 - val\_mse: 0.7013  
Epoch 38/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6807 -  
mse: 0.6807 - val\_loss: 0.6952 - val\_mse: 0.6952  
Epoch 39/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6793 -  
mse: 0.6793 - val\_loss: 0.6899 - val\_mse: 0.6899  
Epoch 40/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6778 -  
mse: 0.6778 - val\_loss: 0.7018 - val\_mse: 0.7018  
Epoch 41/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6769 -  
mse: 0.6769 - val\_loss: 0.6816 - val\_mse: 0.6816  
Epoch 42/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6753 -  
mse: 0.6753 - val\_loss: 0.6984 - val\_mse: 0.6984  
Epoch 43/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6748 -  
mse: 0.6748 - val\_loss: 0.6877 - val\_mse: 0.6877  
Epoch 44/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6736 -  
mse: 0.6736 - val\_loss: 0.6830 - val\_mse: 0.6830  
Epoch 45/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6725 -  
mse: 0.6725 - val\_loss: 0.6832 - val\_mse: 0.6832  
Epoch 46/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6711 -  
mse: 0.6711 - val\_loss: 0.6824 - val\_mse: 0.6824  
Epoch 47/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6700 -  
mse: 0.6700 - val\_loss: 0.6796 - val\_mse: 0.6796

Epoch 48/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6692 -  
mse: 0.6692 - val\_loss: 0.6760 - val\_mse: 0.6760  
Epoch 49/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6678 -  
mse: 0.6678 - val\_loss: 0.6794 - val\_mse: 0.6794  
Epoch 50/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6670 -  
mse: 0.6670 - val\_loss: 0.6764 - val\_mse: 0.6764  
Epoch 51/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6659 -  
mse: 0.6659 - val\_loss: 0.6826 - val\_mse: 0.6826  
Epoch 52/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6647 -  
mse: 0.6647 - val\_loss: 0.6820 - val\_mse: 0.6820  
Epoch 53/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6638 -  
mse: 0.6638 - val\_loss: 0.6862 - val\_mse: 0.6862  
Epoch 54/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6630 -  
mse: 0.6630 - val\_loss: 0.6880 - val\_mse: 0.6880  
Epoch 55/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6619 -  
mse: 0.6619 - val\_loss: 0.6943 - val\_mse: 0.6943  
Epoch 56/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6607 -  
mse: 0.6607 - val\_loss: 0.6816 - val\_mse: 0.6816  
Epoch 57/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6606 -  
mse: 0.6606 - val\_loss: 0.6861 - val\_mse: 0.6861  
Epoch 58/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6587 -  
mse: 0.6587 - val\_loss: 0.6862 - val\_mse: 0.6862  
Epoch 59/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6575 -  
mse: 0.6575 - val\_loss: 0.6761 - val\_mse: 0.6761  
Epoch 60/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6578 -  
mse: 0.6578 - val\_loss: 0.6829 - val\_mse: 0.6829  
Epoch 61/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6558 -  
mse: 0.6558 - val\_loss: 0.6763 - val\_mse: 0.6763  
Epoch 62/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6550 -  
mse: 0.6550 - val\_loss: 0.6922 - val\_mse: 0.6922  
Epoch 63/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6543 -  
mse: 0.6543 - val\_loss: 0.6697 - val\_mse: 0.6697

Epoch 64/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6533 -  
mse: 0.6533 - val\_loss: 0.6827 - val\_mse: 0.6827  
Epoch 65/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6525 -  
mse: 0.6525 - val\_loss: 0.6708 - val\_mse: 0.6708  
Epoch 66/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6519 -  
mse: 0.6519 - val\_loss: 0.6701 - val\_mse: 0.6701  
Epoch 67/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6504 -  
mse: 0.6504 - val\_loss: 0.6830 - val\_mse: 0.6830  
Epoch 68/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6499 -  
mse: 0.6499 - val\_loss: 0.6769 - val\_mse: 0.6769  
Epoch 69/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6482 -  
mse: 0.6482 - val\_loss: 0.6764 - val\_mse: 0.6764  
Epoch 70/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6484 -  
mse: 0.6484 - val\_loss: 0.6765 - val\_mse: 0.6765  
Epoch 71/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6473 -  
mse: 0.6473 - val\_loss: 0.6700 - val\_mse: 0.6700  
Epoch 72/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6464 -  
mse: 0.6464 - val\_loss: 0.6716 - val\_mse: 0.6716  
Epoch 73/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6454 -  
mse: 0.6454 - val\_loss: 0.6713 - val\_mse: 0.6713  
Epoch 74/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6449 -  
mse: 0.6449 - val\_loss: 0.6681 - val\_mse: 0.6681  
Epoch 75/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6437 -  
mse: 0.6437 - val\_loss: 0.6742 - val\_mse: 0.6742  
Epoch 76/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6436 -  
mse: 0.6436 - val\_loss: 0.6799 - val\_mse: 0.6799  
Epoch 77/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6424 -  
mse: 0.6424 - val\_loss: 0.6774 - val\_mse: 0.6774  
Epoch 78/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6420 -  
mse: 0.6420 - val\_loss: 0.6794 - val\_mse: 0.6794  
Epoch 79/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6412 -  
mse: 0.6412 - val\_loss: 0.6696 - val\_mse: 0.6696



Epoch 80/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6401 -  
mse: 0.6401 - val\_loss: 0.6713 - val\_mse: 0.6713  
Epoch 81/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6396 -  
mse: 0.6396 - val\_loss: 0.6739 - val\_mse: 0.6739  
Epoch 82/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6385 -  
mse: 0.6385 - val\_loss: 0.6707 - val\_mse: 0.6707  
Epoch 83/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6379 -  
mse: 0.6379 - val\_loss: 0.6877 - val\_mse: 0.6877  
Epoch 84/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6371 -  
mse: 0.6371 - val\_loss: 0.6756 - val\_mse: 0.6756  
Epoch 85/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6372 -  
mse: 0.6372 - val\_loss: 0.6941 - val\_mse: 0.6941  
Epoch 86/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6363 -  
mse: 0.6363 - val\_loss: 0.6794 - val\_mse: 0.6794  
Epoch 87/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6353 -  
mse: 0.6353 - val\_loss: 0.6944 - val\_mse: 0.6944  
Epoch 88/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6344 -  
mse: 0.6344 - val\_loss: 0.6745 - val\_mse: 0.6745  
Epoch 89/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6344 -  
mse: 0.6344 - val\_loss: 0.6702 - val\_mse: 0.6702  
Epoch 90/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6332 -  
mse: 0.6332 - val\_loss: 0.6732 - val\_mse: 0.6732  
Epoch 91/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6332 -  
mse: 0.6332 - val\_loss: 0.6853 - val\_mse: 0.6853  
Epoch 92/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6323 -  
mse: 0.6323 - val\_loss: 0.6754 - val\_mse: 0.6754  
Epoch 93/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6313 -  
mse: 0.6313 - val\_loss: 0.6723 - val\_mse: 0.6723  
Epoch 94/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6312 -  
mse: 0.6312 - val\_loss: 0.6801 - val\_mse: 0.6801  
Epoch 95/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6306 -  
mse: 0.6306 - val\_loss: 0.6815 - val\_mse: 0.6815

Epoch 96/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6301 -  
mse: 0.6301 - val\_loss: 0.6763 - val\_mse: 0.6763  
Epoch 97/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6290 -  
mse: 0.6290 - val\_loss: 0.6716 - val\_mse: 0.6716  
Epoch 98/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6287 -  
mse: 0.6287 - val\_loss: 0.6803 - val\_mse: 0.6803  
Epoch 99/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6285 -  
mse: 0.6285 - val\_loss: 0.6725 - val\_mse: 0.6725  
Epoch 100/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6274 -  
mse: 0.6274 - val\_loss: 0.6732 - val\_mse: 0.6732  
Epoch 101/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6271 -  
mse: 0.6271 - val\_loss: 0.6803 - val\_mse: 0.6803  
Epoch 102/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6268 -  
mse: 0.6268 - val\_loss: 0.6760 - val\_mse: 0.6760  
Epoch 103/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6261 -  
mse: 0.6261 - val\_loss: 0.6777 - val\_mse: 0.6777  
Epoch 104/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6258 -  
mse: 0.6258 - val\_loss: 0.6793 - val\_mse: 0.6793  
Epoch 105/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6243 -  
mse: 0.6243 - val\_loss: 0.6808 - val\_mse: 0.6808  
Epoch 106/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6240 -  
mse: 0.6240 - val\_loss: 0.6828 - val\_mse: 0.6828  
Epoch 107/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6241 -  
mse: 0.6241 - val\_loss: 0.6789 - val\_mse: 0.6789  
Epoch 108/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6230 -  
mse: 0.6230 - val\_loss: 0.6846 - val\_mse: 0.6846  
Epoch 109/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6230 -  
mse: 0.6230 - val\_loss: 0.6752 - val\_mse: 0.6752  
Epoch 110/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6226 -  
mse: 0.6226 - val\_loss: 0.6710 - val\_mse: 0.6710  
Epoch 111/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6219 -  
mse: 0.6219 - val\_loss: 0.6865 - val\_mse: 0.6865

Epoch 112/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6213 -  
mse: 0.6213 - val\_loss: 0.6889 - val\_mse: 0.6889  
Epoch 113/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6209 -  
mse: 0.6209 - val\_loss: 0.6763 - val\_mse: 0.6763  
Epoch 114/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6200 -  
mse: 0.6200 - val\_loss: 0.6762 - val\_mse: 0.6762  
Epoch 115/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6197 -  
mse: 0.6197 - val\_loss: 0.6921 - val\_mse: 0.6921  
Epoch 116/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6196 -  
mse: 0.6196 - val\_loss: 0.6799 - val\_mse: 0.6799  
Epoch 117/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6188 -  
mse: 0.6188 - val\_loss: 0.6853 - val\_mse: 0.6853  
Epoch 118/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6192 -  
mse: 0.6192 - val\_loss: 0.6792 - val\_mse: 0.6792  
Epoch 119/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6180 -  
mse: 0.6180 - val\_loss: 0.6991 - val\_mse: 0.6991  
Epoch 120/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6173 -  
mse: 0.6173 - val\_loss: 0.6850 - val\_mse: 0.6850  
Epoch 121/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6173 -  
mse: 0.6173 - val\_loss: 0.6792 - val\_mse: 0.6792  
Epoch 122/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6167 -  
mse: 0.6167 - val\_loss: 0.6786 - val\_mse: 0.6786  
Epoch 123/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6159 -  
mse: 0.6159 - val\_loss: 0.6942 - val\_mse: 0.6942  
Epoch 124/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6158 -  
mse: 0.6158 - val\_loss: 0.6983 - val\_mse: 0.6983  
Epoch 125/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6151 -  
mse: 0.6151 - val\_loss: 0.7008 - val\_mse: 0.7008  
Epoch 126/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6146 -  
mse: 0.6146 - val\_loss: 0.6911 - val\_mse: 0.6911  
Epoch 127/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6141 -  
mse: 0.6141 - val\_loss: 0.6839 - val\_mse: 0.6839

Epoch 128/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6140 -  
mse: 0.6140 - val\_loss: 0.6750 - val\_mse: 0.6750  
Epoch 129/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6136 -  
mse: 0.6136 - val\_loss: 0.6887 - val\_mse: 0.6887  
Epoch 130/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6129 -  
mse: 0.6129 - val\_loss: 0.6885 - val\_mse: 0.6885  
Epoch 131/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6127 -  
mse: 0.6127 - val\_loss: 0.6866 - val\_mse: 0.6866  
Epoch 132/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6119 -  
mse: 0.6119 - val\_loss: 0.6906 - val\_mse: 0.6906  
Epoch 133/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6116 -  
mse: 0.6116 - val\_loss: 0.6752 - val\_mse: 0.6752  
Epoch 134/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6113 -  
mse: 0.6113 - val\_loss: 0.6811 - val\_mse: 0.6811  
Epoch 135/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6107 -  
mse: 0.6107 - val\_loss: 0.6927 - val\_mse: 0.6927  
Epoch 136/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6107 -  
mse: 0.6107 - val\_loss: 0.6863 - val\_mse: 0.6863  
Epoch 137/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6103 -  
mse: 0.6103 - val\_loss: 0.6856 - val\_mse: 0.6856  
Epoch 138/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6093 -  
mse: 0.6093 - val\_loss: 0.6944 - val\_mse: 0.6944  
Epoch 139/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6086 -  
mse: 0.6086 - val\_loss: 0.6795 - val\_mse: 0.6795  
Epoch 140/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6091 -  
mse: 0.6091 - val\_loss: 0.6959 - val\_mse: 0.6959  
Epoch 141/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6086 -  
mse: 0.6086 - val\_loss: 0.7022 - val\_mse: 0.7022  
Epoch 142/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6077 -  
mse: 0.6077 - val\_loss: 0.6864 - val\_mse: 0.6864  
Epoch 143/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6077 -  
mse: 0.6077 - val\_loss: 0.6801 - val\_mse: 0.6801

Epoch 144/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6071 -  
mse: 0.6071 - val\_loss: 0.6812 - val\_mse: 0.6812

Epoch 145/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6064 -  
mse: 0.6064 - val\_loss: 0.6775 - val\_mse: 0.6775

Epoch 146/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6059 -  
mse: 0.6059 - val\_loss: 0.7070 - val\_mse: 0.7070

Epoch 147/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6064 -  
mse: 0.6064 - val\_loss: 0.7047 - val\_mse: 0.7047

Epoch 148/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6051 -  
mse: 0.6051 - val\_loss: 0.6981 - val\_mse: 0.6981

Epoch 149/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6054 -  
mse: 0.6054 - val\_loss: 0.6907 - val\_mse: 0.6907

Epoch 150/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6049 -  
mse: 0.6049 - val\_loss: 0.6933 - val\_mse: 0.6933

Epoch 151/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6042 -  
mse: 0.6042 - val\_loss: 0.6779 - val\_mse: 0.6779

Epoch 152/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6036 -  
mse: 0.6036 - val\_loss: 0.6758 - val\_mse: 0.6758

Epoch 153/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6039 -  
mse: 0.6039 - val\_loss: 0.6806 - val\_mse: 0.6806

Epoch 154/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6035 -  
mse: 0.6035 - val\_loss: 0.6875 - val\_mse: 0.6875

Epoch 155/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6026 -  
mse: 0.6026 - val\_loss: 0.7058 - val\_mse: 0.7058

Epoch 156/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6024 -  
mse: 0.6024 - val\_loss: 0.7019 - val\_mse: 0.7019

Epoch 157/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6022 -  
mse: 0.6022 - val\_loss: 0.6789 - val\_mse: 0.6789

Epoch 158/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6013 -  
mse: 0.6013 - val\_loss: 0.6769 - val\_mse: 0.6769

Epoch 159/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6018 -  
mse: 0.6018 - val\_loss: 0.7036 - val\_mse: 0.7036

Epoch 160/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6012 -  
mse: 0.6012 - val\_loss: 0.6803 - val\_mse: 0.6803

Epoch 161/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6005 -  
mse: 0.6005 - val\_loss: 0.6755 - val\_mse: 0.6755

Epoch 162/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6002 -  
mse: 0.6002 - val\_loss: 0.7153 - val\_mse: 0.7153

Epoch 163/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6000 -  
mse: 0.6000 - val\_loss: 0.6972 - val\_mse: 0.6972

Epoch 164/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5994 -  
mse: 0.5994 - val\_loss: 0.7059 - val\_mse: 0.7059

Epoch 165/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5996 -  
mse: 0.5996 - val\_loss: 0.6807 - val\_mse: 0.6807

Epoch 166/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5988 -  
mse: 0.5988 - val\_loss: 0.6772 - val\_mse: 0.6772

Epoch 167/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5986 -  
mse: 0.5986 - val\_loss: 0.7031 - val\_mse: 0.7031

Epoch 168/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5982 -  
mse: 0.5982 - val\_loss: 0.6864 - val\_mse: 0.6864

Epoch 169/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5988 -  
mse: 0.5988 - val\_loss: 0.6963 - val\_mse: 0.6963

Epoch 170/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5970 -  
mse: 0.5970 - val\_loss: 0.6815 - val\_mse: 0.6815

Epoch 171/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5970 -  
mse: 0.5970 - val\_loss: 0.7173 - val\_mse: 0.7173

Epoch 172/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5969 -  
mse: 0.5969 - val\_loss: 0.7060 - val\_mse: 0.7060

Epoch 173/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5963 -  
mse: 0.5963 - val\_loss: 0.6912 - val\_mse: 0.6912

Epoch 174/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5960 -  
mse: 0.5960 - val\_loss: 0.6732 - val\_mse: 0.6732

Epoch 175/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5958 -  
mse: 0.5958 - val\_loss: 0.6946 - val\_mse: 0.6946

Epoch 176/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.5958 -  
mse: 0.5958 - val\_loss: 0.6935 - val\_mse: 0.6935

Epoch 177/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5950 -  
mse: 0.5950 - val\_loss: 0.6877 - val\_mse: 0.6877

Epoch 178/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5948 -  
mse: 0.5948 - val\_loss: 0.6851 - val\_mse: 0.6851

Epoch 179/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5941 -  
mse: 0.5941 - val\_loss: 0.6900 - val\_mse: 0.6900

Epoch 180/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5939 -  
mse: 0.5939 - val\_loss: 0.7183 - val\_mse: 0.7183

Epoch 181/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5940 -  
mse: 0.5940 - val\_loss: 0.7307 - val\_mse: 0.7307

Epoch 182/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5942 -  
mse: 0.5942 - val\_loss: 0.6709 - val\_mse: 0.6709

Epoch 183/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5929 -  
mse: 0.5929 - val\_loss: 0.6976 - val\_mse: 0.6976

Epoch 184/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5929 -  
mse: 0.5929 - val\_loss: 0.7165 - val\_mse: 0.7165

Epoch 185/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5922 -  
mse: 0.5922 - val\_loss: 0.6902 - val\_mse: 0.6902

Epoch 186/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5922 -  
mse: 0.5922 - val\_loss: 0.6959 - val\_mse: 0.6959

Epoch 187/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.5922 -  
mse: 0.5922 - val\_loss: 0.6947 - val\_mse: 0.6947

Epoch 188/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.5915 -  
mse: 0.5915 - val\_loss: 0.6726 - val\_mse: 0.6726

Epoch 189/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.5915 -  
mse: 0.5915 - val\_loss: 0.6859 - val\_mse: 0.6859

Epoch 190/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5909 -  
mse: 0.5909 - val\_loss: 0.6797 - val\_mse: 0.6797

Epoch 191/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5906 -  
mse: 0.5906 - val\_loss: 0.6928 - val\_mse: 0.6928

Epoch 192/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.5901 -  
mse: 0.5901 - val\_loss: 0.6995 - val\_mse: 0.6995  
Epoch 193/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5903 -  
mse: 0.5903 - val\_loss: 0.6986 - val\_mse: 0.6986  
Epoch 194/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5898 -  
mse: 0.5898 - val\_loss: 0.6872 - val\_mse: 0.6872  
Epoch 195/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5898 -  
mse: 0.5898 - val\_loss: 0.6894 - val\_mse: 0.6894  
Epoch 196/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5894 -  
mse: 0.5894 - val\_loss: 0.7045 - val\_mse: 0.7045  
Epoch 197/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5894 -  
mse: 0.5894 - val\_loss: 0.6767 - val\_mse: 0.6767  
Epoch 198/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5887 -  
mse: 0.5887 - val\_loss: 0.6923 - val\_mse: 0.6923  
Epoch 199/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5880 -  
mse: 0.5880 - val\_loss: 0.6848 - val\_mse: 0.6848  
Epoch 200/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5882 -  
mse: 0.5882 - val\_loss: 0.6994 - val\_mse: 0.6994  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.7939 -  
mse: 0.7939 - val\_loss: 0.7756 - val\_mse: 0.7756  
Epoch 2/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.7301 -  
mse: 0.7301 - val\_loss: 0.7662 - val\_mse: 0.7662  
Epoch 3/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7171 -  
mse: 0.7171 - val\_loss: 0.7593 - val\_mse: 0.7593  
Epoch 4/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7069 -  
mse: 0.7069 - val\_loss: 0.7630 - val\_mse: 0.7630  
Epoch 5/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6979 -  
mse: 0.6979 - val\_loss: 0.7530 - val\_mse: 0.7530  
Epoch 6/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6907 -  
mse: 0.6907 - val\_loss: 0.7474 - val\_mse: 0.7474  
Epoch 7/200



```

3353317/3353317 [=====] - 9s 3us/step - loss: 0.6841 -
mse: 0.6841 - val_loss: 0.7445 - val_mse: 0.7445
Epoch 8/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6787 -
mse: 0.6787 - val_loss: 0.7460 - val_mse: 0.7460
Epoch 9/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6740 -
mse: 0.6740 - val_loss: 0.7401 - val_mse: 0.7401
Epoch 10/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6693 -
mse: 0.6693 - val_loss: 0.7433 - val_mse: 0.7433
Epoch 11/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6665 -
mse: 0.6665 - val_loss: 0.7399 - val_mse: 0.7399
Epoch 12/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6633 -
mse: 0.6633 - val_loss: 0.7382 - val_mse: 0.7382
Epoch 13/200
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6601 -
mse: 0.6601 - val_loss: 0.7308 - val_mse: 0.7308
Epoch 14/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6576 -
mse: 0.6576 - val_loss: 0.7318 - val_mse: 0.7318
Epoch 15/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6551 -
mse: 0.6551 - val_loss: 0.7269 - val_mse: 0.7269
Epoch 16/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6530 -
mse: 0.6530 - val_loss: 0.7371 - val_mse: 0.7371
Epoch 17/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6508 -
mse: 0.6508 - val_loss: 0.7451 - val_mse: 0.7451
Epoch 18/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6492 -
mse: 0.6492 - val_loss: 0.7278 - val_mse: 0.7278
Epoch 19/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6474 -
mse: 0.6474 - val_loss: 0.7310 - val_mse: 0.7310
Epoch 20/200
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6456 -
mse: 0.6456 - val_loss: 0.7252 - val_mse: 0.7252
Epoch 21/200
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6436 -
mse: 0.6436 - val_loss: 0.7244 - val_mse: 0.7244
Epoch 22/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6423 -
mse: 0.6423 - val_loss: 0.7214 - val_mse: 0.7214
Epoch 23/200

```

```

3353317/3353317 [=====] - 8s 3us/step - loss: 0.6406 -
mse: 0.6406 - val_loss: 0.7184 - val_mse: 0.7184
Epoch 24/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6396 -
mse: 0.6396 - val_loss: 0.7169 - val_mse: 0.7169
Epoch 25/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6375 -
mse: 0.6375 - val_loss: 0.7180 - val_mse: 0.7180
Epoch 26/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6363 -
mse: 0.6363 - val_loss: 0.7212 - val_mse: 0.7212
Epoch 27/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6347 -
mse: 0.6347 - val_loss: 0.7207 - val_mse: 0.7207
Epoch 28/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6337 -
mse: 0.6337 - val_loss: 0.7201 - val_mse: 0.7201
Epoch 29/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6322 -
mse: 0.6322 - val_loss: 0.7401 - val_mse: 0.7401
Epoch 30/200
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6307 -
mse: 0.6307 - val_loss: 0.7155 - val_mse: 0.7155
Epoch 31/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6296 -
mse: 0.6296 - val_loss: 0.7157 - val_mse: 0.7157
Epoch 32/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6281 -
mse: 0.6281 - val_loss: 0.7167 - val_mse: 0.7167
Epoch 33/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6276 -
mse: 0.6276 - val_loss: 0.7112 - val_mse: 0.7112
Epoch 34/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6264 -
mse: 0.6264 - val_loss: 0.7124 - val_mse: 0.7124
Epoch 35/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6247 -
mse: 0.6247 - val_loss: 0.7219 - val_mse: 0.7219
Epoch 36/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6236 -
mse: 0.6236 - val_loss: 0.7250 - val_mse: 0.7250
Epoch 37/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6224 -
mse: 0.6224 - val_loss: 0.7169 - val_mse: 0.7169
Epoch 38/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6217 -
mse: 0.6217 - val_loss: 0.7193 - val_mse: 0.7193
Epoch 39/200

```

```

3353317/3353317 [=====] - 9s 3us/step - loss: 0.6209 -
mse: 0.6209 - val_loss: 0.7124 - val_mse: 0.7124
Epoch 40/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6200 -
mse: 0.6200 - val_loss: 0.7268 - val_mse: 0.7268
Epoch 41/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6185 -
mse: 0.6185 - val_loss: 0.7107 - val_mse: 0.7107
Epoch 42/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6177 -
mse: 0.6177 - val_loss: 0.7065 - val_mse: 0.7065
Epoch 43/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6169 -
mse: 0.6169 - val_loss: 0.7241 - val_mse: 0.7241
Epoch 44/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6157 -
mse: 0.6157 - val_loss: 0.7144 - val_mse: 0.7144
Epoch 45/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6154 -
mse: 0.6154 - val_loss: 0.7172 - val_mse: 0.7172
Epoch 46/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6138 -
mse: 0.6138 - val_loss: 0.7100 - val_mse: 0.7100
Epoch 47/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6134 -
mse: 0.6134 - val_loss: 0.7078 - val_mse: 0.7078
Epoch 48/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6123 -
mse: 0.6123 - val_loss: 0.7072 - val_mse: 0.7072
Epoch 49/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6119 -
mse: 0.6119 - val_loss: 0.7149 - val_mse: 0.7149
Epoch 50/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6110 -
mse: 0.6110 - val_loss: 0.7036 - val_mse: 0.7036
Epoch 51/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6101 -
mse: 0.6101 - val_loss: 0.7067 - val_mse: 0.7067
Epoch 52/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6091 -
mse: 0.6091 - val_loss: 0.7106 - val_mse: 0.7106
Epoch 53/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6085 -
mse: 0.6085 - val_loss: 0.7031 - val_mse: 0.7031
Epoch 54/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6083 -
mse: 0.6083 - val_loss: 0.7068 - val_mse: 0.7068
Epoch 55/200

```

```

3353317/3353317 [=====] - 9s 3us/step - loss: 0.6071 -
mse: 0.6071 - val_loss: 0.7139 - val_mse: 0.7139
Epoch 56/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6065 -
mse: 0.6065 - val_loss: 0.7138 - val_mse: 0.7138
Epoch 57/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6058 -
mse: 0.6058 - val_loss: 0.6978 - val_mse: 0.6978
Epoch 58/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6054 -
mse: 0.6054 - val_loss: 0.7029 - val_mse: 0.7029
Epoch 59/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6045 -
mse: 0.6045 - val_loss: 0.7074 - val_mse: 0.7074
Epoch 60/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6042 -
mse: 0.6042 - val_loss: 0.6991 - val_mse: 0.6991
Epoch 61/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6026 -
mse: 0.6026 - val_loss: 0.6969 - val_mse: 0.6969
Epoch 62/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6024 -
mse: 0.6024 - val_loss: 0.7076 - val_mse: 0.7076
Epoch 63/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6019 -
mse: 0.6019 - val_loss: 0.6994 - val_mse: 0.6994
Epoch 64/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6014 -
mse: 0.6014 - val_loss: 0.7042 - val_mse: 0.7042
Epoch 65/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6002 -
mse: 0.6002 - val_loss: 0.7007 - val_mse: 0.7007
Epoch 66/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6003 -
mse: 0.6003 - val_loss: 0.6939 - val_mse: 0.6939
Epoch 67/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5993 -
mse: 0.5993 - val_loss: 0.6989 - val_mse: 0.6989
Epoch 68/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5985 -
mse: 0.5985 - val_loss: 0.7073 - val_mse: 0.7073
Epoch 69/200
3353317/3353317 [=====] - 8s 3us/step - loss: 0.5982 -
mse: 0.5982 - val_loss: 0.7004 - val_mse: 0.7004
Epoch 70/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5976 -
mse: 0.5976 - val_loss: 0.7025 - val_mse: 0.7025
Epoch 71/200

```

```

3353317/3353317 [=====] - 9s 3us/step - loss: 0.5971 -
mse: 0.5971 - val_loss: 0.6935 - val_mse: 0.6935
Epoch 72/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5962 -
mse: 0.5962 - val_loss: 0.6973 - val_mse: 0.6973
Epoch 73/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5960 -
mse: 0.5960 - val_loss: 0.6948 - val_mse: 0.6948
Epoch 74/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5956 -
mse: 0.5956 - val_loss: 0.6963 - val_mse: 0.6963
Epoch 75/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5947 -
mse: 0.5947 - val_loss: 0.6984 - val_mse: 0.6984
Epoch 76/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5944 -
mse: 0.5944 - val_loss: 0.6979 - val_mse: 0.6979
Epoch 77/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5935 -
mse: 0.5935 - val_loss: 0.7066 - val_mse: 0.7066
Epoch 78/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5928 -
mse: 0.5928 - val_loss: 0.6961 - val_mse: 0.6961
Epoch 79/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5934 -
mse: 0.5934 - val_loss: 0.6922 - val_mse: 0.6922
Epoch 80/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5920 -
mse: 0.5920 - val_loss: 0.6959 - val_mse: 0.6959
Epoch 81/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5920 -
mse: 0.5920 - val_loss: 0.7307 - val_mse: 0.7307
Epoch 82/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5909 -
mse: 0.5909 - val_loss: 0.6987 - val_mse: 0.6987
Epoch 83/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5911 -
mse: 0.5911 - val_loss: 0.6962 - val_mse: 0.6962
Epoch 84/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5902 -
mse: 0.5902 - val_loss: 0.7030 - val_mse: 0.7030
Epoch 85/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5894 -
mse: 0.5894 - val_loss: 0.6949 - val_mse: 0.6949
Epoch 86/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5899 -
mse: 0.5899 - val_loss: 0.6953 - val_mse: 0.6953
Epoch 87/200

```

```

3353317/3353317 [=====] - 9s 3us/step - loss: 0.5885 -
mse: 0.5885 - val_loss: 0.6928 - val_mse: 0.6928
Epoch 88/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5891 -
mse: 0.5891 - val_loss: 0.6953 - val_mse: 0.6953
Epoch 89/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5878 -
mse: 0.5878 - val_loss: 0.6969 - val_mse: 0.6969
Epoch 90/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5873 -
mse: 0.5873 - val_loss: 0.6991 - val_mse: 0.6991
Epoch 91/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5866 -
mse: 0.5866 - val_loss: 0.6943 - val_mse: 0.6943
Epoch 92/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5863 -
mse: 0.5863 - val_loss: 0.6880 - val_mse: 0.6880
Epoch 93/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5866 -
mse: 0.5866 - val_loss: 0.6995 - val_mse: 0.6995
Epoch 94/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.5856 -
mse: 0.5856 - val_loss: 0.6928 - val_mse: 0.6928
Epoch 95/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5851 -
mse: 0.5851 - val_loss: 0.6901 - val_mse: 0.6901
Epoch 96/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5851 -
mse: 0.5851 - val_loss: 0.6973 - val_mse: 0.6973
Epoch 97/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5846 -
mse: 0.5846 - val_loss: 0.6987 - val_mse: 0.6987
Epoch 98/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5840 -
mse: 0.5840 - val_loss: 0.6945 - val_mse: 0.6945
Epoch 99/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5837 -
mse: 0.5837 - val_loss: 0.6941 - val_mse: 0.6941
Epoch 100/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5832 -
mse: 0.5832 - val_loss: 0.7037 - val_mse: 0.7037
Epoch 101/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5830 -
mse: 0.5830 - val_loss: 0.6997 - val_mse: 0.6997
Epoch 102/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5824 -
mse: 0.5824 - val_loss: 0.6964 - val_mse: 0.6964
Epoch 103/200

```

```

3353317/3353317 [=====] - 10s 3us/step - loss: 0.5816 -
mse: 0.5816 - val_loss: 0.6973 - val_mse: 0.6973
Epoch 104/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5813 -
mse: 0.5813 - val_loss: 0.6996 - val_mse: 0.6996
Epoch 105/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5813 -
mse: 0.5813 - val_loss: 0.7050 - val_mse: 0.7050
Epoch 106/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5805 -
mse: 0.5805 - val_loss: 0.7120 - val_mse: 0.7120
Epoch 107/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5804 -
mse: 0.5804 - val_loss: 0.6979 - val_mse: 0.6979
Epoch 108/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5802 -
mse: 0.5802 - val_loss: 0.6937 - val_mse: 0.6937
Epoch 109/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5793 -
mse: 0.5793 - val_loss: 0.6982 - val_mse: 0.6982
Epoch 110/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5794 -
mse: 0.5794 - val_loss: 0.6866 - val_mse: 0.6866
Epoch 111/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5786 -
mse: 0.5786 - val_loss: 0.6917 - val_mse: 0.6917
Epoch 112/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5788 -
mse: 0.5788 - val_loss: 0.6992 - val_mse: 0.6992
Epoch 113/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5786 -
mse: 0.5786 - val_loss: 0.6938 - val_mse: 0.6938
Epoch 114/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5777 -
mse: 0.5777 - val_loss: 0.7087 - val_mse: 0.7087
Epoch 115/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5772 -
mse: 0.5772 - val_loss: 0.6887 - val_mse: 0.6887
Epoch 116/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5773 -
mse: 0.5773 - val_loss: 0.6943 - val_mse: 0.6943
Epoch 117/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5763 -
mse: 0.5763 - val_loss: 0.6873 - val_mse: 0.6873
Epoch 118/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5768 -
mse: 0.5768 - val_loss: 0.7096 - val_mse: 0.7096
Epoch 119/200

```

```

3353317/3353317 [=====] - 11s 3us/step - loss: 0.5759 -
mse: 0.5759 - val_loss: 0.6922 - val_mse: 0.6922
Epoch 120/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5753 -
mse: 0.5753 - val_loss: 0.6940 - val_mse: 0.6940
Epoch 121/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5754 -
mse: 0.5754 - val_loss: 0.6968 - val_mse: 0.6968
Epoch 122/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5748 -
mse: 0.5748 - val_loss: 0.6925 - val_mse: 0.6925
Epoch 123/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5745 -
mse: 0.5745 - val_loss: 0.6863 - val_mse: 0.6863
Epoch 124/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5738 -
mse: 0.5738 - val_loss: 0.6967 - val_mse: 0.6967
Epoch 125/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5743 -
mse: 0.5743 - val_loss: 0.6905 - val_mse: 0.6905
Epoch 126/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5735 -
mse: 0.5735 - val_loss: 0.6928 - val_mse: 0.6928
Epoch 127/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5734 -
mse: 0.5734 - val_loss: 0.6925 - val_mse: 0.6925
Epoch 128/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5727 -
mse: 0.5727 - val_loss: 0.6912 - val_mse: 0.6912
Epoch 129/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5721 -
mse: 0.5721 - val_loss: 0.6974 - val_mse: 0.6974
Epoch 130/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5726 -
mse: 0.5726 - val_loss: 0.6867 - val_mse: 0.6867
Epoch 131/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5722 -
mse: 0.5722 - val_loss: 0.6934 - val_mse: 0.6934
Epoch 132/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5716 -
mse: 0.5716 - val_loss: 0.6884 - val_mse: 0.6884
Epoch 133/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5717 -
mse: 0.5717 - val_loss: 0.6997 - val_mse: 0.6997
Epoch 134/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5709 -
mse: 0.5709 - val_loss: 0.7043 - val_mse: 0.7043
Epoch 135/200

```



```

3353317/3353317 [=====] - 11s 3us/step - loss: 0.5709 -
mse: 0.5709 - val_loss: 0.6958 - val_mse: 0.6958
Epoch 136/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5707 -
mse: 0.5707 - val_loss: 0.6913 - val_mse: 0.6913
Epoch 137/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5702 -
mse: 0.5702 - val_loss: 0.6997 - val_mse: 0.6997
Epoch 138/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5696 -
mse: 0.5696 - val_loss: 0.6871 - val_mse: 0.6871
Epoch 139/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5695 -
mse: 0.5695 - val_loss: 0.6949 - val_mse: 0.6949
Epoch 140/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5695 -
mse: 0.5695 - val_loss: 0.6998 - val_mse: 0.6998
Epoch 141/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5688 -
mse: 0.5688 - val_loss: 0.6963 - val_mse: 0.6963
Epoch 142/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5684 -
mse: 0.5684 - val_loss: 0.6921 - val_mse: 0.6921
Epoch 143/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5679 -
mse: 0.5679 - val_loss: 0.6999 - val_mse: 0.6999
Epoch 144/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5681 -
mse: 0.5681 - val_loss: 0.6946 - val_mse: 0.6946
Epoch 145/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5680 -
mse: 0.5680 - val_loss: 0.6928 - val_mse: 0.6928
Epoch 146/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5671 -
mse: 0.5671 - val_loss: 0.6929 - val_mse: 0.6929
Epoch 147/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5672 -
mse: 0.5672 - val_loss: 0.6971 - val_mse: 0.6971
Epoch 148/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5666 -
mse: 0.5666 - val_loss: 0.6887 - val_mse: 0.6887
Epoch 149/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5669 -
mse: 0.5669 - val_loss: 0.6948 - val_mse: 0.6948
Epoch 150/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5667 -
mse: 0.5667 - val_loss: 0.6892 - val_mse: 0.6892
Epoch 151/200

```

```

3353317/3353317 [=====] - 11s 3us/step - loss: 0.5655 -
mse: 0.5655 - val_loss: 0.7043 - val_mse: 0.7043
Epoch 152/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5661 -
mse: 0.5661 - val_loss: 0.6966 - val_mse: 0.6966
Epoch 153/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5649 -
mse: 0.5649 - val_loss: 0.7067 - val_mse: 0.7067
Epoch 154/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5648 -
mse: 0.5648 - val_loss: 0.6922 - val_mse: 0.6922
Epoch 155/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5651 -
mse: 0.5651 - val_loss: 0.6797 - val_mse: 0.6797
Epoch 156/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5644 -
mse: 0.5644 - val_loss: 0.6884 - val_mse: 0.6884
Epoch 157/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5640 -
mse: 0.5640 - val_loss: 0.6884 - val_mse: 0.6884
Epoch 158/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5641 -
mse: 0.5641 - val_loss: 0.6975 - val_mse: 0.6975
Epoch 159/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5635 -
mse: 0.5635 - val_loss: 0.6872 - val_mse: 0.6872
Epoch 160/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5631 -
mse: 0.5631 - val_loss: 0.7066 - val_mse: 0.7066
Epoch 161/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5630 -
mse: 0.5630 - val_loss: 0.6936 - val_mse: 0.6936
Epoch 162/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5629 -
mse: 0.5629 - val_loss: 0.6977 - val_mse: 0.6977
Epoch 163/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5625 -
mse: 0.5625 - val_loss: 0.6927 - val_mse: 0.6927
Epoch 164/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5620 -
mse: 0.5620 - val_loss: 0.6916 - val_mse: 0.6916
Epoch 165/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5626 -
mse: 0.5626 - val_loss: 0.6955 - val_mse: 0.6955
Epoch 166/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5617 -
mse: 0.5617 - val_loss: 0.6884 - val_mse: 0.6884
Epoch 167/200

```

3353317/3353317 [=====] - 11s 3us/step - loss: 0.5614 -  
 mse: 0.5614 - val\_loss: 0.6895 - val\_mse: 0.6895  
 Epoch 168/200  
 3353317/3353317 [=====] - 11s 3us/step - loss: 0.5614 -  
 mse: 0.5614 - val\_loss: 0.6954 - val\_mse: 0.6954  
 Epoch 169/200  
 3353317/3353317 [=====] - 11s 3us/step - loss: 0.5611 -  
 mse: 0.5611 - val\_loss: 0.6844 - val\_mse: 0.6844  
 Epoch 170/200  
 3353317/3353317 [=====] - 10s 3us/step - loss: 0.5609 -  
 mse: 0.5609 - val\_loss: 0.7085 - val\_mse: 0.7085  
 Epoch 171/200  
 3353317/3353317 [=====] - 10s 3us/step - loss: 0.5599 -  
 mse: 0.5599 - val\_loss: 0.6858 - val\_mse: 0.6858  
 Epoch 172/200  
 3353317/3353317 [=====] - 11s 3us/step - loss: 0.5602 -  
 mse: 0.5602 - val\_loss: 0.6900 - val\_mse: 0.6900  
 Epoch 173/200  
 3353317/3353317 [=====] - 11s 3us/step - loss: 0.5596 -  
 mse: 0.5596 - val\_loss: 0.7043 - val\_mse: 0.7043  
 Epoch 174/200  
 3353317/3353317 [=====] - 11s 3us/step - loss: 0.5596 -  
 mse: 0.5596 - val\_loss: 0.6899 - val\_mse: 0.6899  
 Epoch 175/200  
 3353317/3353317 [=====] - 11s 3us/step - loss: 0.5591 -  
 mse: 0.5591 - val\_loss: 0.6934 - val\_mse: 0.6934  
 Epoch 176/200  
 3353317/3353317 [=====] - 11s 3us/step - loss: 0.5588 -  
 mse: 0.5588 - val\_loss: 0.6942 - val\_mse: 0.6942  
 Epoch 177/200  
 3353317/3353317 [=====] - 11s 3us/step - loss: 0.5585 -  
 mse: 0.5585 - val\_loss: 0.6850 - val\_mse: 0.6850  
 Epoch 178/200  
 3353317/3353317 [=====] - 10s 3us/step - loss: 0.5588 -  
 mse: 0.5588 - val\_loss: 0.6930 - val\_mse: 0.6930  
 Epoch 179/200  
 3353317/3353317 [=====] - 10s 3us/step - loss: 0.5582 -  
 mse: 0.5582 - val\_loss: 0.6851 - val\_mse: 0.6851  
 Epoch 180/200  
 3353317/3353317 [=====] - 11s 3us/step - loss: 0.5580 -  
 mse: 0.5580 - val\_loss: 0.6836 - val\_mse: 0.6836  
 Epoch 181/200  
 3353317/3353317 [=====] - 10s 3us/step - loss: 0.5572 -  
 mse: 0.5572 - val\_loss: 0.6946 - val\_mse: 0.6946  
 Epoch 182/200  
 3353317/3353317 [=====] - 11s 3us/step - loss: 0.5575 -  
 mse: 0.5575 - val\_loss: 0.6957 - val\_mse: 0.6957  
 Epoch 183/200

```

3353317/3353317 [=====] - 11s 3us/step - loss: 0.5572 -
mse: 0.5572 - val_loss: 0.6974 - val_mse: 0.6974
Epoch 184/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5566 -
mse: 0.5566 - val_loss: 0.6998 - val_mse: 0.6998
Epoch 185/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5569 -
mse: 0.5569 - val_loss: 0.6842 - val_mse: 0.6842
Epoch 186/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5564 -
mse: 0.5564 - val_loss: 0.6909 - val_mse: 0.6909
Epoch 187/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5563 -
mse: 0.5563 - val_loss: 0.7080 - val_mse: 0.7080
Epoch 188/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5558 -
mse: 0.5558 - val_loss: 0.6862 - val_mse: 0.6862
Epoch 189/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5562 -
mse: 0.5562 - val_loss: 0.6868 - val_mse: 0.6868
Epoch 190/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5555 -
mse: 0.5555 - val_loss: 0.6870 - val_mse: 0.6870
Epoch 191/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5552 -
mse: 0.5552 - val_loss: 0.7062 - val_mse: 0.7062
Epoch 192/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5547 -
mse: 0.5547 - val_loss: 0.6901 - val_mse: 0.6901
Epoch 193/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5550 -
mse: 0.5550 - val_loss: 0.6872 - val_mse: 0.6872
Epoch 194/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.5542 -
mse: 0.5542 - val_loss: 0.6924 - val_mse: 0.6924
Epoch 195/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5546 -
mse: 0.5546 - val_loss: 0.6905 - val_mse: 0.6905
Epoch 196/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5546 -
mse: 0.5546 - val_loss: 0.6885 - val_mse: 0.6885
Epoch 197/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5533 -
mse: 0.5533 - val_loss: 0.6764 - val_mse: 0.6764
Epoch 198/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5531 -
mse: 0.5531 - val_loss: 0.6896 - val_mse: 0.6896
Epoch 199/200

```

```

3353317/3353317 [=====] - 11s 3us/step - loss: 0.5530 -
mse: 0.5530 - val_loss: 0.6956 - val_mse: 0.6956
Epoch 200/200
3353317/3353317 [=====] - 11s 3us/step - loss: 0.5529 -
mse: 0.5529 - val_loss: 0.6972 - val_mse: 0.6972
1676659/1676659 [=====] - 3s 2us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.9298 -
mse: 0.9298 - val_loss: 0.8295 - val_mse: 0.8295
Epoch 2/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.8366 -
mse: 0.8366 - val_loss: 0.8401 - val_mse: 0.8401
Epoch 3/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.8182 -
mse: 0.8182 - val_loss: 0.8261 - val_mse: 0.8261
Epoch 4/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.8041 -
mse: 0.8041 - val_loss: 0.8149 - val_mse: 0.8149
Epoch 5/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.7927 -
mse: 0.7927 - val_loss: 0.8120 - val_mse: 0.8120
Epoch 6/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.7830 -
mse: 0.7830 - val_loss: 0.8063 - val_mse: 0.8063
Epoch 7/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7761 -
mse: 0.7761 - val_loss: 0.7857 - val_mse: 0.7857
Epoch 8/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.7691 -
mse: 0.7691 - val_loss: 0.7858 - val_mse: 0.7858
Epoch 9/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.7650 -
mse: 0.7650 - val_loss: 0.7810 - val_mse: 0.7810
Epoch 10/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.7595 -
mse: 0.7595 - val_loss: 0.7709 - val_mse: 0.7709
Epoch 11/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.7561 -
mse: 0.7561 - val_loss: 0.7692 - val_mse: 0.7692
Epoch 12/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.7536 -
mse: 0.7536 - val_loss: 0.7879 - val_mse: 0.7879
Epoch 13/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7501 -
mse: 0.7501 - val_loss: 0.7600 - val_mse: 0.7600
Epoch 14/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7468 -

```

```

mse: 0.7468 - val_loss: 0.7637 - val_mse: 0.7637
Epoch 15/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7449 -
mse: 0.7449 - val_loss: 0.7662 - val_mse: 0.7662
Epoch 16/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7423 -
mse: 0.7423 - val_loss: 0.7594 - val_mse: 0.7594
Epoch 17/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7401 -
mse: 0.7401 - val_loss: 0.7517 - val_mse: 0.7517
Epoch 18/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7381 -
mse: 0.7381 - val_loss: 0.7537 - val_mse: 0.7537
Epoch 19/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7361 -
mse: 0.7361 - val_loss: 0.7505 - val_mse: 0.7505
Epoch 20/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7342 -
mse: 0.7342 - val_loss: 0.7485 - val_mse: 0.7485
Epoch 21/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7325 -
mse: 0.7325 - val_loss: 0.7468 - val_mse: 0.7468
Epoch 22/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7304 -
mse: 0.7304 - val_loss: 0.7482 - val_mse: 0.7482
Epoch 23/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7285 -
mse: 0.7285 - val_loss: 0.7445 - val_mse: 0.7445
Epoch 24/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7267 -
mse: 0.7267 - val_loss: 0.7434 - val_mse: 0.7434
Epoch 25/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7263 -
mse: 0.7263 - val_loss: 0.7417 - val_mse: 0.7417
Epoch 26/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7238 -
mse: 0.7238 - val_loss: 0.7439 - val_mse: 0.7439
Epoch 27/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7224 -
mse: 0.7224 - val_loss: 0.7460 - val_mse: 0.7460
Epoch 28/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7209 -
mse: 0.7209 - val_loss: 0.7456 - val_mse: 0.7456
Epoch 29/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7199 -
mse: 0.7199 - val_loss: 0.7392 - val_mse: 0.7392
Epoch 30/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7183 -

```

```

mse: 0.7183 - val_loss: 0.7475 - val_mse: 0.7475
Epoch 31/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7168 -
mse: 0.7168 - val_loss: 0.7427 - val_mse: 0.7427
Epoch 32/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7155 -
mse: 0.7155 - val_loss: 0.7341 - val_mse: 0.7341
Epoch 33/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7144 -
mse: 0.7144 - val_loss: 0.7405 - val_mse: 0.7405
Epoch 34/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7132 -
mse: 0.7132 - val_loss: 0.7471 - val_mse: 0.7471
Epoch 35/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7116 -
mse: 0.7116 - val_loss: 0.7485 - val_mse: 0.7485
Epoch 36/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7112 -
mse: 0.7112 - val_loss: 0.7418 - val_mse: 0.7418
Epoch 37/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7092 -
mse: 0.7092 - val_loss: 0.7520 - val_mse: 0.7520
Epoch 38/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7079 -
mse: 0.7079 - val_loss: 0.7479 - val_mse: 0.7479
Epoch 39/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.7071 -
mse: 0.7071 - val_loss: 0.7498 - val_mse: 0.7498
Epoch 40/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7059 -
mse: 0.7059 - val_loss: 0.7427 - val_mse: 0.7427
Epoch 41/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7048 -
mse: 0.7048 - val_loss: 0.7442 - val_mse: 0.7442
Epoch 42/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.7037 -
mse: 0.7037 - val_loss: 0.7619 - val_mse: 0.7619
Epoch 43/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7022 -
mse: 0.7022 - val_loss: 0.7461 - val_mse: 0.7461
Epoch 44/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.7011 -
mse: 0.7011 - val_loss: 0.7423 - val_mse: 0.7423
Epoch 45/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.7002 -
mse: 0.7002 - val_loss: 0.7411 - val_mse: 0.7411
Epoch 46/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6987 -

```

```

mse: 0.6987 - val_loss: 0.7444 - val_mse: 0.7444
Epoch 47/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6978 -
mse: 0.6978 - val_loss: 0.7445 - val_mse: 0.7445
Epoch 48/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6965 -
mse: 0.6965 - val_loss: 0.7389 - val_mse: 0.7389
Epoch 49/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6956 -
mse: 0.6956 - val_loss: 0.7414 - val_mse: 0.7414
Epoch 50/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6946 -
mse: 0.6946 - val_loss: 0.7447 - val_mse: 0.7447
Epoch 51/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6943 -
mse: 0.6943 - val_loss: 0.7368 - val_mse: 0.7368
Epoch 52/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6925 -
mse: 0.6925 - val_loss: 0.7530 - val_mse: 0.7530
Epoch 53/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6915 -
mse: 0.6915 - val_loss: 0.7467 - val_mse: 0.7467
Epoch 54/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6906 -
mse: 0.6906 - val_loss: 0.7423 - val_mse: 0.7423
Epoch 55/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6897 -
mse: 0.6897 - val_loss: 0.7385 - val_mse: 0.7385
Epoch 56/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6891 -
mse: 0.6891 - val_loss: 0.7369 - val_mse: 0.7369
Epoch 57/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6881 -
mse: 0.6881 - val_loss: 0.7357 - val_mse: 0.7357
Epoch 58/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6873 -
mse: 0.6873 - val_loss: 0.7403 - val_mse: 0.7403
Epoch 59/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6859 -
mse: 0.6859 - val_loss: 0.7412 - val_mse: 0.7412
Epoch 60/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6847 -
mse: 0.6847 - val_loss: 0.7441 - val_mse: 0.7441
Epoch 61/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6841 -
mse: 0.6841 - val_loss: 0.7362 - val_mse: 0.7362
Epoch 62/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6836 -

```



```

mse: 0.6836 - val_loss: 0.7372 - val_mse: 0.7372
Epoch 63/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6826 -
mse: 0.6826 - val_loss: 0.7433 - val_mse: 0.7433
Epoch 64/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6825 -
mse: 0.6825 - val_loss: 0.7379 - val_mse: 0.7379
Epoch 65/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6805 -
mse: 0.6805 - val_loss: 0.7400 - val_mse: 0.7400
Epoch 66/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6798 -
mse: 0.6798 - val_loss: 0.7335 - val_mse: 0.7335
Epoch 67/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6795 -
mse: 0.6795 - val_loss: 0.7304 - val_mse: 0.7304
Epoch 68/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6786 -
mse: 0.6786 - val_loss: 0.7332 - val_mse: 0.7332
Epoch 69/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6782 -
mse: 0.6782 - val_loss: 0.7324 - val_mse: 0.7324
Epoch 70/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6778 -
mse: 0.6778 - val_loss: 0.7312 - val_mse: 0.7312
Epoch 71/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6760 -
mse: 0.6760 - val_loss: 0.7340 - val_mse: 0.7340
Epoch 72/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6753 -
mse: 0.6753 - val_loss: 0.7289 - val_mse: 0.7289
Epoch 73/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6750 -
mse: 0.6750 - val_loss: 0.7379 - val_mse: 0.7379
Epoch 74/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6740 -
mse: 0.6740 - val_loss: 0.7328 - val_mse: 0.7328
Epoch 75/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6736 -
mse: 0.6736 - val_loss: 0.7453 - val_mse: 0.7453
Epoch 76/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6724 -
mse: 0.6724 - val_loss: 0.7433 - val_mse: 0.7433
Epoch 77/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6721 -
mse: 0.6721 - val_loss: 0.7255 - val_mse: 0.7255
Epoch 78/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6708 -

```

```

mse: 0.6708 - val_loss: 0.7322 - val_mse: 0.7322
Epoch 79/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6705 -
mse: 0.6705 - val_loss: 0.7404 - val_mse: 0.7404
Epoch 80/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6697 -
mse: 0.6697 - val_loss: 0.7328 - val_mse: 0.7328
Epoch 81/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6690 -
mse: 0.6690 - val_loss: 0.7391 - val_mse: 0.7391
Epoch 82/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6688 -
mse: 0.6688 - val_loss: 0.7368 - val_mse: 0.7368
Epoch 83/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6679 -
mse: 0.6679 - val_loss: 0.7226 - val_mse: 0.7226
Epoch 84/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6676 -
mse: 0.6676 - val_loss: 0.7410 - val_mse: 0.7410
Epoch 85/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6667 -
mse: 0.6667 - val_loss: 0.7289 - val_mse: 0.7289
Epoch 86/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6666 -
mse: 0.6666 - val_loss: 0.7267 - val_mse: 0.7267
Epoch 87/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6656 -
mse: 0.6656 - val_loss: 0.7300 - val_mse: 0.7300
Epoch 88/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6651 -
mse: 0.6651 - val_loss: 0.7364 - val_mse: 0.7364
Epoch 89/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6637 -
mse: 0.6637 - val_loss: 0.7359 - val_mse: 0.7359
Epoch 90/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6635 -
mse: 0.6635 - val_loss: 0.7229 - val_mse: 0.7229
Epoch 91/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.6629 -
mse: 0.6629 - val_loss: 0.7276 - val_mse: 0.7276
Epoch 92/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6622 -
mse: 0.6622 - val_loss: 0.7238 - val_mse: 0.7238
Epoch 93/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6618 -
mse: 0.6618 - val_loss: 0.7314 - val_mse: 0.7314
Epoch 94/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6611 -

```

```

mse: 0.6611 - val_loss: 0.7354 - val_mse: 0.7354
Epoch 95/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6606 -
mse: 0.6606 - val_loss: 0.7306 - val_mse: 0.7306
Epoch 96/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6599 -
mse: 0.6599 - val_loss: 0.7298 - val_mse: 0.7298
Epoch 97/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6599 -
mse: 0.6599 - val_loss: 0.7307 - val_mse: 0.7307
Epoch 98/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6585 -
mse: 0.6585 - val_loss: 0.7410 - val_mse: 0.7410
Epoch 99/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6582 -
mse: 0.6582 - val_loss: 0.7351 - val_mse: 0.7351
Epoch 100/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6572 -
mse: 0.6572 - val_loss: 0.7392 - val_mse: 0.7392
Epoch 101/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6574 -
mse: 0.6574 - val_loss: 0.7447 - val_mse: 0.7447
Epoch 102/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6567 -
mse: 0.6567 - val_loss: 0.7230 - val_mse: 0.7230
Epoch 103/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6557 -
mse: 0.6557 - val_loss: 0.7314 - val_mse: 0.7314
Epoch 104/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6555 -
mse: 0.6555 - val_loss: 0.7286 - val_mse: 0.7286
Epoch 105/200
3353318/3353318 [=====] - 11s 3us/step - loss: 0.6553 -
mse: 0.6553 - val_loss: 0.7297 - val_mse: 0.7297
Epoch 106/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6539 -
mse: 0.6539 - val_loss: 0.7254 - val_mse: 0.7254
Epoch 107/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6541 -
mse: 0.6541 - val_loss: 0.7363 - val_mse: 0.7363
Epoch 108/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6538 -
mse: 0.6538 - val_loss: 0.7350 - val_mse: 0.7350
Epoch 109/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6527 -
mse: 0.6527 - val_loss: 0.7302 - val_mse: 0.7302
Epoch 110/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6520 -

```

```

mse: 0.6520 - val_loss: 0.7354 - val_mse: 0.7354
Epoch 111/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6521 -
mse: 0.6521 - val_loss: 0.7291 - val_mse: 0.7291
Epoch 112/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6515 -
mse: 0.6515 - val_loss: 0.7283 - val_mse: 0.7283
Epoch 113/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6509 -
mse: 0.6509 - val_loss: 0.7293 - val_mse: 0.7293
Epoch 114/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6506 -
mse: 0.6506 - val_loss: 0.7255 - val_mse: 0.7255
Epoch 115/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6500 -
mse: 0.6500 - val_loss: 0.7241 - val_mse: 0.7241
Epoch 116/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6489 -
mse: 0.6489 - val_loss: 0.7293 - val_mse: 0.7293
Epoch 117/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6490 -
mse: 0.6490 - val_loss: 0.7328 - val_mse: 0.7328
Epoch 118/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6482 -
mse: 0.6482 - val_loss: 0.7312 - val_mse: 0.7312
Epoch 119/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6478 -
mse: 0.6478 - val_loss: 0.7236 - val_mse: 0.7236
Epoch 120/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6478 -
mse: 0.6478 - val_loss: 0.7274 - val_mse: 0.7274
Epoch 121/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6466 -
mse: 0.6466 - val_loss: 0.7358 - val_mse: 0.7358
Epoch 122/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6462 -
mse: 0.6462 - val_loss: 0.7290 - val_mse: 0.7290
Epoch 123/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6454 -
mse: 0.6454 - val_loss: 0.7320 - val_mse: 0.7320
Epoch 124/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6457 -
mse: 0.6457 - val_loss: 0.7300 - val_mse: 0.7300
Epoch 125/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6449 -
mse: 0.6449 - val_loss: 0.7346 - val_mse: 0.7346
Epoch 126/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6449 -

```

```

mse: 0.6449 - val_loss: 0.7296 - val_mse: 0.7296
Epoch 127/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6436 -
mse: 0.6436 - val_loss: 0.7336 - val_mse: 0.7336
Epoch 128/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6435 -
mse: 0.6435 - val_loss: 0.7365 - val_mse: 0.7365
Epoch 129/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6428 -
mse: 0.6428 - val_loss: 0.7307 - val_mse: 0.7307
Epoch 130/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6427 -
mse: 0.6427 - val_loss: 0.7351 - val_mse: 0.7351
Epoch 131/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6419 -
mse: 0.6419 - val_loss: 0.7378 - val_mse: 0.7378
Epoch 132/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6413 -
mse: 0.6413 - val_loss: 0.7487 - val_mse: 0.7487
Epoch 133/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6408 -
mse: 0.6408 - val_loss: 0.7261 - val_mse: 0.7261
Epoch 134/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6406 -
mse: 0.6406 - val_loss: 0.7293 - val_mse: 0.7293
Epoch 135/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6400 -
mse: 0.6400 - val_loss: 0.7348 - val_mse: 0.7348
Epoch 136/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6397 -
mse: 0.6397 - val_loss: 0.7294 - val_mse: 0.7294
Epoch 137/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6395 -
mse: 0.6395 - val_loss: 0.7350 - val_mse: 0.7350
Epoch 138/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6390 -
mse: 0.6390 - val_loss: 0.7322 - val_mse: 0.7322
Epoch 139/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6384 -
mse: 0.6384 - val_loss: 0.7459 - val_mse: 0.7459
Epoch 140/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6376 -
mse: 0.6376 - val_loss: 0.7381 - val_mse: 0.7381
Epoch 141/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6376 -
mse: 0.6376 - val_loss: 0.7284 - val_mse: 0.7284
Epoch 142/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6370 -

```

```

mse: 0.6370 - val_loss: 0.7400 - val_mse: 0.7400
Epoch 143/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6366 -
mse: 0.6366 - val_loss: 0.7359 - val_mse: 0.7359
Epoch 144/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6359 -
mse: 0.6359 - val_loss: 0.7390 - val_mse: 0.7390
Epoch 145/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6356 -
mse: 0.6356 - val_loss: 0.7334 - val_mse: 0.7334
Epoch 146/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6352 -
mse: 0.6352 - val_loss: 0.7379 - val_mse: 0.7379
Epoch 147/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6349 -
mse: 0.6349 - val_loss: 0.7437 - val_mse: 0.7437
Epoch 148/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6343 -
mse: 0.6343 - val_loss: 0.7329 - val_mse: 0.7329
Epoch 149/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6343 -
mse: 0.6343 - val_loss: 0.7379 - val_mse: 0.7379
Epoch 150/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6334 -
mse: 0.6334 - val_loss: 0.7245 - val_mse: 0.7245
Epoch 151/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6332 -
mse: 0.6332 - val_loss: 0.7335 - val_mse: 0.7335
Epoch 152/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6328 -
mse: 0.6328 - val_loss: 0.7410 - val_mse: 0.7410
Epoch 153/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6321 -
mse: 0.6321 - val_loss: 0.7521 - val_mse: 0.7521
Epoch 154/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6320 -
mse: 0.6320 - val_loss: 0.7510 - val_mse: 0.7510
Epoch 155/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6315 -
mse: 0.6315 - val_loss: 0.7502 - val_mse: 0.7502
Epoch 156/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6309 -
mse: 0.6309 - val_loss: 0.7419 - val_mse: 0.7419
Epoch 157/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6305 -
mse: 0.6305 - val_loss: 0.7605 - val_mse: 0.7605
Epoch 158/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6306 -

```

```

mse: 0.6306 - val_loss: 0.7426 - val_mse: 0.7426
Epoch 159/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6295 -
mse: 0.6295 - val_loss: 0.7485 - val_mse: 0.7485
Epoch 160/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6298 -
mse: 0.6298 - val_loss: 0.7491 - val_mse: 0.7491
Epoch 161/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6293 -
mse: 0.6293 - val_loss: 0.7628 - val_mse: 0.7628
Epoch 162/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6288 -
mse: 0.6288 - val_loss: 0.7691 - val_mse: 0.7691
Epoch 163/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6282 -
mse: 0.6282 - val_loss: 0.7381 - val_mse: 0.7381
Epoch 164/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6281 -
mse: 0.6281 - val_loss: 0.7626 - val_mse: 0.7626
Epoch 165/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6280 -
mse: 0.6280 - val_loss: 0.7679 - val_mse: 0.7679
Epoch 166/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6272 -
mse: 0.6272 - val_loss: 0.7651 - val_mse: 0.7651
Epoch 167/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6269 -
mse: 0.6269 - val_loss: 0.7544 - val_mse: 0.7544
Epoch 168/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6269 -
mse: 0.6269 - val_loss: 0.7892 - val_mse: 0.7891
Epoch 169/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6262 -
mse: 0.6262 - val_loss: 0.7653 - val_mse: 0.7653
Epoch 170/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6259 -
mse: 0.6259 - val_loss: 0.7617 - val_mse: 0.7617
Epoch 171/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6255 -
mse: 0.6255 - val_loss: 0.7751 - val_mse: 0.7751
Epoch 172/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6253 -
mse: 0.6253 - val_loss: 0.7889 - val_mse: 0.7889
Epoch 173/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6252 -
mse: 0.6252 - val_loss: 0.7631 - val_mse: 0.7631
Epoch 174/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6242 -

```

```

mse: 0.6242 - val_loss: 0.7800 - val_mse: 0.7800
Epoch 175/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6243 -
mse: 0.6243 - val_loss: 0.7903 - val_mse: 0.7903
Epoch 176/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6236 -
mse: 0.6236 - val_loss: 0.7730 - val_mse: 0.7730
Epoch 177/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6234 -
mse: 0.6234 - val_loss: 0.7740 - val_mse: 0.7740
Epoch 178/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6229 -
mse: 0.6229 - val_loss: 0.7693 - val_mse: 0.7693
Epoch 179/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6239 -
mse: 0.6239 - val_loss: 0.7642 - val_mse: 0.7642
Epoch 180/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6229 -
mse: 0.6229 - val_loss: 0.7691 - val_mse: 0.7691
Epoch 181/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6224 -
mse: 0.6224 - val_loss: 0.7863 - val_mse: 0.7863
Epoch 182/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6217 -
mse: 0.6217 - val_loss: 0.7745 - val_mse: 0.7745
Epoch 183/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6209 -
mse: 0.6209 - val_loss: 0.7903 - val_mse: 0.7903
Epoch 184/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6212 -
mse: 0.6212 - val_loss: 0.7766 - val_mse: 0.7766
Epoch 185/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6211 -
mse: 0.6211 - val_loss: 0.7764 - val_mse: 0.7764
Epoch 186/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6209 -
mse: 0.6209 - val_loss: 0.7955 - val_mse: 0.7955
Epoch 187/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6203 -
mse: 0.6203 - val_loss: 0.8307 - val_mse: 0.8307
Epoch 188/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6200 -
mse: 0.6200 - val_loss: 0.7920 - val_mse: 0.7920
Epoch 189/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6194 -
mse: 0.6194 - val_loss: 0.7809 - val_mse: 0.7809
Epoch 190/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6197 -

```



```

mse: 0.6197 - val_loss: 0.7970 - val_mse: 0.7970
Epoch 191/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6192 -
mse: 0.6192 - val_loss: 0.7742 - val_mse: 0.7742
Epoch 192/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6187 -
mse: 0.6187 - val_loss: 0.7856 - val_mse: 0.7856
Epoch 193/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6183 -
mse: 0.6183 - val_loss: 0.7976 - val_mse: 0.7976
Epoch 194/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6182 -
mse: 0.6182 - val_loss: 0.8052 - val_mse: 0.8052
Epoch 195/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6183 -
mse: 0.6183 - val_loss: 0.8056 - val_mse: 0.8056
Epoch 196/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6176 -
mse: 0.6176 - val_loss: 0.8005 - val_mse: 0.8005
Epoch 197/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6171 -
mse: 0.6171 - val_loss: 0.8060 - val_mse: 0.8060
Epoch 198/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6175 -
mse: 0.6175 - val_loss: 0.7806 - val_mse: 0.7806
Epoch 199/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6168 -
mse: 0.6168 - val_loss: 0.7948 - val_mse: 0.7948
Epoch 200/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6164 -
mse: 0.6164 - val_loss: 0.8043 - val_mse: 0.8043
1676658/1676658 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9460 -
mse: 0.9460 - val_loss: 0.7891 - val_mse: 0.7891
Epoch 2/5
3353317/3353317 [=====] - 9s 3us/step - loss: 0.8405 -
mse: 0.8405 - val_loss: 0.7751 - val_mse: 0.7751
Epoch 3/5
3353317/3353317 [=====] - 9s 3us/step - loss: 0.8221 -
mse: 0.8221 - val_loss: 0.7737 - val_mse: 0.7737
Epoch 4/5
3353317/3353317 [=====] - 9s 3us/step - loss: 0.8096 -
mse: 0.8096 - val_loss: 0.7646 - val_mse: 0.7646
Epoch 5/5
3353317/3353317 [=====] - 9s 3us/step - loss: 0.7986 -
mse: 0.7986 - val_loss: 0.7651 - val_mse: 0.7651

```

```

1676659/1676659 [=====] - 3s 2us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8476 -
mse: 0.8476 - val_loss: 0.7729 - val_mse: 0.7729
Epoch 2/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7417 -
mse: 0.7417 - val_loss: 0.7701 - val_mse: 0.7701
Epoch 3/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7286 -
mse: 0.7286 - val_loss: 0.7661 - val_mse: 0.7661
Epoch 4/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7199 -
mse: 0.7199 - val_loss: 0.7680 - val_mse: 0.7680
Epoch 5/5
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7126 -
mse: 0.7126 - val_loss: 0.7562 - val_mse: 0.7562
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/5
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9902 -
mse: 0.9902 - val_loss: 0.8092 - val_mse: 0.8092
Epoch 2/5
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8567 -
mse: 0.8567 - val_loss: 0.8206 - val_mse: 0.8206
Epoch 3/5
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8362 -
mse: 0.8362 - val_loss: 0.8646 - val_mse: 0.8646
Epoch 4/5
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8232 -
mse: 0.8232 - val_loss: 0.8186 - val_mse: 0.8186
Epoch 5/5
3353318/3353318 [=====] - 8s 3us/step - loss: 0.8129 -
mse: 0.8129 - val_loss: 0.8349 - val_mse: 0.8349
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/10
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9574 -
mse: 0.9574 - val_loss: 0.7741 - val_mse: 0.7741
Epoch 2/10
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8439 -
mse: 0.8439 - val_loss: 0.7900 - val_mse: 0.7900
Epoch 3/10
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8256 -
mse: 0.8256 - val_loss: 0.7793 - val_mse: 0.7793
Epoch 4/10
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8126 -
mse: 0.8126 - val_loss: 0.7641 - val_mse: 0.7641

```

Epoch 5/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8017 -  
mse: 0.8017 - val\_loss: 0.7811 - val\_mse: 0.7811  
Epoch 6/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7916 -  
mse: 0.7916 - val\_loss: 0.7625 - val\_mse: 0.7625  
Epoch 7/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7821 -  
mse: 0.7821 - val\_loss: 0.7536 - val\_mse: 0.7536  
Epoch 8/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7736 -  
mse: 0.7736 - val\_loss: 0.7511 - val\_mse: 0.7511  
Epoch 9/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7658 -  
mse: 0.7658 - val\_loss: 0.7587 - val\_mse: 0.7587  
Epoch 10/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7589 -  
mse: 0.7589 - val\_loss: 0.7637 - val\_mse: 0.7637  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8408 -  
mse: 0.8408 - val\_loss: 0.7760 - val\_mse: 0.7760  
Epoch 2/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7420 -  
mse: 0.7420 - val\_loss: 0.7705 - val\_mse: 0.7705  
Epoch 3/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7295 -  
mse: 0.7295 - val\_loss: 0.7660 - val\_mse: 0.7660  
Epoch 4/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7207 -  
mse: 0.7207 - val\_loss: 0.7630 - val\_mse: 0.7630  
Epoch 5/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7137 -  
mse: 0.7137 - val\_loss: 0.7619 - val\_mse: 0.7619  
Epoch 6/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7073 -  
mse: 0.7073 - val\_loss: 0.7576 - val\_mse: 0.7576  
Epoch 7/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7012 -  
mse: 0.7012 - val\_loss: 0.7548 - val\_mse: 0.7548  
Epoch 8/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6958 -  
mse: 0.6958 - val\_loss: 0.7528 - val\_mse: 0.7528  
Epoch 9/10  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6912 -  
mse: 0.6912 - val\_loss: 0.7496 - val\_mse: 0.7496  
Epoch 10/10

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6862 -
mse: 0.6862 - val_loss: 0.7466 - val_mse: 0.7466
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/10
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9681 -
mse: 0.9681 - val_loss: 0.8175 - val_mse: 0.8175
Epoch 2/10
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8549 -
mse: 0.8549 - val_loss: 0.8416 - val_mse: 0.8416
Epoch 3/10
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8357 -
mse: 0.8357 - val_loss: 0.8290 - val_mse: 0.8290
Epoch 4/10
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8227 -
mse: 0.8227 - val_loss: 0.8335 - val_mse: 0.8335
Epoch 5/10
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8126 -
mse: 0.8126 - val_loss: 0.8239 - val_mse: 0.8239
Epoch 6/10
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8040 -
mse: 0.8040 - val_loss: 0.8082 - val_mse: 0.8082
Epoch 7/10
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7962 -
mse: 0.7962 - val_loss: 0.8060 - val_mse: 0.8060
Epoch 8/10
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7897 -
mse: 0.7897 - val_loss: 0.8161 - val_mse: 0.8161
Epoch 9/10
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7837 -
mse: 0.7837 - val_loss: 0.7994 - val_mse: 0.7994
Epoch 10/10
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7784 -
mse: 0.7784 - val_loss: 0.7916 - val_mse: 0.7916
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9600 -
mse: 0.9600 - val_loss: 0.7855 - val_mse: 0.7855
Epoch 2/30
3353317/3353317 [=====] - 9s 3us/step - loss: 0.8431 -
mse: 0.8431 - val_loss: 0.7748 - val_mse: 0.7748
Epoch 3/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8239 -
mse: 0.8239 - val_loss: 0.7716 - val_mse: 0.7716
Epoch 4/30
3353317/3353317 [=====] - 8s 3us/step - loss: 0.8108 -
mse: 0.8108 - val_loss: 0.7661 - val_mse: 0.7661

```

Epoch 5/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.8002 -  
 mse: 0.8002 - val\_loss: 0.7627 - val\_mse: 0.7627

Epoch 6/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7906 -  
 mse: 0.7906 - val\_loss: 0.7564 - val\_mse: 0.7564

Epoch 7/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7822 -  
 mse: 0.7822 - val\_loss: 0.7575 - val\_mse: 0.7575

Epoch 8/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7747 -  
 mse: 0.7747 - val\_loss: 0.7584 - val\_mse: 0.7584

Epoch 9/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7671 -  
 mse: 0.7671 - val\_loss: 0.7522 - val\_mse: 0.7522

Epoch 10/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7600 -  
 mse: 0.7600 - val\_loss: 0.7434 - val\_mse: 0.7434

Epoch 11/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7551 -  
 mse: 0.7551 - val\_loss: 0.7434 - val\_mse: 0.7434

Epoch 12/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7496 -  
 mse: 0.7496 - val\_loss: 0.7433 - val\_mse: 0.7433

Epoch 13/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7450 -  
 mse: 0.7450 - val\_loss: 0.7353 - val\_mse: 0.7353

Epoch 14/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7406 -  
 mse: 0.7406 - val\_loss: 0.7381 - val\_mse: 0.7381

Epoch 15/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7367 -  
 mse: 0.7367 - val\_loss: 0.7311 - val\_mse: 0.7311

Epoch 16/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7335 -  
 mse: 0.7335 - val\_loss: 0.7283 - val\_mse: 0.7283

Epoch 17/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7304 -  
 mse: 0.7304 - val\_loss: 0.7315 - val\_mse: 0.7315

Epoch 18/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7284 -  
 mse: 0.7284 - val\_loss: 0.7338 - val\_mse: 0.7338

Epoch 19/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7252 -  
 mse: 0.7252 - val\_loss: 0.7192 - val\_mse: 0.7192

Epoch 20/30  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.7239 -  
 mse: 0.7239 - val\_loss: 0.7249 - val\_mse: 0.7249

Epoch 21/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7210 -  
mse: 0.7210 - val\_loss: 0.7267 - val\_mse: 0.7267  
Epoch 22/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7190 -  
mse: 0.7190 - val\_loss: 0.7211 - val\_mse: 0.7211  
Epoch 23/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7171 -  
mse: 0.7171 - val\_loss: 0.7217 - val\_mse: 0.7217  
Epoch 24/30  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.7153 -  
mse: 0.7153 - val\_loss: 0.7184 - val\_mse: 0.7184  
Epoch 25/30  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.7133 -  
mse: 0.7133 - val\_loss: 0.7323 - val\_mse: 0.7323  
Epoch 26/30  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.7116 -  
mse: 0.7116 - val\_loss: 0.7145 - val\_mse: 0.7145  
Epoch 27/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7101 -  
mse: 0.7101 - val\_loss: 0.7206 - val\_mse: 0.7206  
Epoch 28/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7091 -  
mse: 0.7091 - val\_loss: 0.7403 - val\_mse: 0.7403  
Epoch 29/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7076 -  
mse: 0.7076 - val\_loss: 0.7123 - val\_mse: 0.7123  
Epoch 30/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7065 -  
mse: 0.7065 - val\_loss: 0.7084 - val\_mse: 0.7084  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8458 -  
mse: 0.8458 - val\_loss: 0.7763 - val\_mse: 0.7763  
Epoch 2/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7422 -  
mse: 0.7422 - val\_loss: 0.7711 - val\_mse: 0.7711  
Epoch 3/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7289 -  
mse: 0.7289 - val\_loss: 0.7667 - val\_mse: 0.7667  
Epoch 4/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7206 -  
mse: 0.7206 - val\_loss: 0.7623 - val\_mse: 0.7623  
Epoch 5/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7132 -  
mse: 0.7132 - val\_loss: 0.7616 - val\_mse: 0.7616  
Epoch 6/30

3353317/3353317 [=====] - 8s 2us/step - loss: 0.7064 -  
mse: 0.7064 - val\_loss: 0.7567 - val\_mse: 0.7567  
Epoch 7/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7007 -  
mse: 0.7007 - val\_loss: 0.7535 - val\_mse: 0.7535  
Epoch 8/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6951 -  
mse: 0.6951 - val\_loss: 0.7543 - val\_mse: 0.7543  
Epoch 9/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6901 -  
mse: 0.6901 - val\_loss: 0.7499 - val\_mse: 0.7499  
Epoch 10/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6856 -  
mse: 0.6856 - val\_loss: 0.7466 - val\_mse: 0.7466  
Epoch 11/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6815 -  
mse: 0.6815 - val\_loss: 0.7416 - val\_mse: 0.7416  
Epoch 12/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6775 -  
mse: 0.6775 - val\_loss: 0.7447 - val\_mse: 0.7447  
Epoch 13/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6748 -  
mse: 0.6748 - val\_loss: 0.7397 - val\_mse: 0.7397  
Epoch 14/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6715 -  
mse: 0.6715 - val\_loss: 0.7353 - val\_mse: 0.7353  
Epoch 15/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6687 -  
mse: 0.6687 - val\_loss: 0.7394 - val\_mse: 0.7394  
Epoch 16/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6667 -  
mse: 0.6667 - val\_loss: 0.7324 - val\_mse: 0.7324  
Epoch 17/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6640 -  
mse: 0.6640 - val\_loss: 0.7345 - val\_mse: 0.7345  
Epoch 18/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6619 -  
mse: 0.6619 - val\_loss: 0.7302 - val\_mse: 0.7302  
Epoch 19/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6606 -  
mse: 0.6606 - val\_loss: 0.7353 - val\_mse: 0.7353  
Epoch 20/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6583 -  
mse: 0.6583 - val\_loss: 0.7347 - val\_mse: 0.7347  
Epoch 21/30  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6569 -  
mse: 0.6569 - val\_loss: 0.7283 - val\_mse: 0.7283  
Epoch 22/30

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6549 -
mse: 0.6549 - val_loss: 0.7294 - val_mse: 0.7294
Epoch 23/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6534 -
mse: 0.6534 - val_loss: 0.7247 - val_mse: 0.7247
Epoch 24/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6522 -
mse: 0.6522 - val_loss: 0.7280 - val_mse: 0.7280
Epoch 25/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6509 -
mse: 0.6509 - val_loss: 0.7242 - val_mse: 0.7242
Epoch 26/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6493 -
mse: 0.6493 - val_loss: 0.7392 - val_mse: 0.7392
Epoch 27/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6486 -
mse: 0.6486 - val_loss: 0.7228 - val_mse: 0.7228
Epoch 28/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6475 -
mse: 0.6475 - val_loss: 0.7202 - val_mse: 0.7202
Epoch 29/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6459 -
mse: 0.6459 - val_loss: 0.7193 - val_mse: 0.7193
Epoch 30/30
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6449 -
mse: 0.6449 - val_loss: 0.7165 - val_mse: 0.7165
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9939 -
mse: 0.9939 - val_loss: 0.7977 - val_mse: 0.7977
Epoch 2/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8567 -
mse: 0.8567 - val_loss: 0.8143 - val_mse: 0.8143
Epoch 3/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8380 -
mse: 0.8380 - val_loss: 0.8250 - val_mse: 0.8250
Epoch 4/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8258 -
mse: 0.8258 - val_loss: 0.8234 - val_mse: 0.8234
Epoch 5/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8154 -
mse: 0.8154 - val_loss: 0.8146 - val_mse: 0.8146
Epoch 6/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8066 -
mse: 0.8066 - val_loss: 0.8160 - val_mse: 0.8160
Epoch 7/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7985 -

```



```

mse: 0.7985 - val_loss: 0.8031 - val_mse: 0.8031
Epoch 8/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7915 -
mse: 0.7915 - val_loss: 0.7928 - val_mse: 0.7928
Epoch 9/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7852 -
mse: 0.7852 - val_loss: 0.7943 - val_mse: 0.7943
Epoch 10/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7797 -
mse: 0.7797 - val_loss: 0.7848 - val_mse: 0.7848
Epoch 11/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7755 -
mse: 0.7755 - val_loss: 0.8011 - val_mse: 0.8011
Epoch 12/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7710 -
mse: 0.7710 - val_loss: 0.7786 - val_mse: 0.7786
Epoch 13/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7675 -
mse: 0.7675 - val_loss: 0.7750 - val_mse: 0.7750
Epoch 14/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7644 -
mse: 0.7644 - val_loss: 0.7721 - val_mse: 0.7721
Epoch 15/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7613 -
mse: 0.7613 - val_loss: 0.7718 - val_mse: 0.7718
Epoch 16/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7589 -
mse: 0.7589 - val_loss: 0.7676 - val_mse: 0.7676
Epoch 17/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7562 -
mse: 0.7562 - val_loss: 0.7607 - val_mse: 0.7607
Epoch 18/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7536 -
mse: 0.7536 - val_loss: 0.7630 - val_mse: 0.7630
Epoch 19/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7523 -
mse: 0.7523 - val_loss: 0.7668 - val_mse: 0.7668
Epoch 20/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7502 -
mse: 0.7502 - val_loss: 0.7727 - val_mse: 0.7727
Epoch 21/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7485 -
mse: 0.7485 - val_loss: 0.7580 - val_mse: 0.7580
Epoch 22/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7464 -
mse: 0.7464 - val_loss: 0.7625 - val_mse: 0.7625
Epoch 23/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7449 -

```

```

mse: 0.7449 - val_loss: 0.7551 - val_mse: 0.7551
Epoch 24/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7437 -
mse: 0.7437 - val_loss: 0.7549 - val_mse: 0.7549
Epoch 25/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7420 -
mse: 0.7420 - val_loss: 0.7532 - val_mse: 0.7532
Epoch 26/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7406 -
mse: 0.7406 - val_loss: 0.7651 - val_mse: 0.7651
Epoch 27/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7397 -
mse: 0.7397 - val_loss: 0.7590 - val_mse: 0.7590
Epoch 28/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7378 -
mse: 0.7378 - val_loss: 0.7596 - val_mse: 0.7596
Epoch 29/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7367 -
mse: 0.7367 - val_loss: 0.7447 - val_mse: 0.7447
Epoch 30/30
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7357 -
mse: 0.7357 - val_loss: 0.7472 - val_mse: 0.7472
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9487 -
mse: 0.9487 - val_loss: 0.7788 - val_mse: 0.7788
Epoch 2/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8432 -
mse: 0.8432 - val_loss: 0.7744 - val_mse: 0.7744
Epoch 3/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8246 -
mse: 0.8246 - val_loss: 0.7673 - val_mse: 0.7673
Epoch 4/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8112 -
mse: 0.8112 - val_loss: 0.7734 - val_mse: 0.7734
Epoch 5/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8006 -
mse: 0.8006 - val_loss: 0.7616 - val_mse: 0.7616
Epoch 6/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7910 -
mse: 0.7910 - val_loss: 0.7619 - val_mse: 0.7619
Epoch 7/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7821 -
mse: 0.7821 - val_loss: 0.7554 - val_mse: 0.7554
Epoch 8/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7742 -
mse: 0.7742 - val_loss: 0.7601 - val_mse: 0.7601

```

Epoch 9/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7669 -  
mse: 0.7669 - val\_loss: 0.7512 - val\_mse: 0.7512  
Epoch 10/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7608 -  
mse: 0.7608 - val\_loss: 0.7483 - val\_mse: 0.7483  
Epoch 11/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7546 -  
mse: 0.7546 - val\_loss: 0.7411 - val\_mse: 0.7411  
Epoch 12/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7498 -  
mse: 0.7498 - val\_loss: 0.7433 - val\_mse: 0.7433  
Epoch 13/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7453 -  
mse: 0.7453 - val\_loss: 0.7513 - val\_mse: 0.7513  
Epoch 14/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7412 -  
mse: 0.7412 - val\_loss: 0.7364 - val\_mse: 0.7364  
Epoch 15/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7374 -  
mse: 0.7374 - val\_loss: 0.7368 - val\_mse: 0.7368  
Epoch 16/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7342 -  
mse: 0.7342 - val\_loss: 0.7316 - val\_mse: 0.7316  
Epoch 17/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7311 -  
mse: 0.7311 - val\_loss: 0.7376 - val\_mse: 0.7376  
Epoch 18/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7285 -  
mse: 0.7285 - val\_loss: 0.7288 - val\_mse: 0.7288  
Epoch 19/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7258 -  
mse: 0.7258 - val\_loss: 0.7253 - val\_mse: 0.7253  
Epoch 20/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7244 -  
mse: 0.7244 - val\_loss: 0.7217 - val\_mse: 0.7217  
Epoch 21/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7221 -  
mse: 0.7221 - val\_loss: 0.7258 - val\_mse: 0.7258  
Epoch 22/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7199 -  
mse: 0.7199 - val\_loss: 0.7190 - val\_mse: 0.7190  
Epoch 23/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7180 -  
mse: 0.7180 - val\_loss: 0.7175 - val\_mse: 0.7175  
Epoch 24/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7166 -  
mse: 0.7166 - val\_loss: 0.7249 - val\_mse: 0.7249

Epoch 25/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7150 -  
mse: 0.7150 - val\_loss: 0.7312 - val\_mse: 0.7312

Epoch 26/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7132 -  
mse: 0.7132 - val\_loss: 0.7262 - val\_mse: 0.7262

Epoch 27/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7114 -  
mse: 0.7114 - val\_loss: 0.7232 - val\_mse: 0.7232

Epoch 28/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7104 -  
mse: 0.7104 - val\_loss: 0.7220 - val\_mse: 0.7220

Epoch 29/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7096 -  
mse: 0.7096 - val\_loss: 0.7349 - val\_mse: 0.7349

Epoch 30/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7081 -  
mse: 0.7081 - val\_loss: 0.7104 - val\_mse: 0.7104

Epoch 31/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7063 -  
mse: 0.7063 - val\_loss: 0.7153 - val\_mse: 0.7153

Epoch 32/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7046 -  
mse: 0.7046 - val\_loss: 0.7108 - val\_mse: 0.7108

Epoch 33/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7042 -  
mse: 0.7042 - val\_loss: 0.7078 - val\_mse: 0.7078

Epoch 34/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7022 -  
mse: 0.7022 - val\_loss: 0.7055 - val\_mse: 0.7055

Epoch 35/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7011 -  
mse: 0.7011 - val\_loss: 0.7114 - val\_mse: 0.7114

Epoch 36/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7000 -  
mse: 0.7000 - val\_loss: 0.7162 - val\_mse: 0.7162

Epoch 37/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6991 -  
mse: 0.6991 - val\_loss: 0.7030 - val\_mse: 0.7030

Epoch 38/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6975 -  
mse: 0.6975 - val\_loss: 0.7025 - val\_mse: 0.7025

Epoch 39/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6969 -  
mse: 0.6969 - val\_loss: 0.7005 - val\_mse: 0.7005

Epoch 40/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6956 -  
mse: 0.6956 - val\_loss: 0.7007 - val\_mse: 0.7007

Epoch 41/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6943 -  
mse: 0.6943 - val\_loss: 0.7162 - val\_mse: 0.7162  
Epoch 42/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6931 -  
mse: 0.6931 - val\_loss: 0.7000 - val\_mse: 0.7000  
Epoch 43/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6925 -  
mse: 0.6925 - val\_loss: 0.6987 - val\_mse: 0.6987  
Epoch 44/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6915 -  
mse: 0.6915 - val\_loss: 0.6978 - val\_mse: 0.6978  
Epoch 45/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6901 -  
mse: 0.6901 - val\_loss: 0.7085 - val\_mse: 0.7085  
Epoch 46/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6893 -  
mse: 0.6893 - val\_loss: 0.7026 - val\_mse: 0.7026  
Epoch 47/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6880 -  
mse: 0.6880 - val\_loss: 0.7000 - val\_mse: 0.7000  
Epoch 48/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6878 -  
mse: 0.6878 - val\_loss: 0.6982 - val\_mse: 0.6982  
Epoch 49/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6859 -  
mse: 0.6859 - val\_loss: 0.6962 - val\_mse: 0.6962  
Epoch 50/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6854 -  
mse: 0.6854 - val\_loss: 0.7105 - val\_mse: 0.7105  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8414 -  
mse: 0.8414 - val\_loss: 0.7746 - val\_mse: 0.7746  
Epoch 2/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7403 -  
mse: 0.7403 - val\_loss: 0.7682 - val\_mse: 0.7682  
Epoch 3/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7274 -  
mse: 0.7274 - val\_loss: 0.7663 - val\_mse: 0.7663  
Epoch 4/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7186 -  
mse: 0.7186 - val\_loss: 0.7612 - val\_mse: 0.7612  
Epoch 5/50  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7117 -  
mse: 0.7117 - val\_loss: 0.7601 - val\_mse: 0.7601  
Epoch 6/50

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.7056 -
mse: 0.7056 - val_loss: 0.7584 - val_mse: 0.7584
Epoch 7/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6993 -
mse: 0.6993 - val_loss: 0.7552 - val_mse: 0.7552
Epoch 8/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6945 -
mse: 0.6945 - val_loss: 0.7517 - val_mse: 0.7517
Epoch 9/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6897 -
mse: 0.6897 - val_loss: 0.7503 - val_mse: 0.7503
Epoch 10/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6849 -
mse: 0.6849 - val_loss: 0.7491 - val_mse: 0.7491
Epoch 11/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6816 -
mse: 0.6816 - val_loss: 0.7479 - val_mse: 0.7479
Epoch 12/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6776 -
mse: 0.6776 - val_loss: 0.7463 - val_mse: 0.7463
Epoch 13/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6749 -
mse: 0.6749 - val_loss: 0.7475 - val_mse: 0.7475
Epoch 14/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6725 -
mse: 0.6725 - val_loss: 0.7388 - val_mse: 0.7388
Epoch 15/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6690 -
mse: 0.6690 - val_loss: 0.7429 - val_mse: 0.7429
Epoch 16/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6671 -
mse: 0.6671 - val_loss: 0.7383 - val_mse: 0.7383
Epoch 17/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6651 -
mse: 0.6651 - val_loss: 0.7384 - val_mse: 0.7384
Epoch 18/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6629 -
mse: 0.6629 - val_loss: 0.7321 - val_mse: 0.7321
Epoch 19/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6608 -
mse: 0.6608 - val_loss: 0.7323 - val_mse: 0.7323
Epoch 20/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6588 -
mse: 0.6588 - val_loss: 0.7343 - val_mse: 0.7343
Epoch 21/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6574 -
mse: 0.6574 - val_loss: 0.7277 - val_mse: 0.7277
Epoch 22/50

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6564 -
mse: 0.6564 - val_loss: 0.7262 - val_mse: 0.7262
Epoch 23/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6540 -
mse: 0.6540 - val_loss: 0.7290 - val_mse: 0.7290
Epoch 24/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6529 -
mse: 0.6529 - val_loss: 0.7258 - val_mse: 0.7258
Epoch 25/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6516 -
mse: 0.6516 - val_loss: 0.7265 - val_mse: 0.7265
Epoch 26/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6507 -
mse: 0.6507 - val_loss: 0.7200 - val_mse: 0.7200
Epoch 27/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6492 -
mse: 0.6492 - val_loss: 0.7214 - val_mse: 0.7214
Epoch 28/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6480 -
mse: 0.6480 - val_loss: 0.7178 - val_mse: 0.7178
Epoch 29/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6469 -
mse: 0.6469 - val_loss: 0.7185 - val_mse: 0.7185
Epoch 30/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6456 -
mse: 0.6456 - val_loss: 0.7158 - val_mse: 0.7158
Epoch 31/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6441 -
mse: 0.6441 - val_loss: 0.7178 - val_mse: 0.7178
Epoch 32/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6434 -
mse: 0.6434 - val_loss: 0.7175 - val_mse: 0.7175
Epoch 33/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6423 -
mse: 0.6423 - val_loss: 0.7180 - val_mse: 0.7180
Epoch 34/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6409 -
mse: 0.6409 - val_loss: 0.7167 - val_mse: 0.7167
Epoch 35/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6403 -
mse: 0.6403 - val_loss: 0.7325 - val_mse: 0.7325
Epoch 36/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6395 -
mse: 0.6395 - val_loss: 0.7138 - val_mse: 0.7138
Epoch 37/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6382 -
mse: 0.6382 - val_loss: 0.7103 - val_mse: 0.7103
Epoch 38/50

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6375 -
mse: 0.6375 - val_loss: 0.7120 - val_mse: 0.7120
Epoch 39/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6363 -
mse: 0.6363 - val_loss: 0.7266 - val_mse: 0.7266
Epoch 40/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6357 -
mse: 0.6357 - val_loss: 0.7110 - val_mse: 0.7110
Epoch 41/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6344 -
mse: 0.6344 - val_loss: 0.7081 - val_mse: 0.7081
Epoch 42/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6335 -
mse: 0.6335 - val_loss: 0.7106 - val_mse: 0.7106
Epoch 43/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6327 -
mse: 0.6327 - val_loss: 0.7133 - val_mse: 0.7133
Epoch 44/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6313 -
mse: 0.6313 - val_loss: 0.7066 - val_mse: 0.7066
Epoch 45/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6308 -
mse: 0.6308 - val_loss: 0.7153 - val_mse: 0.7153
Epoch 46/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6300 -
mse: 0.6300 - val_loss: 0.7103 - val_mse: 0.7103
Epoch 47/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6291 -
mse: 0.6291 - val_loss: 0.7107 - val_mse: 0.7107
Epoch 48/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6283 -
mse: 0.6283 - val_loss: 0.7071 - val_mse: 0.7071
Epoch 49/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6280 -
mse: 0.6280 - val_loss: 0.7119 - val_mse: 0.7119
Epoch 50/50
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6266 -
mse: 0.6266 - val_loss: 0.7046 - val_mse: 0.7046
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/50
3353318/3353318 [=====] - 8s 2us/step - loss: 1.0098 -
mse: 1.0098 - val_loss: 0.7967 - val_mse: 0.7967
Epoch 2/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8627 -
mse: 0.8627 - val_loss: 0.8171 - val_mse: 0.8171
Epoch 3/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8416 -

```



```

mse: 0.8416 - val_loss: 0.8221 - val_mse: 0.8221
Epoch 4/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8272 -
mse: 0.8272 - val_loss: 0.8285 - val_mse: 0.8285
Epoch 5/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8168 -
mse: 0.8168 - val_loss: 0.8303 - val_mse: 0.8303
Epoch 6/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8078 -
mse: 0.8078 - val_loss: 0.8178 - val_mse: 0.8178
Epoch 7/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8002 -
mse: 0.8002 - val_loss: 0.8118 - val_mse: 0.8118
Epoch 8/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7931 -
mse: 0.7931 - val_loss: 0.8284 - val_mse: 0.8284
Epoch 9/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7876 -
mse: 0.7876 - val_loss: 0.8075 - val_mse: 0.8075
Epoch 10/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7821 -
mse: 0.7821 - val_loss: 0.8042 - val_mse: 0.8042
Epoch 11/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7774 -
mse: 0.7774 - val_loss: 0.7997 - val_mse: 0.7997
Epoch 12/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7736 -
mse: 0.7736 - val_loss: 0.7854 - val_mse: 0.7854
Epoch 13/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7694 -
mse: 0.7694 - val_loss: 0.7866 - val_mse: 0.7866
Epoch 14/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7661 -
mse: 0.7661 - val_loss: 0.7845 - val_mse: 0.7845
Epoch 15/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7638 -
mse: 0.7638 - val_loss: 0.7861 - val_mse: 0.7861
Epoch 16/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7602 -
mse: 0.7602 - val_loss: 0.7813 - val_mse: 0.7813
Epoch 17/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7589 -
mse: 0.7589 - val_loss: 0.7678 - val_mse: 0.7678
Epoch 18/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7560 -
mse: 0.7560 - val_loss: 0.7710 - val_mse: 0.7710
Epoch 19/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7537 -

```

```

mse: 0.7537 - val_loss: 0.7687 - val_mse: 0.7687
Epoch 20/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7515 -
mse: 0.7515 - val_loss: 0.7716 - val_mse: 0.7716
Epoch 21/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7497 -
mse: 0.7497 - val_loss: 0.7667 - val_mse: 0.7667
Epoch 22/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7483 -
mse: 0.7483 - val_loss: 0.7646 - val_mse: 0.7646
Epoch 23/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7464 -
mse: 0.7464 - val_loss: 0.7673 - val_mse: 0.7673
Epoch 24/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7449 -
mse: 0.7449 - val_loss: 0.7649 - val_mse: 0.7649
Epoch 25/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7434 -
mse: 0.7434 - val_loss: 0.7763 - val_mse: 0.7763
Epoch 26/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7426 -
mse: 0.7426 - val_loss: 0.7633 - val_mse: 0.7633
Epoch 27/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7401 -
mse: 0.7401 - val_loss: 0.7595 - val_mse: 0.7595
Epoch 28/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7395 -
mse: 0.7395 - val_loss: 0.7656 - val_mse: 0.7656
Epoch 29/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7379 -
mse: 0.7379 - val_loss: 0.7761 - val_mse: 0.7761
Epoch 30/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7364 -
mse: 0.7364 - val_loss: 0.7664 - val_mse: 0.7664
Epoch 31/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7349 -
mse: 0.7349 - val_loss: 0.7565 - val_mse: 0.7565
Epoch 32/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7338 -
mse: 0.7338 - val_loss: 0.7630 - val_mse: 0.7630
Epoch 33/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7326 -
mse: 0.7326 - val_loss: 0.7605 - val_mse: 0.7605
Epoch 34/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7317 -
mse: 0.7317 - val_loss: 0.7534 - val_mse: 0.7534
Epoch 35/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7305 -

```

```

mse: 0.7305 - val_loss: 0.7556 - val_mse: 0.7556
Epoch 36/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7296 -
mse: 0.7296 - val_loss: 0.7623 - val_mse: 0.7623
Epoch 37/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7282 -
mse: 0.7282 - val_loss: 0.7812 - val_mse: 0.7812
Epoch 38/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7278 -
mse: 0.7278 - val_loss: 0.7650 - val_mse: 0.7650
Epoch 39/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7267 -
mse: 0.7267 - val_loss: 0.7554 - val_mse: 0.7554
Epoch 40/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7251 -
mse: 0.7251 - val_loss: 0.7611 - val_mse: 0.7611
Epoch 41/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7246 -
mse: 0.7246 - val_loss: 0.7589 - val_mse: 0.7589
Epoch 42/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7235 -
mse: 0.7235 - val_loss: 0.7481 - val_mse: 0.7481
Epoch 43/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7227 -
mse: 0.7227 - val_loss: 0.7626 - val_mse: 0.7626
Epoch 44/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7211 -
mse: 0.7211 - val_loss: 0.7578 - val_mse: 0.7578
Epoch 45/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7210 -
mse: 0.7210 - val_loss: 0.7499 - val_mse: 0.7499
Epoch 46/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7201 -
mse: 0.7201 - val_loss: 0.7593 - val_mse: 0.7593
Epoch 47/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7188 -
mse: 0.7188 - val_loss: 0.7519 - val_mse: 0.7519
Epoch 48/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7174 -
mse: 0.7174 - val_loss: 0.7491 - val_mse: 0.7491
Epoch 49/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7170 -
mse: 0.7170 - val_loss: 0.7519 - val_mse: 0.7519
Epoch 50/50
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7156 -
mse: 0.7156 - val_loss: 0.7494 - val_mse: 0.7494
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples

```

Epoch 1/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9787 -  
mse: 0.9787 - val\_loss: 0.7869 - val\_mse: 0.7869

Epoch 2/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8421 -  
mse: 0.8421 - val\_loss: 0.7697 - val\_mse: 0.7697

Epoch 3/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8236 -  
mse: 0.8236 - val\_loss: 0.7723 - val\_mse: 0.7723

Epoch 4/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8102 -  
mse: 0.8102 - val\_loss: 0.7772 - val\_mse: 0.7772

Epoch 5/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8003 -  
mse: 0.8003 - val\_loss: 0.7664 - val\_mse: 0.7664

Epoch 6/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7913 -  
mse: 0.7913 - val\_loss: 0.7582 - val\_mse: 0.7582

Epoch 7/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7826 -  
mse: 0.7826 - val\_loss: 0.7554 - val\_mse: 0.7554

Epoch 8/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7743 -  
mse: 0.7743 - val\_loss: 0.7549 - val\_mse: 0.7549

Epoch 9/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7672 -  
mse: 0.7672 - val\_loss: 0.7522 - val\_mse: 0.7522

Epoch 10/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7614 -  
mse: 0.7614 - val\_loss: 0.7428 - val\_mse: 0.7428

Epoch 11/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7548 -  
mse: 0.7548 - val\_loss: 0.7438 - val\_mse: 0.7438

Epoch 12/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7503 -  
mse: 0.7503 - val\_loss: 0.7401 - val\_mse: 0.7401

Epoch 13/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7454 -  
mse: 0.7454 - val\_loss: 0.7325 - val\_mse: 0.7325

Epoch 14/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7412 -  
mse: 0.7412 - val\_loss: 0.7385 - val\_mse: 0.7385

Epoch 15/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7384 -  
mse: 0.7384 - val\_loss: 0.7325 - val\_mse: 0.7325

Epoch 16/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7344 -  
mse: 0.7344 - val\_loss: 0.7425 - val\_mse: 0.7425

Epoch 17/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7316 -  
mse: 0.7316 - val\_loss: 0.7299 - val\_mse: 0.7299  
Epoch 18/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7289 -  
mse: 0.7289 - val\_loss: 0.7304 - val\_mse: 0.7303  
Epoch 19/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7264 -  
mse: 0.7264 - val\_loss: 0.7270 - val\_mse: 0.7270  
Epoch 20/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7244 -  
mse: 0.7244 - val\_loss: 0.7252 - val\_mse: 0.7252  
Epoch 21/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7224 -  
mse: 0.7224 - val\_loss: 0.7224 - val\_mse: 0.7224  
Epoch 22/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7198 -  
mse: 0.7198 - val\_loss: 0.7204 - val\_mse: 0.7204  
Epoch 23/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7181 -  
mse: 0.7181 - val\_loss: 0.7235 - val\_mse: 0.7235  
Epoch 24/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7163 -  
mse: 0.7163 - val\_loss: 0.7265 - val\_mse: 0.7265  
Epoch 25/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7145 -  
mse: 0.7145 - val\_loss: 0.7173 - val\_mse: 0.7173  
Epoch 26/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7139 -  
mse: 0.7139 - val\_loss: 0.7135 - val\_mse: 0.7135  
Epoch 27/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7117 -  
mse: 0.7117 - val\_loss: 0.7150 - val\_mse: 0.7150  
Epoch 28/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7105 -  
mse: 0.7105 - val\_loss: 0.7114 - val\_mse: 0.7114  
Epoch 29/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7082 -  
mse: 0.7082 - val\_loss: 0.7485 - val\_mse: 0.7485  
Epoch 30/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7075 -  
mse: 0.7075 - val\_loss: 0.7172 - val\_mse: 0.7172  
Epoch 31/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7059 -  
mse: 0.7059 - val\_loss: 0.7064 - val\_mse: 0.7064  
Epoch 32/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7047 -  
mse: 0.7047 - val\_loss: 0.7056 - val\_mse: 0.7056

Epoch 33/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7042 -  
mse: 0.7042 - val\_loss: 0.7130 - val\_mse: 0.7130  
Epoch 34/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7023 -  
mse: 0.7023 - val\_loss: 0.7196 - val\_mse: 0.7196  
Epoch 35/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7011 -  
mse: 0.7011 - val\_loss: 0.7083 - val\_mse: 0.7083  
Epoch 36/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7000 -  
mse: 0.7000 - val\_loss: 0.7033 - val\_mse: 0.7033  
Epoch 37/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6988 -  
mse: 0.6988 - val\_loss: 0.7034 - val\_mse: 0.7034  
Epoch 38/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6979 -  
mse: 0.6979 - val\_loss: 0.7026 - val\_mse: 0.7026  
Epoch 39/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6968 -  
mse: 0.6968 - val\_loss: 0.7020 - val\_mse: 0.7020  
Epoch 40/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6955 -  
mse: 0.6955 - val\_loss: 0.6970 - val\_mse: 0.6970  
Epoch 41/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6941 -  
mse: 0.6941 - val\_loss: 0.6997 - val\_mse: 0.6997  
Epoch 42/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6935 -  
mse: 0.6935 - val\_loss: 0.7025 - val\_mse: 0.7025  
Epoch 43/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6924 -  
mse: 0.6924 - val\_loss: 0.6999 - val\_mse: 0.6999  
Epoch 44/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6909 -  
mse: 0.6909 - val\_loss: 0.7009 - val\_mse: 0.7009  
Epoch 45/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6900 -  
mse: 0.6900 - val\_loss: 0.7025 - val\_mse: 0.7025  
Epoch 46/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6889 -  
mse: 0.6889 - val\_loss: 0.7018 - val\_mse: 0.7018  
Epoch 47/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6887 -  
mse: 0.6887 - val\_loss: 0.6914 - val\_mse: 0.6914  
Epoch 48/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6870 -  
mse: 0.6870 - val\_loss: 0.7003 - val\_mse: 0.7003

Epoch 49/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6861 -  
mse: 0.6861 - val\_loss: 0.7035 - val\_mse: 0.7035  
Epoch 50/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6851 -  
mse: 0.6851 - val\_loss: 0.7075 - val\_mse: 0.7075  
Epoch 51/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6842 -  
mse: 0.6842 - val\_loss: 0.6955 - val\_mse: 0.6955  
Epoch 52/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6832 -  
mse: 0.6832 - val\_loss: 0.7131 - val\_mse: 0.7131  
Epoch 53/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6836 -  
mse: 0.6836 - val\_loss: 0.6928 - val\_mse: 0.6928  
Epoch 54/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6813 -  
mse: 0.6813 - val\_loss: 0.6881 - val\_mse: 0.6881  
Epoch 55/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6806 -  
mse: 0.6806 - val\_loss: 0.6943 - val\_mse: 0.6943  
Epoch 56/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6796 -  
mse: 0.6796 - val\_loss: 0.6907 - val\_mse: 0.6907  
Epoch 57/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6795 -  
mse: 0.6795 - val\_loss: 0.6934 - val\_mse: 0.6934  
Epoch 58/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6784 -  
mse: 0.6784 - val\_loss: 0.7116 - val\_mse: 0.7116  
Epoch 59/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6773 -  
mse: 0.6773 - val\_loss: 0.6933 - val\_mse: 0.6933  
Epoch 60/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6770 -  
mse: 0.6770 - val\_loss: 0.7029 - val\_mse: 0.7029  
Epoch 61/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6760 -  
mse: 0.6760 - val\_loss: 0.6839 - val\_mse: 0.6839  
Epoch 62/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6747 -  
mse: 0.6747 - val\_loss: 0.6911 - val\_mse: 0.6911  
Epoch 63/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6737 -  
mse: 0.6737 - val\_loss: 0.6853 - val\_mse: 0.6853  
Epoch 64/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6737 -  
mse: 0.6737 - val\_loss: 0.6925 - val\_mse: 0.6925

Epoch 65/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6726 -  
mse: 0.6726 - val\_loss: 0.6908 - val\_mse: 0.6908  
Epoch 66/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6715 -  
mse: 0.6715 - val\_loss: 0.6877 - val\_mse: 0.6877  
Epoch 67/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6706 -  
mse: 0.6706 - val\_loss: 0.6853 - val\_mse: 0.6853  
Epoch 68/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6704 -  
mse: 0.6704 - val\_loss: 0.6816 - val\_mse: 0.6816  
Epoch 69/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6695 -  
mse: 0.6695 - val\_loss: 0.6910 - val\_mse: 0.6910  
Epoch 70/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6687 -  
mse: 0.6687 - val\_loss: 0.7127 - val\_mse: 0.7127  
Epoch 71/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6685 -  
mse: 0.6685 - val\_loss: 0.6801 - val\_mse: 0.6801  
Epoch 72/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6674 -  
mse: 0.6674 - val\_loss: 0.6826 - val\_mse: 0.6826  
Epoch 73/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6665 -  
mse: 0.6665 - val\_loss: 0.7023 - val\_mse: 0.7023  
Epoch 74/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6658 -  
mse: 0.6658 - val\_loss: 0.6824 - val\_mse: 0.6824  
Epoch 75/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6657 -  
mse: 0.6657 - val\_loss: 0.6819 - val\_mse: 0.6819  
Epoch 76/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6642 -  
mse: 0.6642 - val\_loss: 0.6796 - val\_mse: 0.6796  
Epoch 77/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6638 -  
mse: 0.6638 - val\_loss: 0.6838 - val\_mse: 0.6838  
Epoch 78/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6631 -  
mse: 0.6631 - val\_loss: 0.6802 - val\_mse: 0.6802  
Epoch 79/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6624 -  
mse: 0.6624 - val\_loss: 0.6871 - val\_mse: 0.6871  
Epoch 80/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6620 -  
mse: 0.6620 - val\_loss: 0.6872 - val\_mse: 0.6872



Epoch 81/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6609 -  
mse: 0.6609 - val\_loss: 0.6843 - val\_mse: 0.6843  
Epoch 82/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6604 -  
mse: 0.6604 - val\_loss: 0.6844 - val\_mse: 0.6844  
Epoch 83/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6599 -  
mse: 0.6599 - val\_loss: 0.6779 - val\_mse: 0.6779  
Epoch 84/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6595 -  
mse: 0.6595 - val\_loss: 0.6804 - val\_mse: 0.6804  
Epoch 85/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6584 -  
mse: 0.6584 - val\_loss: 0.6798 - val\_mse: 0.6798  
Epoch 86/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6581 -  
mse: 0.6581 - val\_loss: 0.6801 - val\_mse: 0.6801  
Epoch 87/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6575 -  
mse: 0.6575 - val\_loss: 0.7008 - val\_mse: 0.7008  
Epoch 88/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6563 -  
mse: 0.6563 - val\_loss: 0.6891 - val\_mse: 0.6891  
Epoch 89/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6558 -  
mse: 0.6558 - val\_loss: 0.6784 - val\_mse: 0.6784  
Epoch 90/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6555 -  
mse: 0.6555 - val\_loss: 0.6827 - val\_mse: 0.6827  
Epoch 91/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6547 -  
mse: 0.6547 - val\_loss: 0.6869 - val\_mse: 0.6869  
Epoch 92/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6546 -  
mse: 0.6546 - val\_loss: 0.6846 - val\_mse: 0.6846  
Epoch 93/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6545 -  
mse: 0.6545 - val\_loss: 0.6866 - val\_mse: 0.6866  
Epoch 94/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6526 -  
mse: 0.6526 - val\_loss: 0.6845 - val\_mse: 0.6845  
Epoch 95/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6527 -  
mse: 0.6527 - val\_loss: 0.6839 - val\_mse: 0.6839  
Epoch 96/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6518 -  
mse: 0.6518 - val\_loss: 0.6819 - val\_mse: 0.6819

Epoch 97/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6514 -  
mse: 0.6514 - val\_loss: 0.6782 - val\_mse: 0.6782  
Epoch 98/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6511 -  
mse: 0.6511 - val\_loss: 0.6795 - val\_mse: 0.6795  
Epoch 99/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6505 -  
mse: 0.6505 - val\_loss: 0.6758 - val\_mse: 0.6758  
Epoch 100/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6496 -  
mse: 0.6496 - val\_loss: 0.6845 - val\_mse: 0.6845  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8594 -  
mse: 0.8594 - val\_loss: 0.7744 - val\_mse: 0.7744  
Epoch 2/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7409 -  
mse: 0.7409 - val\_loss: 0.7725 - val\_mse: 0.7725  
Epoch 3/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7281 -  
mse: 0.7281 - val\_loss: 0.7655 - val\_mse: 0.7655  
Epoch 4/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7197 -  
mse: 0.7197 - val\_loss: 0.7619 - val\_mse: 0.7619  
Epoch 5/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7129 -  
mse: 0.7129 - val\_loss: 0.7636 - val\_mse: 0.7636  
Epoch 6/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7070 -  
mse: 0.7070 - val\_loss: 0.7616 - val\_mse: 0.7616  
Epoch 7/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7009 -  
mse: 0.7009 - val\_loss: 0.7575 - val\_mse: 0.7575  
Epoch 8/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6957 -  
mse: 0.6957 - val\_loss: 0.7515 - val\_mse: 0.7515  
Epoch 9/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6913 -  
mse: 0.6913 - val\_loss: 0.7489 - val\_mse: 0.7489  
Epoch 10/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6863 -  
mse: 0.6863 - val\_loss: 0.7504 - val\_mse: 0.7504  
Epoch 11/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6829 -  
mse: 0.6829 - val\_loss: 0.7469 - val\_mse: 0.7469  
Epoch 12/100

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6789 -
mse: 0.6789 - val_loss: 0.7483 - val_mse: 0.7483
Epoch 13/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6756 -
mse: 0.6756 - val_loss: 0.7435 - val_mse: 0.7435
Epoch 14/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6728 -
mse: 0.6728 - val_loss: 0.7528 - val_mse: 0.7528
Epoch 15/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6699 -
mse: 0.6699 - val_loss: 0.7421 - val_mse: 0.7421
Epoch 16/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6672 -
mse: 0.6672 - val_loss: 0.7383 - val_mse: 0.7383
Epoch 17/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6651 -
mse: 0.6651 - val_loss: 0.7392 - val_mse: 0.7392
Epoch 18/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6633 -
mse: 0.6633 - val_loss: 0.7401 - val_mse: 0.7401
Epoch 19/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6616 -
mse: 0.6616 - val_loss: 0.7318 - val_mse: 0.7318
Epoch 20/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6593 -
mse: 0.6593 - val_loss: 0.7311 - val_mse: 0.7311
Epoch 21/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6578 -
mse: 0.6578 - val_loss: 0.7312 - val_mse: 0.7312
Epoch 22/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6565 -
mse: 0.6565 - val_loss: 0.7364 - val_mse: 0.7364
Epoch 23/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6546 -
mse: 0.6546 - val_loss: 0.7309 - val_mse: 0.7309
Epoch 24/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6534 -
mse: 0.6534 - val_loss: 0.7240 - val_mse: 0.7240
Epoch 25/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6522 -
mse: 0.6522 - val_loss: 0.7253 - val_mse: 0.7253
Epoch 26/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6508 -
mse: 0.6508 - val_loss: 0.7365 - val_mse: 0.7365
Epoch 27/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6492 -
mse: 0.6492 - val_loss: 0.7213 - val_mse: 0.7213
Epoch 28/100

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6484 -
mse: 0.6484 - val_loss: 0.7270 - val_mse: 0.7270
Epoch 29/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6471 -
mse: 0.6471 - val_loss: 0.7335 - val_mse: 0.7335
Epoch 30/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6457 -
mse: 0.6457 - val_loss: 0.7189 - val_mse: 0.7189
Epoch 31/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6448 -
mse: 0.6448 - val_loss: 0.7250 - val_mse: 0.7250
Epoch 32/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6438 -
mse: 0.6438 - val_loss: 0.7349 - val_mse: 0.7349
Epoch 33/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6429 -
mse: 0.6429 - val_loss: 0.7258 - val_mse: 0.7258
Epoch 34/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6417 -
mse: 0.6417 - val_loss: 0.7318 - val_mse: 0.7318
Epoch 35/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6404 -
mse: 0.6404 - val_loss: 0.7161 - val_mse: 0.7161
Epoch 36/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6401 -
mse: 0.6401 - val_loss: 0.7188 - val_mse: 0.7188
Epoch 37/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6389 -
mse: 0.6389 - val_loss: 0.7212 - val_mse: 0.7212
Epoch 38/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6377 -
mse: 0.6377 - val_loss: 0.7224 - val_mse: 0.7224
Epoch 39/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6369 -
mse: 0.6369 - val_loss: 0.7180 - val_mse: 0.7180
Epoch 40/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6360 -
mse: 0.6360 - val_loss: 0.7193 - val_mse: 0.7193
Epoch 41/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6352 -
mse: 0.6352 - val_loss: 0.7219 - val_mse: 0.7219
Epoch 42/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6350 -
mse: 0.6350 - val_loss: 0.7309 - val_mse: 0.7309
Epoch 43/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6334 -
mse: 0.6334 - val_loss: 0.7191 - val_mse: 0.7191
Epoch 44/100

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6325 -  
mse: 0.6325 - val\_loss: 0.7154 - val\_mse: 0.7154  
Epoch 45/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6324 -  
mse: 0.6324 - val\_loss: 0.7142 - val\_mse: 0.7142  
Epoch 46/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6312 -  
mse: 0.6312 - val\_loss: 0.7150 - val\_mse: 0.7150  
Epoch 47/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6307 -  
mse: 0.6307 - val\_loss: 0.7087 - val\_mse: 0.7087  
Epoch 48/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6298 -  
mse: 0.6298 - val\_loss: 0.7094 - val\_mse: 0.7094  
Epoch 49/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6289 -  
mse: 0.6289 - val\_loss: 0.7131 - val\_mse: 0.7131  
Epoch 50/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6284 -  
mse: 0.6284 - val\_loss: 0.7077 - val\_mse: 0.7077  
Epoch 51/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6273 -  
mse: 0.6273 - val\_loss: 0.7094 - val\_mse: 0.7094  
Epoch 52/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6265 -  
mse: 0.6265 - val\_loss: 0.7107 - val\_mse: 0.7107  
Epoch 53/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6260 -  
mse: 0.6260 - val\_loss: 0.7096 - val\_mse: 0.7096  
Epoch 54/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6257 -  
mse: 0.6257 - val\_loss: 0.7052 - val\_mse: 0.7052  
Epoch 55/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6248 -  
mse: 0.6248 - val\_loss: 0.7155 - val\_mse: 0.7155  
Epoch 56/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6241 -  
mse: 0.6241 - val\_loss: 0.7068 - val\_mse: 0.7068  
Epoch 57/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6232 -  
mse: 0.6232 - val\_loss: 0.7083 - val\_mse: 0.7083  
Epoch 58/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6231 -  
mse: 0.6231 - val\_loss: 0.7043 - val\_mse: 0.7043  
Epoch 59/100  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6218 -  
mse: 0.6218 - val\_loss: 0.7184 - val\_mse: 0.7184  
Epoch 60/100

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6218 -
mse: 0.6218 - val_loss: 0.7054 - val_mse: 0.7054
Epoch 61/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6215 -
mse: 0.6215 - val_loss: 0.7076 - val_mse: 0.7076
Epoch 62/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6202 -
mse: 0.6202 - val_loss: 0.7037 - val_mse: 0.7037
Epoch 63/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6192 -
mse: 0.6192 - val_loss: 0.7129 - val_mse: 0.7129
Epoch 64/100
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6186 -
mse: 0.6186 - val_loss: 0.7027 - val_mse: 0.7027
Epoch 65/100
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6187 -
mse: 0.6187 - val_loss: 0.6994 - val_mse: 0.6994
Epoch 66/100
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6179 -
mse: 0.6179 - val_loss: 0.7063 - val_mse: 0.7063
Epoch 67/100
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6171 -
mse: 0.6171 - val_loss: 0.7019 - val_mse: 0.7019
Epoch 68/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6163 -
mse: 0.6163 - val_loss: 0.7124 - val_mse: 0.7124
Epoch 69/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6165 -
mse: 0.6165 - val_loss: 0.7031 - val_mse: 0.7031
Epoch 70/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6157 -
mse: 0.6157 - val_loss: 0.7087 - val_mse: 0.7087
Epoch 71/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6151 -
mse: 0.6151 - val_loss: 0.7001 - val_mse: 0.7001
Epoch 72/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6146 -
mse: 0.6146 - val_loss: 0.7001 - val_mse: 0.7001
Epoch 73/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6138 -
mse: 0.6138 - val_loss: 0.7078 - val_mse: 0.7078
Epoch 74/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6138 -
mse: 0.6138 - val_loss: 0.7056 - val_mse: 0.7056
Epoch 75/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6134 -
mse: 0.6134 - val_loss: 0.7026 - val_mse: 0.7026
Epoch 76/100

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6123 -
mse: 0.6123 - val_loss: 0.7146 - val_mse: 0.7146
Epoch 77/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6117 -
mse: 0.6117 - val_loss: 0.7002 - val_mse: 0.7002
Epoch 78/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6114 -
mse: 0.6114 - val_loss: 0.7008 - val_mse: 0.7008
Epoch 79/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6109 -
mse: 0.6109 - val_loss: 0.7018 - val_mse: 0.7018
Epoch 80/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6105 -
mse: 0.6105 - val_loss: 0.7053 - val_mse: 0.7053
Epoch 81/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6100 -
mse: 0.6100 - val_loss: 0.7091 - val_mse: 0.7091
Epoch 82/100
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6102 -
mse: 0.6102 - val_loss: 0.6945 - val_mse: 0.6945
Epoch 83/100
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6090 -
mse: 0.6090 - val_loss: 0.6982 - val_mse: 0.6982
Epoch 84/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6084 -
mse: 0.6084 - val_loss: 0.6986 - val_mse: 0.6986
Epoch 85/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6079 -
mse: 0.6079 - val_loss: 0.6987 - val_mse: 0.6987
Epoch 86/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6072 -
mse: 0.6072 - val_loss: 0.6976 - val_mse: 0.6976
Epoch 87/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6075 -
mse: 0.6075 - val_loss: 0.7000 - val_mse: 0.7000
Epoch 88/100
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6066 -
mse: 0.6066 - val_loss: 0.6971 - val_mse: 0.6971
Epoch 89/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6058 -
mse: 0.6058 - val_loss: 0.6938 - val_mse: 0.6938
Epoch 90/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6062 -
mse: 0.6062 - val_loss: 0.7024 - val_mse: 0.7024
Epoch 91/100
3353317/3353317 [=====] - 306s 91us/step - loss: 0.6050
- mse: 0.6050 - val_loss: 0.6947 - val_mse: 0.6947
Epoch 92/100

```

```

3353317/3353317 [=====] - 11s 3us/step - loss: 0.6045 -
mse: 0.6045 - val_loss: 0.6935 - val_mse: 0.6935
Epoch 93/100
3353317/3353317 [=====] - 895s 267us/step - loss:
0.6044 - mse: 0.6044 - val_loss: 0.6941 - val_mse: 0.6941
Epoch 94/100
3353317/3353317 [=====] - 901s 269us/step - loss:
0.6034 - mse: 0.6034 - val_loss: 0.6955 - val_mse: 0.6955
Epoch 95/100
3353317/3353317 [=====] - 773s 231us/step - loss:
0.6040 - mse: 0.6040 - val_loss: 0.6930 - val_mse: 0.6930
Epoch 96/100
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6032 -
mse: 0.6032 - val_loss: 0.6940 - val_mse: 0.6940
Epoch 97/100
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6028 -
mse: 0.6028 - val_loss: 0.6955 - val_mse: 0.6955
Epoch 98/100
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6022 -
mse: 0.6022 - val_loss: 0.6869 - val_mse: 0.6869
Epoch 99/100
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6016 -
mse: 0.6016 - val_loss: 0.7003 - val_mse: 0.7003
Epoch 100/100
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6013 -
mse: 0.6013 - val_loss: 0.6914 - val_mse: 0.6914
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9845 -
mse: 0.9845 - val_loss: 0.8021 - val_mse: 0.8021
Epoch 2/100
3353318/3353318 [=====] - 9s 3us/step - loss: 0.8589 -
mse: 0.8589 - val_loss: 0.8215 - val_mse: 0.8215
Epoch 3/100
3353318/3353318 [=====] - 9s 3us/step - loss: 0.8401 -
mse: 0.8401 - val_loss: 0.8284 - val_mse: 0.8284
Epoch 4/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8270 -
mse: 0.8270 - val_loss: 0.8416 - val_mse: 0.8416
Epoch 5/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8166 -
mse: 0.8166 - val_loss: 0.8500 - val_mse: 0.8500
Epoch 6/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8073 -
mse: 0.8073 - val_loss: 0.8209 - val_mse: 0.8209
Epoch 7/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7990 -

```



```

mse: 0.7990 - val_loss: 0.8126 - val_mse: 0.8126
Epoch 8/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7915 -
mse: 0.7915 - val_loss: 0.7967 - val_mse: 0.7967
Epoch 9/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7858 -
mse: 0.7858 - val_loss: 0.7978 - val_mse: 0.7978
Epoch 10/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7798 -
mse: 0.7798 - val_loss: 0.7872 - val_mse: 0.7872
Epoch 11/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7756 -
mse: 0.7756 - val_loss: 0.7819 - val_mse: 0.7819
Epoch 12/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7714 -
mse: 0.7714 - val_loss: 0.7769 - val_mse: 0.7769
Epoch 13/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7685 -
mse: 0.7685 - val_loss: 0.7814 - val_mse: 0.7814
Epoch 14/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7644 -
mse: 0.7644 - val_loss: 0.7817 - val_mse: 0.7817
Epoch 15/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7624 -
mse: 0.7624 - val_loss: 0.7682 - val_mse: 0.7682
Epoch 16/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7591 -
mse: 0.7591 - val_loss: 0.7683 - val_mse: 0.7683
Epoch 17/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7566 -
mse: 0.7566 - val_loss: 0.7647 - val_mse: 0.7647
Epoch 18/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7544 -
mse: 0.7544 - val_loss: 0.7615 - val_mse: 0.7615
Epoch 19/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7528 -
mse: 0.7528 - val_loss: 0.7653 - val_mse: 0.7653
Epoch 20/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7509 -
mse: 0.7509 - val_loss: 0.7548 - val_mse: 0.7548
Epoch 21/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7491 -
mse: 0.7491 - val_loss: 0.7503 - val_mse: 0.7503
Epoch 22/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7471 -
mse: 0.7471 - val_loss: 0.7565 - val_mse: 0.7565
Epoch 23/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7453 -

```

```

mse: 0.7453 - val_loss: 0.7489 - val_mse: 0.7489
Epoch 24/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7441 -
mse: 0.7441 - val_loss: 0.7501 - val_mse: 0.7501
Epoch 25/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7428 -
mse: 0.7428 - val_loss: 0.7510 - val_mse: 0.7510
Epoch 26/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7411 -
mse: 0.7411 - val_loss: 0.7551 - val_mse: 0.7551
Epoch 27/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7403 -
mse: 0.7403 - val_loss: 0.7516 - val_mse: 0.7516
Epoch 28/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7383 -
mse: 0.7383 - val_loss: 0.7463 - val_mse: 0.7463
Epoch 29/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7371 -
mse: 0.7371 - val_loss: 0.7467 - val_mse: 0.7467
Epoch 30/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7362 -
mse: 0.7362 - val_loss: 0.7433 - val_mse: 0.7433
Epoch 31/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7351 -
mse: 0.7351 - val_loss: 0.7509 - val_mse: 0.7509
Epoch 32/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7340 -
mse: 0.7340 - val_loss: 0.7594 - val_mse: 0.7594
Epoch 33/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7327 -
mse: 0.7327 - val_loss: 0.7393 - val_mse: 0.7393
Epoch 34/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7316 -
mse: 0.7316 - val_loss: 0.7444 - val_mse: 0.7444
Epoch 35/100
3353318/3353318 [=====] - 8s 3us/step - loss: 0.7303 -
mse: 0.7303 - val_loss: 0.7413 - val_mse: 0.7413
Epoch 36/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7295 -
mse: 0.7295 - val_loss: 0.7342 - val_mse: 0.7342
Epoch 37/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7284 -
mse: 0.7284 - val_loss: 0.7440 - val_mse: 0.7440
Epoch 38/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7273 -
mse: 0.7273 - val_loss: 0.7374 - val_mse: 0.7374
Epoch 39/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7261 -

```

```

mse: 0.7261 - val_loss: 0.7374 - val_mse: 0.7374
Epoch 40/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7256 -
mse: 0.7256 - val_loss: 0.7384 - val_mse: 0.7384
Epoch 41/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7242 -
mse: 0.7242 - val_loss: 0.7320 - val_mse: 0.7320
Epoch 42/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7230 -
mse: 0.7230 - val_loss: 0.7333 - val_mse: 0.7333
Epoch 43/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7225 -
mse: 0.7225 - val_loss: 0.7380 - val_mse: 0.7380
Epoch 44/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7210 -
mse: 0.7210 - val_loss: 0.7311 - val_mse: 0.7311
Epoch 45/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7203 -
mse: 0.7203 - val_loss: 0.7298 - val_mse: 0.7298
Epoch 46/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7198 -
mse: 0.7198 - val_loss: 0.7353 - val_mse: 0.7353
Epoch 47/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7181 -
mse: 0.7181 - val_loss: 0.7313 - val_mse: 0.7313
Epoch 48/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7171 -
mse: 0.7171 - val_loss: 0.7322 - val_mse: 0.7322
Epoch 49/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7162 -
mse: 0.7162 - val_loss: 0.7312 - val_mse: 0.7312
Epoch 50/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7152 -
mse: 0.7152 - val_loss: 0.7264 - val_mse: 0.7264
Epoch 51/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7144 -
mse: 0.7144 - val_loss: 0.7346 - val_mse: 0.7346
Epoch 52/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7140 -
mse: 0.7140 - val_loss: 0.7363 - val_mse: 0.7363
Epoch 53/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7123 -
mse: 0.7123 - val_loss: 0.7451 - val_mse: 0.7451
Epoch 54/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7122 -
mse: 0.7122 - val_loss: 0.7301 - val_mse: 0.7301
Epoch 55/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7105 -

```

```

mse: 0.7105 - val_loss: 0.7310 - val_mse: 0.7310
Epoch 56/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7098 -
mse: 0.7098 - val_loss: 0.7277 - val_mse: 0.7277
Epoch 57/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7090 -
mse: 0.7090 - val_loss: 0.7240 - val_mse: 0.7240
Epoch 58/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7087 -
mse: 0.7087 - val_loss: 0.7288 - val_mse: 0.7288
Epoch 59/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7071 -
mse: 0.7071 - val_loss: 0.7348 - val_mse: 0.7348
Epoch 60/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7066 -
mse: 0.7066 - val_loss: 0.7304 - val_mse: 0.7304
Epoch 61/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7060 -
mse: 0.7060 - val_loss: 0.7384 - val_mse: 0.7384
Epoch 62/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7049 -
mse: 0.7049 - val_loss: 0.7295 - val_mse: 0.7295
Epoch 63/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7045 -
mse: 0.7045 - val_loss: 0.7277 - val_mse: 0.7277
Epoch 64/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7030 -
mse: 0.7030 - val_loss: 0.7244 - val_mse: 0.7244
Epoch 65/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7026 -
mse: 0.7026 - val_loss: 0.7334 - val_mse: 0.7334
Epoch 66/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7026 -
mse: 0.7026 - val_loss: 0.7267 - val_mse: 0.7267
Epoch 67/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7012 -
mse: 0.7012 - val_loss: 0.7323 - val_mse: 0.7323
Epoch 68/100
3353318/3353318 [=====] - 9s 3us/step - loss: 0.7006 -
mse: 0.7006 - val_loss: 0.7244 - val_mse: 0.7244
Epoch 69/100
3353318/3353318 [=====] - 8s 3us/step - loss: 0.6996 -
mse: 0.6996 - val_loss: 0.7263 - val_mse: 0.7263
Epoch 70/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6993 -
mse: 0.6993 - val_loss: 0.7273 - val_mse: 0.7273
Epoch 71/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6980 -

```

```

mse: 0.6980 - val_loss: 0.7297 - val_mse: 0.7297
Epoch 72/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6976 -
mse: 0.6976 - val_loss: 0.7325 - val_mse: 0.7325
Epoch 73/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6968 -
mse: 0.6968 - val_loss: 0.7304 - val_mse: 0.7304
Epoch 74/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6964 -
mse: 0.6964 - val_loss: 0.7251 - val_mse: 0.7251
Epoch 75/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6958 -
mse: 0.6958 - val_loss: 0.7253 - val_mse: 0.7253
Epoch 76/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6945 -
mse: 0.6945 - val_loss: 0.7270 - val_mse: 0.7270
Epoch 77/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6942 -
mse: 0.6942 - val_loss: 0.7291 - val_mse: 0.7291
Epoch 78/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6935 -
mse: 0.6935 - val_loss: 0.7239 - val_mse: 0.7239
Epoch 79/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6931 -
mse: 0.6931 - val_loss: 0.7270 - val_mse: 0.7270
Epoch 80/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6919 -
mse: 0.6919 - val_loss: 0.7235 - val_mse: 0.7235
Epoch 81/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6915 -
mse: 0.6915 - val_loss: 0.7259 - val_mse: 0.7259
Epoch 82/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6910 -
mse: 0.6910 - val_loss: 0.7255 - val_mse: 0.7255
Epoch 83/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6910 -
mse: 0.6910 - val_loss: 0.7289 - val_mse: 0.7289
Epoch 84/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6895 -
mse: 0.6895 - val_loss: 0.7235 - val_mse: 0.7235
Epoch 85/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6888 -
mse: 0.6888 - val_loss: 0.7292 - val_mse: 0.7292
Epoch 86/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6885 -
mse: 0.6885 - val_loss: 0.7391 - val_mse: 0.7391
Epoch 87/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6885 -

```

```

mse: 0.6885 - val_loss: 0.7246 - val_mse: 0.7246
Epoch 88/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6869 -
mse: 0.6869 - val_loss: 0.7266 - val_mse: 0.7266
Epoch 89/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6869 -
mse: 0.6869 - val_loss: 0.7215 - val_mse: 0.7215
Epoch 90/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6860 -
mse: 0.6860 - val_loss: 0.7286 - val_mse: 0.7286
Epoch 91/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6852 -
mse: 0.6852 - val_loss: 0.7237 - val_mse: 0.7237
Epoch 92/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6849 -
mse: 0.6849 - val_loss: 0.7329 - val_mse: 0.7329
Epoch 93/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6855 -
mse: 0.6855 - val_loss: 0.7301 - val_mse: 0.7301
Epoch 94/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6847 -
mse: 0.6847 - val_loss: 0.7318 - val_mse: 0.7318
Epoch 95/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6831 -
mse: 0.6831 - val_loss: 0.7239 - val_mse: 0.7239
Epoch 96/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6827 -
mse: 0.6827 - val_loss: 0.7247 - val_mse: 0.7247
Epoch 97/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6819 -
mse: 0.6819 - val_loss: 0.7279 - val_mse: 0.7279
Epoch 98/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6816 -
mse: 0.6816 - val_loss: 0.7242 - val_mse: 0.7242
Epoch 99/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6812 -
mse: 0.6812 - val_loss: 0.7399 - val_mse: 0.7399
Epoch 100/100
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6810 -
mse: 0.6810 - val_loss: 0.7305 - val_mse: 0.7305
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.9751 -
mse: 0.9751 - val_loss: 0.7790 - val_mse: 0.7790
Epoch 2/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8415 -
mse: 0.8415 - val_loss: 0.7712 - val_mse: 0.7712

```

Epoch 3/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8232 -  
mse: 0.8232 - val\_loss: 0.7629 - val\_mse: 0.7629

Epoch 4/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8106 -  
mse: 0.8106 - val\_loss: 0.7911 - val\_mse: 0.7911

Epoch 5/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8006 -  
mse: 0.8006 - val\_loss: 0.7694 - val\_mse: 0.7694

Epoch 6/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7911 -  
mse: 0.7911 - val\_loss: 0.7572 - val\_mse: 0.7572

Epoch 7/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7826 -  
mse: 0.7827 - val\_loss: 0.7700 - val\_mse: 0.7700

Epoch 8/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7745 -  
mse: 0.7745 - val\_loss: 0.7697 - val\_mse: 0.7697

Epoch 9/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7670 -  
mse: 0.7670 - val\_loss: 0.7577 - val\_mse: 0.7577

Epoch 10/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7600 -  
mse: 0.7600 - val\_loss: 0.7588 - val\_mse: 0.7588

Epoch 11/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7548 -  
mse: 0.7548 - val\_loss: 0.7509 - val\_mse: 0.7509

Epoch 12/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7487 -  
mse: 0.7487 - val\_loss: 0.7480 - val\_mse: 0.7480

Epoch 13/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7443 -  
mse: 0.7443 - val\_loss: 0.7373 - val\_mse: 0.7373

Epoch 14/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7396 -  
mse: 0.7396 - val\_loss: 0.7567 - val\_mse: 0.7567

Epoch 15/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7359 -  
mse: 0.7359 - val\_loss: 0.7288 - val\_mse: 0.7288

Epoch 16/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7333 -  
mse: 0.7333 - val\_loss: 0.7422 - val\_mse: 0.7422

Epoch 17/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7294 -  
mse: 0.7294 - val\_loss: 0.7252 - val\_mse: 0.7252

Epoch 18/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7270 -  
mse: 0.7270 - val\_loss: 0.7327 - val\_mse: 0.7327

Epoch 19/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7249 -  
mse: 0.7249 - val\_loss: 0.7218 - val\_mse: 0.7218

Epoch 20/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7222 -  
mse: 0.7222 - val\_loss: 0.7206 - val\_mse: 0.7206

Epoch 21/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7206 -  
mse: 0.7206 - val\_loss: 0.7450 - val\_mse: 0.7450

Epoch 22/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7184 -  
mse: 0.7184 - val\_loss: 0.7142 - val\_mse: 0.7142

Epoch 23/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7163 -  
mse: 0.7163 - val\_loss: 0.7183 - val\_mse: 0.7183

Epoch 24/150  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.7150 -  
mse: 0.7150 - val\_loss: 0.7157 - val\_mse: 0.7157

Epoch 25/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7130 -  
mse: 0.7130 - val\_loss: 0.7385 - val\_mse: 0.7385

Epoch 26/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7111 -  
mse: 0.7111 - val\_loss: 0.7116 - val\_mse: 0.7116

Epoch 27/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7099 -  
mse: 0.7099 - val\_loss: 0.7102 - val\_mse: 0.7102

Epoch 28/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7085 -  
mse: 0.7085 - val\_loss: 0.7131 - val\_mse: 0.7131

Epoch 29/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7067 -  
mse: 0.7067 - val\_loss: 0.7220 - val\_mse: 0.7220

Epoch 30/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7056 -  
mse: 0.7056 - val\_loss: 0.7131 - val\_mse: 0.7131

Epoch 31/150  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.7044 -  
mse: 0.7044 - val\_loss: 0.7162 - val\_mse: 0.7162

Epoch 32/150  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.7027 -  
mse: 0.7027 - val\_loss: 0.7205 - val\_mse: 0.7205

Epoch 33/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7018 -  
mse: 0.7018 - val\_loss: 0.7088 - val\_mse: 0.7088

Epoch 34/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7004 -  
mse: 0.7004 - val\_loss: 0.7116 - val\_mse: 0.7116



Epoch 35/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6993 -  
 mse: 0.6993 - val\_loss: 0.7346 - val\_mse: 0.7346

Epoch 36/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6980 -  
 mse: 0.6980 - val\_loss: 0.7105 - val\_mse: 0.7105

Epoch 37/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6968 -  
 mse: 0.6968 - val\_loss: 0.7015 - val\_mse: 0.7015

Epoch 38/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6961 -  
 mse: 0.6961 - val\_loss: 0.7039 - val\_mse: 0.7039

Epoch 39/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6944 -  
 mse: 0.6944 - val\_loss: 0.7002 - val\_mse: 0.7002

Epoch 40/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6936 -  
 mse: 0.6936 - val\_loss: 0.7062 - val\_mse: 0.7062

Epoch 41/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6931 -  
 mse: 0.6931 - val\_loss: 0.7102 - val\_mse: 0.7102

Epoch 42/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6921 -  
 mse: 0.6921 - val\_loss: 0.7067 - val\_mse: 0.7067

Epoch 43/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6913 -  
 mse: 0.6913 - val\_loss: 0.7056 - val\_mse: 0.7056

Epoch 44/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6900 -  
 mse: 0.6900 - val\_loss: 0.7052 - val\_mse: 0.7052

Epoch 45/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6889 -  
 mse: 0.6889 - val\_loss: 0.7019 - val\_mse: 0.7019

Epoch 46/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6877 -  
 mse: 0.6877 - val\_loss: 0.7046 - val\_mse: 0.7046

Epoch 47/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6874 -  
 mse: 0.6874 - val\_loss: 0.6979 - val\_mse: 0.6979

Epoch 48/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6869 -  
 mse: 0.6869 - val\_loss: 0.7058 - val\_mse: 0.7058

Epoch 49/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6855 -  
 mse: 0.6855 - val\_loss: 0.7011 - val\_mse: 0.7011

Epoch 50/150  
 3353317/3353317 [=====] - 8s 2us/step - loss: 0.6857 -  
 mse: 0.6857 - val\_loss: 0.6947 - val\_mse: 0.6947

Epoch 51/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6835 -  
mse: 0.6835 - val\_loss: 0.6971 - val\_mse: 0.6971  
Epoch 52/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6829 -  
mse: 0.6829 - val\_loss: 0.7281 - val\_mse: 0.7281  
Epoch 53/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6823 -  
mse: 0.6823 - val\_loss: 0.7096 - val\_mse: 0.7096  
Epoch 54/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6809 -  
mse: 0.6809 - val\_loss: 0.7031 - val\_mse: 0.7031  
Epoch 55/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6807 -  
mse: 0.6807 - val\_loss: 0.6958 - val\_mse: 0.6958  
Epoch 56/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6800 -  
mse: 0.6800 - val\_loss: 0.7054 - val\_mse: 0.7054  
Epoch 57/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6789 -  
mse: 0.6789 - val\_loss: 0.6983 - val\_mse: 0.6983  
Epoch 58/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6790 -  
mse: 0.6790 - val\_loss: 0.7019 - val\_mse: 0.7019  
Epoch 59/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6774 -  
mse: 0.6774 - val\_loss: 0.6929 - val\_mse: 0.6929  
Epoch 60/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6766 -  
mse: 0.6766 - val\_loss: 0.6861 - val\_mse: 0.6861  
Epoch 61/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6761 -  
mse: 0.6761 - val\_loss: 0.6914 - val\_mse: 0.6914  
Epoch 62/150  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6756 -  
mse: 0.6756 - val\_loss: 0.6935 - val\_mse: 0.6935  
Epoch 63/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6745 -  
mse: 0.6745 - val\_loss: 0.6815 - val\_mse: 0.6815  
Epoch 64/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6737 -  
mse: 0.6737 - val\_loss: 0.6930 - val\_mse: 0.6930  
Epoch 65/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6727 -  
mse: 0.6727 - val\_loss: 0.6953 - val\_mse: 0.6953  
Epoch 66/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6721 -  
mse: 0.6721 - val\_loss: 0.6863 - val\_mse: 0.6863

Epoch 67/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6714 -  
mse: 0.6714 - val\_loss: 0.6838 - val\_mse: 0.6838  
Epoch 68/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6704 -  
mse: 0.6704 - val\_loss: 0.6946 - val\_mse: 0.6946  
Epoch 69/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6699 -  
mse: 0.6699 - val\_loss: 0.6825 - val\_mse: 0.6825  
Epoch 70/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6687 -  
mse: 0.6687 - val\_loss: 0.6865 - val\_mse: 0.6865  
Epoch 71/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6677 -  
mse: 0.6677 - val\_loss: 0.6822 - val\_mse: 0.6822  
Epoch 72/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6675 -  
mse: 0.6675 - val\_loss: 0.6822 - val\_mse: 0.6822  
Epoch 73/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6663 -  
mse: 0.6663 - val\_loss: 0.6831 - val\_mse: 0.6831  
Epoch 74/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6657 -  
mse: 0.6657 - val\_loss: 0.6906 - val\_mse: 0.6906  
Epoch 75/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6645 -  
mse: 0.6645 - val\_loss: 0.6851 - val\_mse: 0.6851  
Epoch 76/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6642 -  
mse: 0.6642 - val\_loss: 0.6814 - val\_mse: 0.6814  
Epoch 77/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6641 -  
mse: 0.6641 - val\_loss: 0.6833 - val\_mse: 0.6833  
Epoch 78/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6624 -  
mse: 0.6624 - val\_loss: 0.6839 - val\_mse: 0.6839  
Epoch 79/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6624 -  
mse: 0.6624 - val\_loss: 0.6841 - val\_mse: 0.6841  
Epoch 80/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6622 -  
mse: 0.6622 - val\_loss: 0.6813 - val\_mse: 0.6813  
Epoch 81/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6607 -  
mse: 0.6607 - val\_loss: 0.6985 - val\_mse: 0.6985  
Epoch 82/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6601 -  
mse: 0.6601 - val\_loss: 0.6857 - val\_mse: 0.6857

Epoch 83/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6594 -  
mse: 0.6594 - val\_loss: 0.6807 - val\_mse: 0.6807  
Epoch 84/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6591 -  
mse: 0.6591 - val\_loss: 0.6856 - val\_mse: 0.6856  
Epoch 85/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6587 -  
mse: 0.6587 - val\_loss: 0.6749 - val\_mse: 0.6749  
Epoch 86/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6583 -  
mse: 0.6583 - val\_loss: 0.6795 - val\_mse: 0.6795  
Epoch 87/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6568 -  
mse: 0.6568 - val\_loss: 0.6883 - val\_mse: 0.6883  
Epoch 88/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6566 -  
mse: 0.6566 - val\_loss: 0.6774 - val\_mse: 0.6774  
Epoch 89/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6559 -  
mse: 0.6559 - val\_loss: 0.6784 - val\_mse: 0.6784  
Epoch 90/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6553 -  
mse: 0.6553 - val\_loss: 0.6831 - val\_mse: 0.6831  
Epoch 91/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6549 -  
mse: 0.6549 - val\_loss: 0.6892 - val\_mse: 0.6892  
Epoch 92/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6541 -  
mse: 0.6541 - val\_loss: 0.6779 - val\_mse: 0.6779  
Epoch 93/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6544 -  
mse: 0.6544 - val\_loss: 0.6710 - val\_mse: 0.6710  
Epoch 94/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6534 -  
mse: 0.6534 - val\_loss: 0.6760 - val\_mse: 0.6760  
Epoch 95/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6532 -  
mse: 0.6532 - val\_loss: 0.6760 - val\_mse: 0.6760  
Epoch 96/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6520 -  
mse: 0.6520 - val\_loss: 0.6786 - val\_mse: 0.6786  
Epoch 97/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6515 -  
mse: 0.6515 - val\_loss: 0.6830 - val\_mse: 0.6830  
Epoch 98/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6517 -  
mse: 0.6517 - val\_loss: 0.6860 - val\_mse: 0.6860

Epoch 99/150  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6510 -  
mse: 0.6510 - val\_loss: 0.6774 - val\_mse: 0.6774  
Epoch 100/150  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6509 -  
mse: 0.6509 - val\_loss: 0.6849 - val\_mse: 0.6849  
Epoch 101/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6491 -  
mse: 0.6491 - val\_loss: 0.6753 - val\_mse: 0.6753  
Epoch 102/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6495 -  
mse: 0.6495 - val\_loss: 0.6810 - val\_mse: 0.6810  
Epoch 103/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6484 -  
mse: 0.6484 - val\_loss: 0.6944 - val\_mse: 0.6944  
Epoch 104/150  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6484 -  
mse: 0.6484 - val\_loss: 0.6749 - val\_mse: 0.6749  
Epoch 105/150  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6477 -  
mse: 0.6477 - val\_loss: 0.6790 - val\_mse: 0.6790  
Epoch 106/150  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6473 -  
mse: 0.6473 - val\_loss: 0.6762 - val\_mse: 0.6762  
Epoch 107/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6468 -  
mse: 0.6468 - val\_loss: 0.6924 - val\_mse: 0.6924  
Epoch 108/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6466 -  
mse: 0.6466 - val\_loss: 0.6807 - val\_mse: 0.6807  
Epoch 109/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6456 -  
mse: 0.6456 - val\_loss: 0.6783 - val\_mse: 0.6783  
Epoch 110/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6456 -  
mse: 0.6456 - val\_loss: 0.6756 - val\_mse: 0.6756  
Epoch 111/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6450 -  
mse: 0.6450 - val\_loss: 0.6748 - val\_mse: 0.6748  
Epoch 112/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6446 -  
mse: 0.6446 - val\_loss: 0.6801 - val\_mse: 0.6801  
Epoch 113/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6453 -  
mse: 0.6453 - val\_loss: 0.6768 - val\_mse: 0.6768  
Epoch 114/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6434 -  
mse: 0.6434 - val\_loss: 0.6827 - val\_mse: 0.6827

Epoch 115/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6429 -  
mse: 0.6429 - val\_loss: 0.6730 - val\_mse: 0.6730  
Epoch 116/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6425 -  
mse: 0.6425 - val\_loss: 0.6764 - val\_mse: 0.6764  
Epoch 117/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6425 -  
mse: 0.6425 - val\_loss: 0.6802 - val\_mse: 0.6802  
Epoch 118/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6414 -  
mse: 0.6414 - val\_loss: 0.6783 - val\_mse: 0.6783  
Epoch 119/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6418 -  
mse: 0.6418 - val\_loss: 0.6823 - val\_mse: 0.6823  
Epoch 120/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6415 -  
mse: 0.6415 - val\_loss: 0.6750 - val\_mse: 0.6750  
Epoch 121/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6410 -  
mse: 0.6410 - val\_loss: 0.6702 - val\_mse: 0.6702  
Epoch 122/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6399 -  
mse: 0.6399 - val\_loss: 0.6696 - val\_mse: 0.6696  
Epoch 123/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6397 -  
mse: 0.6397 - val\_loss: 0.6697 - val\_mse: 0.6697  
Epoch 124/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6391 -  
mse: 0.6391 - val\_loss: 0.6772 - val\_mse: 0.6772  
Epoch 125/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6392 -  
mse: 0.6392 - val\_loss: 0.6757 - val\_mse: 0.6757  
Epoch 126/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6383 -  
mse: 0.6383 - val\_loss: 0.6828 - val\_mse: 0.6828  
Epoch 127/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6380 -  
mse: 0.6380 - val\_loss: 0.6758 - val\_mse: 0.6758  
Epoch 128/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6380 -  
mse: 0.6380 - val\_loss: 0.6668 - val\_mse: 0.6668  
Epoch 129/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6368 -  
mse: 0.6368 - val\_loss: 0.6744 - val\_mse: 0.6744  
Epoch 130/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6366 -  
mse: 0.6366 - val\_loss: 0.6733 - val\_mse: 0.6733

Epoch 131/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6368 -  
mse: 0.6368 - val\_loss: 0.6747 - val\_mse: 0.6747  
Epoch 132/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6366 -  
mse: 0.6366 - val\_loss: 0.6721 - val\_mse: 0.6721  
Epoch 133/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6358 -  
mse: 0.6358 - val\_loss: 0.6759 - val\_mse: 0.6759  
Epoch 134/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6350 -  
mse: 0.6350 - val\_loss: 0.6757 - val\_mse: 0.6757  
Epoch 135/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6348 -  
mse: 0.6348 - val\_loss: 0.6748 - val\_mse: 0.6748  
Epoch 136/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6343 -  
mse: 0.6343 - val\_loss: 0.6942 - val\_mse: 0.6942  
Epoch 137/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6340 -  
mse: 0.6340 - val\_loss: 0.6666 - val\_mse: 0.6666  
Epoch 138/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6336 -  
mse: 0.6336 - val\_loss: 0.6702 - val\_mse: 0.6702  
Epoch 139/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6330 -  
mse: 0.6330 - val\_loss: 0.6765 - val\_mse: 0.6765  
Epoch 140/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6331 -  
mse: 0.6331 - val\_loss: 0.6745 - val\_mse: 0.6745  
Epoch 141/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6321 -  
mse: 0.6321 - val\_loss: 0.6683 - val\_mse: 0.6683  
Epoch 142/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6317 -  
mse: 0.6317 - val\_loss: 0.6789 - val\_mse: 0.6789  
Epoch 143/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6316 -  
mse: 0.6316 - val\_loss: 0.6911 - val\_mse: 0.6911  
Epoch 144/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6318 -  
mse: 0.6318 - val\_loss: 0.6946 - val\_mse: 0.6946  
Epoch 145/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6310 -  
mse: 0.6310 - val\_loss: 0.6814 - val\_mse: 0.6814  
Epoch 146/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6306 -  
mse: 0.6306 - val\_loss: 0.6754 - val\_mse: 0.6754

Epoch 147/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6301 -  
mse: 0.6301 - val\_loss: 0.6726 - val\_mse: 0.6726  
Epoch 148/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6298 -  
mse: 0.6298 - val\_loss: 0.6703 - val\_mse: 0.6703  
Epoch 149/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6291 -  
mse: 0.6291 - val\_loss: 0.6647 - val\_mse: 0.6647  
Epoch 150/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6296 -  
mse: 0.6296 - val\_loss: 0.6738 - val\_mse: 0.6738  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8430 -  
mse: 0.8430 - val\_loss: 0.7741 - val\_mse: 0.7741  
Epoch 2/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7405 -  
mse: 0.7405 - val\_loss: 0.7744 - val\_mse: 0.7744  
Epoch 3/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7284 -  
mse: 0.7284 - val\_loss: 0.7661 - val\_mse: 0.7661  
Epoch 4/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7202 -  
mse: 0.7202 - val\_loss: 0.7618 - val\_mse: 0.7618  
Epoch 5/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7130 -  
mse: 0.7130 - val\_loss: 0.7594 - val\_mse: 0.7594  
Epoch 6/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7067 -  
mse: 0.7067 - val\_loss: 0.7548 - val\_mse: 0.7548  
Epoch 7/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7011 -  
mse: 0.7011 - val\_loss: 0.7561 - val\_mse: 0.7561  
Epoch 8/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6959 -  
mse: 0.6959 - val\_loss: 0.7552 - val\_mse: 0.7552  
Epoch 9/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6911 -  
mse: 0.6911 - val\_loss: 0.7459 - val\_mse: 0.7459  
Epoch 10/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6864 -  
mse: 0.6864 - val\_loss: 0.7493 - val\_mse: 0.7493  
Epoch 11/150  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6827 -  
mse: 0.6827 - val\_loss: 0.7440 - val\_mse: 0.7440  
Epoch 12/150



```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6792 -
mse: 0.6792 - val_loss: 0.7438 - val_mse: 0.7438
Epoch 13/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6757 -
mse: 0.6757 - val_loss: 0.7403 - val_mse: 0.7403
Epoch 14/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6727 -
mse: 0.6727 - val_loss: 0.7435 - val_mse: 0.7435
Epoch 15/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6706 -
mse: 0.6706 - val_loss: 0.7409 - val_mse: 0.7409
Epoch 16/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6675 -
mse: 0.6675 - val_loss: 0.7396 - val_mse: 0.7396
Epoch 17/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6654 -
mse: 0.6654 - val_loss: 0.7364 - val_mse: 0.7364
Epoch 18/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6631 -
mse: 0.6631 - val_loss: 0.7351 - val_mse: 0.7351
Epoch 19/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6618 -
mse: 0.6618 - val_loss: 0.7318 - val_mse: 0.7318
Epoch 20/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6591 -
mse: 0.6591 - val_loss: 0.7332 - val_mse: 0.7332
Epoch 21/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6585 -
mse: 0.6585 - val_loss: 0.7326 - val_mse: 0.7326
Epoch 22/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6562 -
mse: 0.6562 - val_loss: 0.7309 - val_mse: 0.7309
Epoch 23/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6549 -
mse: 0.6549 - val_loss: 0.7368 - val_mse: 0.7368
Epoch 24/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6543 -
mse: 0.6543 - val_loss: 0.7309 - val_mse: 0.7309
Epoch 25/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6522 -
mse: 0.6522 - val_loss: 0.7237 - val_mse: 0.7237
Epoch 26/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6511 -
mse: 0.6511 - val_loss: 0.7273 - val_mse: 0.7273
Epoch 27/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6503 -
mse: 0.6503 - val_loss: 0.7262 - val_mse: 0.7262
Epoch 28/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6486 -
mse: 0.6486 - val_loss: 0.7234 - val_mse: 0.7234
Epoch 29/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6474 -
mse: 0.6474 - val_loss: 0.7216 - val_mse: 0.7216
Epoch 30/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6464 -
mse: 0.6464 - val_loss: 0.7194 - val_mse: 0.7194
Epoch 31/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6454 -
mse: 0.6454 - val_loss: 0.7242 - val_mse: 0.7242
Epoch 32/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6441 -
mse: 0.6441 - val_loss: 0.7198 - val_mse: 0.7198
Epoch 33/150
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6431 -
mse: 0.6431 - val_loss: 0.7169 - val_mse: 0.7169
Epoch 34/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6422 -
mse: 0.6422 - val_loss: 0.7173 - val_mse: 0.7173
Epoch 35/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6412 -
mse: 0.6412 - val_loss: 0.7179 - val_mse: 0.7179
Epoch 36/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6403 -
mse: 0.6403 - val_loss: 0.7150 - val_mse: 0.7150
Epoch 37/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6390 -
mse: 0.6390 - val_loss: 0.7222 - val_mse: 0.7222
Epoch 38/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6384 -
mse: 0.6384 - val_loss: 0.7117 - val_mse: 0.7117
Epoch 39/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6373 -
mse: 0.6373 - val_loss: 0.7169 - val_mse: 0.7169
Epoch 40/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6368 -
mse: 0.6368 - val_loss: 0.7139 - val_mse: 0.7139
Epoch 41/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6356 -
mse: 0.6356 - val_loss: 0.7283 - val_mse: 0.7283
Epoch 42/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6348 -
mse: 0.6348 - val_loss: 0.7200 - val_mse: 0.7200
Epoch 43/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6337 -
mse: 0.6337 - val_loss: 0.7151 - val_mse: 0.7151
Epoch 44/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6328 -
mse: 0.6328 - val_loss: 0.7167 - val_mse: 0.7167
Epoch 45/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6330 -
mse: 0.6330 - val_loss: 0.7158 - val_mse: 0.7158
Epoch 46/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6313 -
mse: 0.6313 - val_loss: 0.7128 - val_mse: 0.7128
Epoch 47/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6309 -
mse: 0.6309 - val_loss: 0.7145 - val_mse: 0.7145
Epoch 48/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6299 -
mse: 0.6299 - val_loss: 0.7068 - val_mse: 0.7068
Epoch 49/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6289 -
mse: 0.6289 - val_loss: 0.7096 - val_mse: 0.7096
Epoch 50/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6282 -
mse: 0.6282 - val_loss: 0.7120 - val_mse: 0.7120
Epoch 51/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6273 -
mse: 0.6273 - val_loss: 0.7094 - val_mse: 0.7094
Epoch 52/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6270 -
mse: 0.6270 - val_loss: 0.7171 - val_mse: 0.7171
Epoch 53/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6267 -
mse: 0.6267 - val_loss: 0.7156 - val_mse: 0.7156
Epoch 54/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6249 -
mse: 0.6249 - val_loss: 0.7120 - val_mse: 0.7120
Epoch 55/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6244 -
mse: 0.6244 - val_loss: 0.7063 - val_mse: 0.7063
Epoch 56/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6234 -
mse: 0.6234 - val_loss: 0.7088 - val_mse: 0.7088
Epoch 57/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6229 -
mse: 0.6229 - val_loss: 0.7014 - val_mse: 0.7014
Epoch 58/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6225 -
mse: 0.6225 - val_loss: 0.7060 - val_mse: 0.7060
Epoch 59/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6216 -
mse: 0.6216 - val_loss: 0.7108 - val_mse: 0.7108
Epoch 60/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6216 -
mse: 0.6216 - val_loss: 0.7077 - val_mse: 0.7077
Epoch 61/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6202 -
mse: 0.6202 - val_loss: 0.7095 - val_mse: 0.7095
Epoch 62/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6196 -
mse: 0.6196 - val_loss: 0.7121 - val_mse: 0.7121
Epoch 63/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6193 -
mse: 0.6193 - val_loss: 0.6994 - val_mse: 0.6994
Epoch 64/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6185 -
mse: 0.6185 - val_loss: 0.7046 - val_mse: 0.7046
Epoch 65/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6178 -
mse: 0.6178 - val_loss: 0.7010 - val_mse: 0.7010
Epoch 66/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6173 -
mse: 0.6173 - val_loss: 0.7100 - val_mse: 0.7100
Epoch 67/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6172 -
mse: 0.6172 - val_loss: 0.7100 - val_mse: 0.7100
Epoch 68/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6157 -
mse: 0.6157 - val_loss: 0.7058 - val_mse: 0.7058
Epoch 69/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6152 -
mse: 0.6152 - val_loss: 0.7035 - val_mse: 0.7035
Epoch 70/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6152 -
mse: 0.6152 - val_loss: 0.7043 - val_mse: 0.7043
Epoch 71/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6143 -
mse: 0.6143 - val_loss: 0.6979 - val_mse: 0.6979
Epoch 72/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6134 -
mse: 0.6134 - val_loss: 0.6974 - val_mse: 0.6974
Epoch 73/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6127 -
mse: 0.6127 - val_loss: 0.6999 - val_mse: 0.6999
Epoch 74/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6125 -
mse: 0.6125 - val_loss: 0.7103 - val_mse: 0.7103
Epoch 75/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6123 -
mse: 0.6123 - val_loss: 0.6980 - val_mse: 0.6980
Epoch 76/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6119 -
mse: 0.6119 - val_loss: 0.6956 - val_mse: 0.6956
Epoch 77/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6107 -
mse: 0.6107 - val_loss: 0.6974 - val_mse: 0.6973
Epoch 78/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6110 -
mse: 0.6110 - val_loss: 0.7054 - val_mse: 0.7054
Epoch 79/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6097 -
mse: 0.6097 - val_loss: 0.6951 - val_mse: 0.6951
Epoch 80/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6093 -
mse: 0.6093 - val_loss: 0.6950 - val_mse: 0.6950
Epoch 81/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6088 -
mse: 0.6088 - val_loss: 0.6975 - val_mse: 0.6975
Epoch 82/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6081 -
mse: 0.6081 - val_loss: 0.6987 - val_mse: 0.6987
Epoch 83/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6080 -
mse: 0.6080 - val_loss: 0.7027 - val_mse: 0.7027
Epoch 84/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6070 -
mse: 0.6070 - val_loss: 0.6910 - val_mse: 0.6910
Epoch 85/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6070 -
mse: 0.6070 - val_loss: 0.6952 - val_mse: 0.6952
Epoch 86/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6061 -
mse: 0.6061 - val_loss: 0.6950 - val_mse: 0.6950
Epoch 87/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6062 -
mse: 0.6062 - val_loss: 0.7017 - val_mse: 0.7017
Epoch 88/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6056 -
mse: 0.6055 - val_loss: 0.6951 - val_mse: 0.6951
Epoch 89/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6051 -
mse: 0.6051 - val_loss: 0.6908 - val_mse: 0.6908
Epoch 90/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6044 -
mse: 0.6044 - val_loss: 0.7001 - val_mse: 0.7001
Epoch 91/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6041 -
mse: 0.6041 - val_loss: 0.6961 - val_mse: 0.6961
Epoch 92/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6039 -
mse: 0.6039 - val_loss: 0.6927 - val_mse: 0.6927
Epoch 93/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6032 -
mse: 0.6032 - val_loss: 0.6989 - val_mse: 0.6989
Epoch 94/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6026 -
mse: 0.6026 - val_loss: 0.6943 - val_mse: 0.6943
Epoch 95/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6026 -
mse: 0.6026 - val_loss: 0.6878 - val_mse: 0.6878
Epoch 96/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6015 -
mse: 0.6015 - val_loss: 0.6875 - val_mse: 0.6875
Epoch 97/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6012 -
mse: 0.6012 - val_loss: 0.6935 - val_mse: 0.6935
Epoch 98/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6011 -
mse: 0.6011 - val_loss: 0.6905 - val_mse: 0.6905
Epoch 99/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6014 -
mse: 0.6014 - val_loss: 0.7011 - val_mse: 0.7011
Epoch 100/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6003 -
mse: 0.6003 - val_loss: 0.6913 - val_mse: 0.6913
Epoch 101/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5997 -
mse: 0.5997 - val_loss: 0.6826 - val_mse: 0.6826
Epoch 102/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5992 -
mse: 0.5992 - val_loss: 0.6851 - val_mse: 0.6851
Epoch 103/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5994 -
mse: 0.5993 - val_loss: 0.6919 - val_mse: 0.6919
Epoch 104/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5988 -
mse: 0.5988 - val_loss: 0.6847 - val_mse: 0.6847
Epoch 105/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5990 -
mse: 0.5990 - val_loss: 0.6860 - val_mse: 0.6860
Epoch 106/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5979 -
mse: 0.5979 - val_loss: 0.6848 - val_mse: 0.6848
Epoch 107/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5983 -
mse: 0.5983 - val_loss: 0.6902 - val_mse: 0.6902
Epoch 108/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.5969 -
mse: 0.5969 - val_loss: 0.6858 - val_mse: 0.6858
Epoch 109/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5966 -
mse: 0.5966 - val_loss: 0.6894 - val_mse: 0.6894
Epoch 110/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5964 -
mse: 0.5964 - val_loss: 0.6874 - val_mse: 0.6874
Epoch 111/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5960 -
mse: 0.5960 - val_loss: 0.6834 - val_mse: 0.6834
Epoch 112/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5957 -
mse: 0.5957 - val_loss: 0.6930 - val_mse: 0.6930
Epoch 113/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5951 -
mse: 0.5951 - val_loss: 0.6843 - val_mse: 0.6843
Epoch 114/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5950 -
mse: 0.5950 - val_loss: 0.6870 - val_mse: 0.6870
Epoch 115/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5944 -
mse: 0.5944 - val_loss: 0.6836 - val_mse: 0.6836
Epoch 116/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5944 -
mse: 0.5944 - val_loss: 0.6800 - val_mse: 0.6800
Epoch 117/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5947 -
mse: 0.5947 - val_loss: 0.6839 - val_mse: 0.6839
Epoch 118/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5939 -
mse: 0.5939 - val_loss: 0.6836 - val_mse: 0.6836
Epoch 119/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5931 -
mse: 0.5931 - val_loss: 0.6889 - val_mse: 0.6889
Epoch 120/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5932 -
mse: 0.5932 - val_loss: 0.6847 - val_mse: 0.6847
Epoch 121/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5930 -
mse: 0.5930 - val_loss: 0.6892 - val_mse: 0.6892
Epoch 122/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5921 -
mse: 0.5921 - val_loss: 0.6797 - val_mse: 0.6797
Epoch 123/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5924 -
mse: 0.5924 - val_loss: 0.6855 - val_mse: 0.6855
Epoch 124/150

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.5916 -
mse: 0.5916 - val_loss: 0.6928 - val_mse: 0.6928
Epoch 125/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5911 -
mse: 0.5911 - val_loss: 0.6896 - val_mse: 0.6896
Epoch 126/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5909 -
mse: 0.5909 - val_loss: 0.6854 - val_mse: 0.6854
Epoch 127/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5906 -
mse: 0.5906 - val_loss: 0.6827 - val_mse: 0.6827
Epoch 128/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5908 -
mse: 0.5908 - val_loss: 0.6801 - val_mse: 0.6801
Epoch 129/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5902 -
mse: 0.5902 - val_loss: 0.6819 - val_mse: 0.6819
Epoch 130/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5898 -
mse: 0.5898 - val_loss: 0.6910 - val_mse: 0.6910
Epoch 131/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5893 -
mse: 0.5893 - val_loss: 0.6840 - val_mse: 0.6840
Epoch 132/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5894 -
mse: 0.5894 - val_loss: 0.6791 - val_mse: 0.6791
Epoch 133/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5888 -
mse: 0.5888 - val_loss: 0.6761 - val_mse: 0.6761
Epoch 134/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5890 -
mse: 0.5890 - val_loss: 0.6869 - val_mse: 0.6869
Epoch 135/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5883 -
mse: 0.5883 - val_loss: 0.6813 - val_mse: 0.6813
Epoch 136/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5882 -
mse: 0.5882 - val_loss: 0.6783 - val_mse: 0.6783
Epoch 137/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5874 -
mse: 0.5874 - val_loss: 0.6798 - val_mse: 0.6798
Epoch 138/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5874 -
mse: 0.5874 - val_loss: 0.6953 - val_mse: 0.6953
Epoch 139/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5872 -
mse: 0.5872 - val_loss: 0.6845 - val_mse: 0.6845
Epoch 140/150

```



```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.5868 -
mse: 0.5868 - val_loss: 0.6824 - val_mse: 0.6824
Epoch 141/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5869 -
mse: 0.5869 - val_loss: 0.6811 - val_mse: 0.6811
Epoch 142/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5864 -
mse: 0.5864 - val_loss: 0.6861 - val_mse: 0.6861
Epoch 143/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5860 -
mse: 0.5860 - val_loss: 0.6770 - val_mse: 0.6770
Epoch 144/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5858 -
mse: 0.5858 - val_loss: 0.6824 - val_mse: 0.6824
Epoch 145/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5856 -
mse: 0.5856 - val_loss: 0.6750 - val_mse: 0.6750
Epoch 146/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5855 -
mse: 0.5855 - val_loss: 0.6820 - val_mse: 0.6820
Epoch 147/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5849 -
mse: 0.5849 - val_loss: 0.6826 - val_mse: 0.6826
Epoch 148/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5847 -
mse: 0.5847 - val_loss: 0.6797 - val_mse: 0.6797
Epoch 149/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5843 -
mse: 0.5843 - val_loss: 0.6854 - val_mse: 0.6854
Epoch 150/150
3353317/3353317 [=====] - 8s 2us/step - loss: 0.5840 -
mse: 0.5840 - val_loss: 0.6748 - val_mse: 0.6748
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9718 -
mse: 0.9718 - val_loss: 0.7999 - val_mse: 0.7999
Epoch 2/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8537 -
mse: 0.8537 - val_loss: 0.8599 - val_mse: 0.8599
Epoch 3/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8352 -
mse: 0.8352 - val_loss: 0.8339 - val_mse: 0.8339
Epoch 4/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8235 -
mse: 0.8235 - val_loss: 0.8596 - val_mse: 0.8596
Epoch 5/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8135 -

```

```

mse: 0.8135 - val_loss: 0.8202 - val_mse: 0.8202
Epoch 6/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8052 -
mse: 0.8053 - val_loss: 0.8154 - val_mse: 0.8154
Epoch 7/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7974 -
mse: 0.7974 - val_loss: 0.8235 - val_mse: 0.8235
Epoch 8/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7909 -
mse: 0.7909 - val_loss: 0.8207 - val_mse: 0.8207
Epoch 9/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.7848 -
mse: 0.7848 - val_loss: 0.8076 - val_mse: 0.8076
Epoch 10/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7803 -
mse: 0.7803 - val_loss: 0.7960 - val_mse: 0.7960
Epoch 11/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7751 -
mse: 0.7751 - val_loss: 0.7950 - val_mse: 0.7950
Epoch 12/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7713 -
mse: 0.7713 - val_loss: 0.7842 - val_mse: 0.7842
Epoch 13/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7683 -
mse: 0.7683 - val_loss: 0.7828 - val_mse: 0.7828
Epoch 14/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7641 -
mse: 0.7641 - val_loss: 0.7698 - val_mse: 0.7698
Epoch 15/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.7618 -
mse: 0.7618 - val_loss: 0.7739 - val_mse: 0.7739
Epoch 16/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7588 -
mse: 0.7588 - val_loss: 0.7817 - val_mse: 0.7817
Epoch 17/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7563 -
mse: 0.7563 - val_loss: 0.7702 - val_mse: 0.7702
Epoch 18/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7545 -
mse: 0.7545 - val_loss: 0.7629 - val_mse: 0.7629
Epoch 19/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7525 -
mse: 0.7525 - val_loss: 0.7741 - val_mse: 0.7741
Epoch 20/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7506 -
mse: 0.7506 - val_loss: 0.7690 - val_mse: 0.7690
Epoch 21/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7484 -

```

```

mse: 0.7484 - val_loss: 0.7560 - val_mse: 0.7560
Epoch 22/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7467 -
mse: 0.7467 - val_loss: 0.7615 - val_mse: 0.7615
Epoch 23/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7454 -
mse: 0.7454 - val_loss: 0.7545 - val_mse: 0.7545
Epoch 24/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7434 -
mse: 0.7434 - val_loss: 0.7620 - val_mse: 0.7620
Epoch 25/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7421 -
mse: 0.7421 - val_loss: 0.7606 - val_mse: 0.7606
Epoch 26/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7414 -
mse: 0.7414 - val_loss: 0.7470 - val_mse: 0.7470
Epoch 27/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7399 -
mse: 0.7399 - val_loss: 0.7560 - val_mse: 0.7560
Epoch 28/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7380 -
mse: 0.7380 - val_loss: 0.7689 - val_mse: 0.7689
Epoch 29/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7372 -
mse: 0.7372 - val_loss: 0.7606 - val_mse: 0.7606
Epoch 30/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7361 -
mse: 0.7361 - val_loss: 0.7538 - val_mse: 0.7538
Epoch 31/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7340 -
mse: 0.7340 - val_loss: 0.7589 - val_mse: 0.7589
Epoch 32/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7338 -
mse: 0.7338 - val_loss: 0.7608 - val_mse: 0.7608
Epoch 33/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7323 -
mse: 0.7323 - val_loss: 0.7496 - val_mse: 0.7496
Epoch 34/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7312 -
mse: 0.7312 - val_loss: 0.7504 - val_mse: 0.7504
Epoch 35/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7304 -
mse: 0.7304 - val_loss: 0.7666 - val_mse: 0.7666
Epoch 36/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7290 -
mse: 0.7290 - val_loss: 0.7559 - val_mse: 0.7559
Epoch 37/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7284 -

```

```

mse: 0.7284 - val_loss: 0.7541 - val_mse: 0.7541
Epoch 38/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7277 -
mse: 0.7277 - val_loss: 0.7516 - val_mse: 0.7516
Epoch 39/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7260 -
mse: 0.7260 - val_loss: 0.7411 - val_mse: 0.7411
Epoch 40/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7259 -
mse: 0.7259 - val_loss: 0.7440 - val_mse: 0.7440
Epoch 41/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7236 -
mse: 0.7236 - val_loss: 0.7477 - val_mse: 0.7477
Epoch 42/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7228 -
mse: 0.7228 - val_loss: 0.7467 - val_mse: 0.7467
Epoch 43/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7217 -
mse: 0.7217 - val_loss: 0.7480 - val_mse: 0.7480
Epoch 44/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7217 -
mse: 0.7217 - val_loss: 0.7423 - val_mse: 0.7423
Epoch 45/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7202 -
mse: 0.7202 - val_loss: 0.7547 - val_mse: 0.7547
Epoch 46/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7192 -
mse: 0.7192 - val_loss: 0.7406 - val_mse: 0.7406
Epoch 47/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7190 -
mse: 0.7190 - val_loss: 0.7446 - val_mse: 0.7446
Epoch 48/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7173 -
mse: 0.7173 - val_loss: 0.7463 - val_mse: 0.7463
Epoch 49/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7170 -
mse: 0.7170 - val_loss: 0.7392 - val_mse: 0.7392
Epoch 50/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7158 -
mse: 0.7158 - val_loss: 0.7427 - val_mse: 0.7427
Epoch 51/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7149 -
mse: 0.7149 - val_loss: 0.7469 - val_mse: 0.7469
Epoch 52/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7138 -
mse: 0.7138 - val_loss: 0.7439 - val_mse: 0.7439
Epoch 53/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7126 -

```

```

mse: 0.7126 - val_loss: 0.7452 - val_mse: 0.7452
Epoch 54/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7123 -
mse: 0.7123 - val_loss: 0.7560 - val_mse: 0.7560
Epoch 55/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7112 -
mse: 0.7112 - val_loss: 0.7421 - val_mse: 0.7421
Epoch 56/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7111 -
mse: 0.7111 - val_loss: 0.7597 - val_mse: 0.7597
Epoch 57/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7098 -
mse: 0.7098 - val_loss: 0.7402 - val_mse: 0.7402
Epoch 58/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7095 -
mse: 0.7095 - val_loss: 0.7393 - val_mse: 0.7393
Epoch 59/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7084 -
mse: 0.7084 - val_loss: 0.7534 - val_mse: 0.7534
Epoch 60/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7077 -
mse: 0.7077 - val_loss: 0.7464 - val_mse: 0.7464
Epoch 61/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7071 -
mse: 0.7071 - val_loss: 0.7358 - val_mse: 0.7358
Epoch 62/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7057 -
mse: 0.7057 - val_loss: 0.7353 - val_mse: 0.7353
Epoch 63/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7050 -
mse: 0.7050 - val_loss: 0.7415 - val_mse: 0.7415
Epoch 64/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7044 -
mse: 0.7044 - val_loss: 0.7460 - val_mse: 0.7460
Epoch 65/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7036 -
mse: 0.7036 - val_loss: 0.7357 - val_mse: 0.7357
Epoch 66/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7029 -
mse: 0.7029 - val_loss: 0.7354 - val_mse: 0.7354
Epoch 67/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7020 -
mse: 0.7020 - val_loss: 0.7440 - val_mse: 0.7440
Epoch 68/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7015 -
mse: 0.7015 - val_loss: 0.7419 - val_mse: 0.7419
Epoch 69/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7009 -

```

```

mse: 0.7009 - val_loss: 0.7384 - val_mse: 0.7384
Epoch 70/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6998 -
mse: 0.6998 - val_loss: 0.7361 - val_mse: 0.7361
Epoch 71/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6988 -
mse: 0.6988 - val_loss: 0.7444 - val_mse: 0.7444
Epoch 72/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6980 -
mse: 0.6980 - val_loss: 0.7340 - val_mse: 0.7340
Epoch 73/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6983 -
mse: 0.6983 - val_loss: 0.7430 - val_mse: 0.7430
Epoch 74/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6969 -
mse: 0.6969 - val_loss: 0.7374 - val_mse: 0.7374
Epoch 75/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6965 -
mse: 0.6965 - val_loss: 0.7337 - val_mse: 0.7337
Epoch 76/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6960 -
mse: 0.6960 - val_loss: 0.7436 - val_mse: 0.7436
Epoch 77/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6951 -
mse: 0.6951 - val_loss: 0.7376 - val_mse: 0.7376
Epoch 78/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6942 -
mse: 0.6942 - val_loss: 0.7346 - val_mse: 0.7346
Epoch 79/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6940 -
mse: 0.6940 - val_loss: 0.7425 - val_mse: 0.7425
Epoch 80/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6931 -
mse: 0.6931 - val_loss: 0.7421 - val_mse: 0.7421
Epoch 81/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6922 -
mse: 0.6922 - val_loss: 0.7351 - val_mse: 0.7351
Epoch 82/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6917 -
mse: 0.6917 - val_loss: 0.7412 - val_mse: 0.7412
Epoch 83/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6915 -
mse: 0.6915 - val_loss: 0.7416 - val_mse: 0.7416
Epoch 84/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6904 -
mse: 0.6904 - val_loss: 0.7420 - val_mse: 0.7420
Epoch 85/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6904 -

```

```

mse: 0.6904 - val_loss: 0.7390 - val_mse: 0.7390
Epoch 86/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6890 -
mse: 0.6890 - val_loss: 0.7387 - val_mse: 0.7387
Epoch 87/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6889 -
mse: 0.6889 - val_loss: 0.7366 - val_mse: 0.7366
Epoch 88/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6880 -
mse: 0.6880 - val_loss: 0.7363 - val_mse: 0.7363
Epoch 89/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6875 -
mse: 0.6875 - val_loss: 0.7398 - val_mse: 0.7398
Epoch 90/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6873 -
mse: 0.6873 - val_loss: 0.7432 - val_mse: 0.7432
Epoch 91/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6867 -
mse: 0.6867 - val_loss: 0.7374 - val_mse: 0.7374
Epoch 92/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6855 -
mse: 0.6855 - val_loss: 0.7407 - val_mse: 0.7407
Epoch 93/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6851 -
mse: 0.6851 - val_loss: 0.7538 - val_mse: 0.7538
Epoch 94/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6852 -
mse: 0.6852 - val_loss: 0.7443 - val_mse: 0.7443
Epoch 95/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6843 -
mse: 0.6843 - val_loss: 0.7369 - val_mse: 0.7369
Epoch 96/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6837 -
mse: 0.6837 - val_loss: 0.7358 - val_mse: 0.7358
Epoch 97/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6834 -
mse: 0.6834 - val_loss: 0.7310 - val_mse: 0.7310
Epoch 98/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6822 -
mse: 0.6822 - val_loss: 0.7384 - val_mse: 0.7384
Epoch 99/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6818 -
mse: 0.6818 - val_loss: 0.7438 - val_mse: 0.7438
Epoch 100/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6821 -
mse: 0.6821 - val_loss: 0.7395 - val_mse: 0.7395
Epoch 101/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6809 -

```

```

mse: 0.6809 - val_loss: 0.7585 - val_mse: 0.7585
Epoch 102/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6802 -
mse: 0.6802 - val_loss: 0.7445 - val_mse: 0.7445
Epoch 103/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6792 -
mse: 0.6792 - val_loss: 0.7381 - val_mse: 0.7381
Epoch 104/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6790 -
mse: 0.6790 - val_loss: 0.7585 - val_mse: 0.7585
Epoch 105/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6787 -
mse: 0.6787 - val_loss: 0.7372 - val_mse: 0.7372
Epoch 106/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6783 -
mse: 0.6783 - val_loss: 0.7370 - val_mse: 0.7370
Epoch 107/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6775 -
mse: 0.6775 - val_loss: 0.7374 - val_mse: 0.7374
Epoch 108/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6770 -
mse: 0.6770 - val_loss: 0.7401 - val_mse: 0.7401
Epoch 109/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6765 -
mse: 0.6765 - val_loss: 0.7377 - val_mse: 0.7377
Epoch 110/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6760 -
mse: 0.6760 - val_loss: 0.7300 - val_mse: 0.7300
Epoch 111/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6755 -
mse: 0.6755 - val_loss: 0.7511 - val_mse: 0.7511
Epoch 112/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6756 -
mse: 0.6756 - val_loss: 0.7499 - val_mse: 0.7499
Epoch 113/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6744 -
mse: 0.6744 - val_loss: 0.7493 - val_mse: 0.7493
Epoch 114/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6748 -
mse: 0.6748 - val_loss: 0.7428 - val_mse: 0.7428
Epoch 115/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6743 -
mse: 0.6743 - val_loss: 0.7381 - val_mse: 0.7381
Epoch 116/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6728 -
mse: 0.6728 - val_loss: 0.7529 - val_mse: 0.7529
Epoch 117/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6724 -

```



```

mse: 0.6724 - val_loss: 0.7341 - val_mse: 0.7341
Epoch 118/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6725 -
mse: 0.6725 - val_loss: 0.7351 - val_mse: 0.7351
Epoch 119/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6714 -
mse: 0.6714 - val_loss: 0.7378 - val_mse: 0.7378
Epoch 120/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6719 -
mse: 0.6719 - val_loss: 0.7471 - val_mse: 0.7471
Epoch 121/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6705 -
mse: 0.6705 - val_loss: 0.7496 - val_mse: 0.7496
Epoch 122/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6703 -
mse: 0.6703 - val_loss: 0.7472 - val_mse: 0.7472
Epoch 123/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6697 -
mse: 0.6697 - val_loss: 0.7509 - val_mse: 0.7509
Epoch 124/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6698 -
mse: 0.6698 - val_loss: 0.7397 - val_mse: 0.7397
Epoch 125/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6695 -
mse: 0.6695 - val_loss: 0.7453 - val_mse: 0.7453
Epoch 126/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6683 -
mse: 0.6683 - val_loss: 0.7312 - val_mse: 0.7312
Epoch 127/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6682 -
mse: 0.6682 - val_loss: 0.7426 - val_mse: 0.7426
Epoch 128/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6673 -
mse: 0.6673 - val_loss: 0.7401 - val_mse: 0.7401
Epoch 129/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6671 -
mse: 0.6671 - val_loss: 0.7695 - val_mse: 0.7695
Epoch 130/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6668 -
mse: 0.6668 - val_loss: 0.7566 - val_mse: 0.7566
Epoch 131/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6659 -
mse: 0.6659 - val_loss: 0.7404 - val_mse: 0.7404
Epoch 132/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6659 -
mse: 0.6659 - val_loss: 0.7809 - val_mse: 0.7809
Epoch 133/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6651 -

```

```

mse: 0.6651 - val_loss: 0.7546 - val_mse: 0.7546
Epoch 134/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6646 -
mse: 0.6646 - val_loss: 0.7526 - val_mse: 0.7526
Epoch 135/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6644 -
mse: 0.6644 - val_loss: 0.7429 - val_mse: 0.7429
Epoch 136/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6638 -
mse: 0.6638 - val_loss: 0.7635 - val_mse: 0.7635
Epoch 137/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6636 -
mse: 0.6636 - val_loss: 0.7527 - val_mse: 0.7527
Epoch 138/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6627 -
mse: 0.6627 - val_loss: 0.7691 - val_mse: 0.7691
Epoch 139/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6634 -
mse: 0.6634 - val_loss: 0.7610 - val_mse: 0.7610
Epoch 140/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6618 -
mse: 0.6618 - val_loss: 0.7399 - val_mse: 0.7399
Epoch 141/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6617 -
mse: 0.6617 - val_loss: 0.8319 - val_mse: 0.8319
Epoch 142/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6620 -
mse: 0.6620 - val_loss: 0.7582 - val_mse: 0.7582
Epoch 143/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6605 -
mse: 0.6605 - val_loss: 0.7473 - val_mse: 0.7473
Epoch 144/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6598 -
mse: 0.6598 - val_loss: 0.7651 - val_mse: 0.7651
Epoch 145/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6596 -
mse: 0.6596 - val_loss: 0.7550 - val_mse: 0.7550
Epoch 146/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6592 -
mse: 0.6592 - val_loss: 0.7926 - val_mse: 0.7926
Epoch 147/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6588 -
mse: 0.6588 - val_loss: 0.7654 - val_mse: 0.7654
Epoch 148/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6586 -
mse: 0.6586 - val_loss: 0.7622 - val_mse: 0.7622
Epoch 149/150
3353318/3353318 [=====] - 7s 2us/step - loss: 0.6581 -

```

```

mse: 0.6581 - val_loss: 0.7692 - val_mse: 0.7692
Epoch 150/150
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6574 -
mse: 0.6574 - val_loss: 0.7810 - val_mse: 0.7810
1676658/1676658 [=====] - 2s 1us/step
Train on 3353317 samples, validate on 221802 samples
Epoch 1/200
3353317/3353317 [=====] - 7s 2us/step - loss: 0.9560 -
mse: 0.9560 - val_loss: 0.7756 - val_mse: 0.7756
Epoch 2/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8455 -
mse: 0.8455 - val_loss: 0.7742 - val_mse: 0.7742
Epoch 3/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8267 -
mse: 0.8267 - val_loss: 0.7676 - val_mse: 0.7676
Epoch 4/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8133 -
mse: 0.8133 - val_loss: 0.7631 - val_mse: 0.7631
Epoch 5/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8024 -
mse: 0.8024 - val_loss: 0.7712 - val_mse: 0.7712
Epoch 6/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7926 -
mse: 0.7926 - val_loss: 0.7553 - val_mse: 0.7553
Epoch 7/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7840 -
mse: 0.7840 - val_loss: 0.7569 - val_mse: 0.7569
Epoch 8/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7757 -
mse: 0.7757 - val_loss: 0.7539 - val_mse: 0.7539
Epoch 9/200
3353317/3353317 [=====] - 7s 2us/step - loss: 0.7684 -
mse: 0.7684 - val_loss: 0.7450 - val_mse: 0.7450
Epoch 10/200
3353317/3353317 [=====] - 7s 2us/step - loss: 0.7613 -
mse: 0.7613 - val_loss: 0.7488 - val_mse: 0.7488
Epoch 11/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7551 -
mse: 0.7551 - val_loss: 0.7596 - val_mse: 0.7596
Epoch 12/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7502 -
mse: 0.7502 - val_loss: 0.7359 - val_mse: 0.7359
Epoch 13/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7452 -
mse: 0.7452 - val_loss: 0.7330 - val_mse: 0.7330
Epoch 14/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7412 -
mse: 0.7412 - val_loss: 0.7350 - val_mse: 0.7350

```

Epoch 15/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7374 -  
mse: 0.7374 - val\_loss: 0.7319 - val\_mse: 0.7319  
Epoch 16/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7341 -  
mse: 0.7341 - val\_loss: 0.7441 - val\_mse: 0.7441  
Epoch 17/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7315 -  
mse: 0.7315 - val\_loss: 0.7374 - val\_mse: 0.7374  
Epoch 18/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7286 -  
mse: 0.7286 - val\_loss: 0.7278 - val\_mse: 0.7278  
Epoch 19/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7264 -  
mse: 0.7264 - val\_loss: 0.7291 - val\_mse: 0.7291  
Epoch 20/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7238 -  
mse: 0.7238 - val\_loss: 0.7233 - val\_mse: 0.7233  
Epoch 21/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7213 -  
mse: 0.7213 - val\_loss: 0.7232 - val\_mse: 0.7232  
Epoch 22/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7200 -  
mse: 0.7200 - val\_loss: 0.7208 - val\_mse: 0.7208  
Epoch 23/200  
3353317/3353317 [=====] - 7s 2us/step - loss: 0.7184 -  
mse: 0.7184 - val\_loss: 0.7229 - val\_mse: 0.7229  
Epoch 24/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7163 -  
mse: 0.7163 - val\_loss: 0.7156 - val\_mse: 0.7156  
Epoch 25/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7144 -  
mse: 0.7144 - val\_loss: 0.7203 - val\_mse: 0.7203  
Epoch 26/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7134 -  
mse: 0.7134 - val\_loss: 0.7190 - val\_mse: 0.7190  
Epoch 27/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7121 -  
mse: 0.7121 - val\_loss: 0.7170 - val\_mse: 0.7170  
Epoch 28/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7102 -  
mse: 0.7102 - val\_loss: 0.7190 - val\_mse: 0.7190  
Epoch 29/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7093 -  
mse: 0.7093 - val\_loss: 0.7124 - val\_mse: 0.7124  
Epoch 30/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7072 -  
mse: 0.7072 - val\_loss: 0.7145 - val\_mse: 0.7145

Epoch 31/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7063 -  
mse: 0.7063 - val\_loss: 0.7098 - val\_mse: 0.7098  
Epoch 32/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7047 -  
mse: 0.7047 - val\_loss: 0.7178 - val\_mse: 0.7178  
Epoch 33/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7034 -  
mse: 0.7034 - val\_loss: 0.7112 - val\_mse: 0.7112  
Epoch 34/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7019 -  
mse: 0.7019 - val\_loss: 0.7172 - val\_mse: 0.7172  
Epoch 35/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7014 -  
mse: 0.7014 - val\_loss: 0.7192 - val\_mse: 0.7192  
Epoch 36/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7003 -  
mse: 0.7003 - val\_loss: 0.7103 - val\_mse: 0.7103  
Epoch 37/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6987 -  
mse: 0.6987 - val\_loss: 0.7052 - val\_mse: 0.7052  
Epoch 38/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6977 -  
mse: 0.6977 - val\_loss: 0.7023 - val\_mse: 0.7023  
Epoch 39/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6961 -  
mse: 0.6961 - val\_loss: 0.7076 - val\_mse: 0.7076  
Epoch 40/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6955 -  
mse: 0.6955 - val\_loss: 0.7222 - val\_mse: 0.7222  
Epoch 41/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6942 -  
mse: 0.6942 - val\_loss: 0.7067 - val\_mse: 0.7067  
Epoch 42/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6935 -  
mse: 0.6935 - val\_loss: 0.7148 - val\_mse: 0.7148  
Epoch 43/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6921 -  
mse: 0.6921 - val\_loss: 0.7100 - val\_mse: 0.7100  
Epoch 44/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6907 -  
mse: 0.6907 - val\_loss: 0.7015 - val\_mse: 0.7015  
Epoch 45/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6900 -  
mse: 0.6900 - val\_loss: 0.6964 - val\_mse: 0.6964  
Epoch 46/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6893 -  
mse: 0.6893 - val\_loss: 0.6971 - val\_mse: 0.6971

Epoch 47/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6881 -  
mse: 0.6881 - val\_loss: 0.7037 - val\_mse: 0.7037  
Epoch 48/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6874 -  
mse: 0.6874 - val\_loss: 0.7014 - val\_mse: 0.7014  
Epoch 49/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6864 -  
mse: 0.6864 - val\_loss: 0.7113 - val\_mse: 0.7113  
Epoch 50/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6853 -  
mse: 0.6853 - val\_loss: 0.6953 - val\_mse: 0.6953  
Epoch 51/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6847 -  
mse: 0.6847 - val\_loss: 0.7123 - val\_mse: 0.7123  
Epoch 52/200  
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6840 -  
mse: 0.6840 - val\_loss: 0.6959 - val\_mse: 0.6959  
Epoch 53/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6825 -  
mse: 0.6825 - val\_loss: 0.7045 - val\_mse: 0.7045  
Epoch 54/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6814 -  
mse: 0.6814 - val\_loss: 0.6923 - val\_mse: 0.6923  
Epoch 55/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6809 -  
mse: 0.6809 - val\_loss: 0.6961 - val\_mse: 0.6961  
Epoch 56/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6799 -  
mse: 0.6799 - val\_loss: 0.6934 - val\_mse: 0.6934  
Epoch 57/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6788 -  
mse: 0.6788 - val\_loss: 0.7088 - val\_mse: 0.7088  
Epoch 58/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6786 -  
mse: 0.6786 - val\_loss: 0.6927 - val\_mse: 0.6927  
Epoch 59/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6773 -  
mse: 0.6773 - val\_loss: 0.6924 - val\_mse: 0.6924  
Epoch 60/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6766 -  
mse: 0.6766 - val\_loss: 0.7064 - val\_mse: 0.7064  
Epoch 61/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6756 -  
mse: 0.6756 - val\_loss: 0.6991 - val\_mse: 0.6991  
Epoch 62/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6756 -  
mse: 0.6756 - val\_loss: 0.6913 - val\_mse: 0.6913

Epoch 63/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6739 -  
mse: 0.6739 - val\_loss: 0.6914 - val\_mse: 0.6914  
Epoch 64/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6733 -  
mse: 0.6733 - val\_loss: 0.6900 - val\_mse: 0.6900  
Epoch 65/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6723 -  
mse: 0.6723 - val\_loss: 0.6912 - val\_mse: 0.6912  
Epoch 66/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6720 -  
mse: 0.6720 - val\_loss: 0.6998 - val\_mse: 0.6998  
Epoch 67/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6710 -  
mse: 0.6710 - val\_loss: 0.6868 - val\_mse: 0.6868  
Epoch 68/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6703 -  
mse: 0.6703 - val\_loss: 0.6857 - val\_mse: 0.6857  
Epoch 69/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6691 -  
mse: 0.6691 - val\_loss: 0.6860 - val\_mse: 0.6860  
Epoch 70/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6692 -  
mse: 0.6692 - val\_loss: 0.6848 - val\_mse: 0.6848  
Epoch 71/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6679 -  
mse: 0.6679 - val\_loss: 0.7101 - val\_mse: 0.7101  
Epoch 72/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6671 -  
mse: 0.6671 - val\_loss: 0.6846 - val\_mse: 0.6846  
Epoch 73/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6668 -  
mse: 0.6668 - val\_loss: 0.6986 - val\_mse: 0.6986  
Epoch 74/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6658 -  
mse: 0.6658 - val\_loss: 0.6856 - val\_mse: 0.6856  
Epoch 75/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6651 -  
mse: 0.6651 - val\_loss: 0.6920 - val\_mse: 0.6920  
Epoch 76/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6646 -  
mse: 0.6646 - val\_loss: 0.6997 - val\_mse: 0.6997  
Epoch 77/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6639 -  
mse: 0.6639 - val\_loss: 0.6804 - val\_mse: 0.6804  
Epoch 78/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6631 -  
mse: 0.6631 - val\_loss: 0.6821 - val\_mse: 0.6821

Epoch 79/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6623 -  
mse: 0.6623 - val\_loss: 0.6855 - val\_mse: 0.6855  
Epoch 80/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6617 -  
mse: 0.6617 - val\_loss: 0.6857 - val\_mse: 0.6857  
Epoch 81/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6615 -  
mse: 0.6615 - val\_loss: 0.6842 - val\_mse: 0.6842  
Epoch 82/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6609 -  
mse: 0.6609 - val\_loss: 0.6849 - val\_mse: 0.6849  
Epoch 83/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6599 -  
mse: 0.6599 - val\_loss: 0.6808 - val\_mse: 0.6808  
Epoch 84/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6594 -  
mse: 0.6594 - val\_loss: 0.6788 - val\_mse: 0.6788  
Epoch 85/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6587 -  
mse: 0.6587 - val\_loss: 0.6851 - val\_mse: 0.6851  
Epoch 86/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6585 -  
mse: 0.6585 - val\_loss: 0.6862 - val\_mse: 0.6862  
Epoch 87/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6575 -  
mse: 0.6575 - val\_loss: 0.6812 - val\_mse: 0.6812  
Epoch 88/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6571 -  
mse: 0.6571 - val\_loss: 0.6804 - val\_mse: 0.6804  
Epoch 89/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6561 -  
mse: 0.6561 - val\_loss: 0.6781 - val\_mse: 0.6781  
Epoch 90/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6560 -  
mse: 0.6560 - val\_loss: 0.6765 - val\_mse: 0.6765  
Epoch 91/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6555 -  
mse: 0.6555 - val\_loss: 0.6830 - val\_mse: 0.6830  
Epoch 92/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6546 -  
mse: 0.6546 - val\_loss: 0.6778 - val\_mse: 0.6778  
Epoch 93/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6542 -  
mse: 0.6542 - val\_loss: 0.6770 - val\_mse: 0.6770  
Epoch 94/200  
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6535 -  
mse: 0.6535 - val\_loss: 0.6782 - val\_mse: 0.6782



Epoch 95/200  
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6534 -  
mse: 0.6534 - val\_loss: 0.6919 - val\_mse: 0.6919  
Epoch 96/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6529 -  
mse: 0.6529 - val\_loss: 0.6906 - val\_mse: 0.6906  
Epoch 97/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6517 -  
mse: 0.6517 - val\_loss: 0.6788 - val\_mse: 0.6788  
Epoch 98/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6521 -  
mse: 0.6521 - val\_loss: 0.6903 - val\_mse: 0.6903  
Epoch 99/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6507 -  
mse: 0.6507 - val\_loss: 0.6741 - val\_mse: 0.6741  
Epoch 100/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6507 -  
mse: 0.6507 - val\_loss: 0.7008 - val\_mse: 0.7008  
Epoch 101/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6498 -  
mse: 0.6498 - val\_loss: 0.6826 - val\_mse: 0.6826  
Epoch 102/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6496 -  
mse: 0.6496 - val\_loss: 0.6766 - val\_mse: 0.6766  
Epoch 103/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6487 -  
mse: 0.6487 - val\_loss: 0.6787 - val\_mse: 0.6787  
Epoch 104/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6492 -  
mse: 0.6492 - val\_loss: 0.6854 - val\_mse: 0.6854  
Epoch 105/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6487 -  
mse: 0.6487 - val\_loss: 0.6807 - val\_mse: 0.6807  
Epoch 106/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6478 -  
mse: 0.6478 - val\_loss: 0.6784 - val\_mse: 0.6784  
Epoch 107/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6469 -  
mse: 0.6469 - val\_loss: 0.6837 - val\_mse: 0.6837  
Epoch 108/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6471 -  
mse: 0.6471 - val\_loss: 0.6779 - val\_mse: 0.6779  
Epoch 109/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6458 -  
mse: 0.6458 - val\_loss: 0.6769 - val\_mse: 0.6769  
Epoch 110/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6456 -  
mse: 0.6456 - val\_loss: 0.6832 - val\_mse: 0.6832

Epoch 111/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6456 -  
mse: 0.6456 - val\_loss: 0.6752 - val\_mse: 0.6752  
Epoch 112/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6446 -  
mse: 0.6446 - val\_loss: 0.6726 - val\_mse: 0.6726  
Epoch 113/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6441 -  
mse: 0.6441 - val\_loss: 0.6774 - val\_mse: 0.6774  
Epoch 114/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6441 -  
mse: 0.6441 - val\_loss: 0.6735 - val\_mse: 0.6735  
Epoch 115/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6441 -  
mse: 0.6441 - val\_loss: 0.6775 - val\_mse: 0.6775  
Epoch 116/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6434 -  
mse: 0.6434 - val\_loss: 0.6764 - val\_mse: 0.6764  
Epoch 117/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6429 -  
mse: 0.6429 - val\_loss: 0.6865 - val\_mse: 0.6865  
Epoch 118/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6416 -  
mse: 0.6416 - val\_loss: 0.6741 - val\_mse: 0.6741  
Epoch 119/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6413 -  
mse: 0.6413 - val\_loss: 0.6818 - val\_mse: 0.6818  
Epoch 120/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6420 -  
mse: 0.6420 - val\_loss: 0.6732 - val\_mse: 0.6732  
Epoch 121/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6410 -  
mse: 0.6410 - val\_loss: 0.6755 - val\_mse: 0.6755  
Epoch 122/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6401 -  
mse: 0.6401 - val\_loss: 0.6750 - val\_mse: 0.6750  
Epoch 123/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6399 -  
mse: 0.6399 - val\_loss: 0.6803 - val\_mse: 0.6803  
Epoch 124/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6397 -  
mse: 0.6397 - val\_loss: 0.6837 - val\_mse: 0.6837  
Epoch 125/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6398 -  
mse: 0.6398 - val\_loss: 0.6830 - val\_mse: 0.6830  
Epoch 126/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6389 -  
mse: 0.6389 - val\_loss: 0.6701 - val\_mse: 0.6701

Epoch 127/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6386 -  
mse: 0.6386 - val\_loss: 0.6789 - val\_mse: 0.6789

Epoch 128/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6381 -  
mse: 0.6381 - val\_loss: 0.6702 - val\_mse: 0.6702

Epoch 129/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6376 -  
mse: 0.6376 - val\_loss: 0.6748 - val\_mse: 0.6748

Epoch 130/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6373 -  
mse: 0.6373 - val\_loss: 0.6694 - val\_mse: 0.6694

Epoch 131/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6370 -  
mse: 0.6370 - val\_loss: 0.6766 - val\_mse: 0.6766

Epoch 132/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6370 -  
mse: 0.6370 - val\_loss: 0.6716 - val\_mse: 0.6716

Epoch 133/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6358 -  
mse: 0.6358 - val\_loss: 0.6771 - val\_mse: 0.6771

Epoch 134/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6356 -  
mse: 0.6356 - val\_loss: 0.6684 - val\_mse: 0.6684

Epoch 135/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6350 -  
mse: 0.6350 - val\_loss: 0.6657 - val\_mse: 0.6657

Epoch 136/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6351 -  
mse: 0.6351 - val\_loss: 0.6808 - val\_mse: 0.6808

Epoch 137/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6341 -  
mse: 0.6341 - val\_loss: 0.6690 - val\_mse: 0.6690

Epoch 138/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6336 -  
mse: 0.6336 - val\_loss: 0.6731 - val\_mse: 0.6731

Epoch 139/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6338 -  
mse: 0.6338 - val\_loss: 0.6705 - val\_mse: 0.6705

Epoch 140/200  
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6331 -  
mse: 0.6331 - val\_loss: 0.6800 - val\_mse: 0.6800

Epoch 141/200  
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6325 -  
mse: 0.6325 - val\_loss: 0.6700 - val\_mse: 0.6700

Epoch 142/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6324 -  
mse: 0.6324 - val\_loss: 0.6705 - val\_mse: 0.6705

Epoch 143/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6317 -  
mse: 0.6317 - val\_loss: 0.6722 - val\_mse: 0.6722

Epoch 144/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6317 -  
mse: 0.6317 - val\_loss: 0.6676 - val\_mse: 0.6676

Epoch 145/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6313 -  
mse: 0.6313 - val\_loss: 0.6759 - val\_mse: 0.6759

Epoch 146/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6307 -  
mse: 0.6307 - val\_loss: 0.6818 - val\_mse: 0.6818

Epoch 147/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6299 -  
mse: 0.6299 - val\_loss: 0.6705 - val\_mse: 0.6705

Epoch 148/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6304 -  
mse: 0.6304 - val\_loss: 0.6726 - val\_mse: 0.6726

Epoch 149/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6298 -  
mse: 0.6298 - val\_loss: 0.6794 - val\_mse: 0.6794

Epoch 150/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6294 -  
mse: 0.6294 - val\_loss: 0.6655 - val\_mse: 0.6655

Epoch 151/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6290 -  
mse: 0.6290 - val\_loss: 0.6692 - val\_mse: 0.6692

Epoch 152/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6283 -  
mse: 0.6283 - val\_loss: 0.6691 - val\_mse: 0.6691

Epoch 153/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6289 -  
mse: 0.6289 - val\_loss: 0.6683 - val\_mse: 0.6683

Epoch 154/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6280 -  
mse: 0.6280 - val\_loss: 0.6672 - val\_mse: 0.6672

Epoch 155/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6279 -  
mse: 0.6279 - val\_loss: 0.6728 - val\_mse: 0.6728

Epoch 156/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6274 -  
mse: 0.6274 - val\_loss: 0.6811 - val\_mse: 0.6811

Epoch 157/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6267 -  
mse: 0.6267 - val\_loss: 0.6659 - val\_mse: 0.6659

Epoch 158/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6266 -  
mse: 0.6266 - val\_loss: 0.6645 - val\_mse: 0.6645

Epoch 159/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6263 -  
mse: 0.6263 - val\_loss: 0.6734 - val\_mse: 0.6734  
Epoch 160/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6261 -  
mse: 0.6261 - val\_loss: 0.6659 - val\_mse: 0.6659  
Epoch 161/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6252 -  
mse: 0.6252 - val\_loss: 0.6748 - val\_mse: 0.6748  
Epoch 162/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6252 -  
mse: 0.6252 - val\_loss: 0.6787 - val\_mse: 0.6787  
Epoch 163/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6250 -  
mse: 0.6250 - val\_loss: 0.6867 - val\_mse: 0.6867  
Epoch 164/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6242 -  
mse: 0.6242 - val\_loss: 0.6683 - val\_mse: 0.6683  
Epoch 165/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6239 -  
mse: 0.6239 - val\_loss: 0.6671 - val\_mse: 0.6671  
Epoch 166/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6237 -  
mse: 0.6237 - val\_loss: 0.6700 - val\_mse: 0.6700  
Epoch 167/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6233 -  
mse: 0.6233 - val\_loss: 0.6599 - val\_mse: 0.6599  
Epoch 168/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6232 -  
mse: 0.6232 - val\_loss: 0.6768 - val\_mse: 0.6768  
Epoch 169/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6229 -  
mse: 0.6229 - val\_loss: 0.6696 - val\_mse: 0.6696  
Epoch 170/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6221 -  
mse: 0.6221 - val\_loss: 0.6613 - val\_mse: 0.6613  
Epoch 171/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6217 -  
mse: 0.6217 - val\_loss: 0.6687 - val\_mse: 0.6687  
Epoch 172/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6220 -  
mse: 0.6220 - val\_loss: 0.6739 - val\_mse: 0.6739  
Epoch 173/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6216 -  
mse: 0.6216 - val\_loss: 0.6633 - val\_mse: 0.6633  
Epoch 174/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6206 -  
mse: 0.6206 - val\_loss: 0.6601 - val\_mse: 0.6601

Epoch 175/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6205 -  
mse: 0.6205 - val\_loss: 0.6636 - val\_mse: 0.6636  
Epoch 176/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6199 -  
mse: 0.6199 - val\_loss: 0.6693 - val\_mse: 0.6693  
Epoch 177/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6198 -  
mse: 0.6198 - val\_loss: 0.6697 - val\_mse: 0.6697  
Epoch 178/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6196 -  
mse: 0.6196 - val\_loss: 0.6667 - val\_mse: 0.6667  
Epoch 179/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6194 -  
mse: 0.6194 - val\_loss: 0.6771 - val\_mse: 0.6771  
Epoch 180/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6193 -  
mse: 0.6193 - val\_loss: 0.6610 - val\_mse: 0.6610  
Epoch 181/200  
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6188 -  
mse: 0.6188 - val\_loss: 0.6664 - val\_mse: 0.6664  
Epoch 182/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6185 -  
mse: 0.6185 - val\_loss: 0.6637 - val\_mse: 0.6637  
Epoch 183/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6177 -  
mse: 0.6177 - val\_loss: 0.6665 - val\_mse: 0.6665  
Epoch 184/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6180 -  
mse: 0.6180 - val\_loss: 0.6752 - val\_mse: 0.6752  
Epoch 185/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6176 -  
mse: 0.6176 - val\_loss: 0.6667 - val\_mse: 0.6667  
Epoch 186/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6173 -  
mse: 0.6173 - val\_loss: 0.6682 - val\_mse: 0.6682  
Epoch 187/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6169 -  
mse: 0.6169 - val\_loss: 0.6798 - val\_mse: 0.6798  
Epoch 188/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6170 -  
mse: 0.6170 - val\_loss: 0.6696 - val\_mse: 0.6696  
Epoch 189/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6155 -  
mse: 0.6155 - val\_loss: 0.6778 - val\_mse: 0.6778  
Epoch 190/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6159 -  
mse: 0.6159 - val\_loss: 0.6634 - val\_mse: 0.6634

Epoch 191/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6155 -  
mse: 0.6155 - val\_loss: 0.6636 - val\_mse: 0.6636  
Epoch 192/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6159 -  
mse: 0.6159 - val\_loss: 0.6639 - val\_mse: 0.6639  
Epoch 193/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6149 -  
mse: 0.6149 - val\_loss: 0.6701 - val\_mse: 0.6701  
Epoch 194/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6145 -  
mse: 0.6145 - val\_loss: 0.6655 - val\_mse: 0.6655  
Epoch 195/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6141 -  
mse: 0.6141 - val\_loss: 0.6772 - val\_mse: 0.6772  
Epoch 196/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6147 -  
mse: 0.6147 - val\_loss: 0.6729 - val\_mse: 0.6729  
Epoch 197/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6134 -  
mse: 0.6134 - val\_loss: 0.6712 - val\_mse: 0.6712  
Epoch 198/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6134 -  
mse: 0.6134 - val\_loss: 0.6696 - val\_mse: 0.6696  
Epoch 199/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6130 -  
mse: 0.6130 - val\_loss: 0.6593 - val\_mse: 0.6593  
Epoch 200/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6128 -  
mse: 0.6128 - val\_loss: 0.6691 - val\_mse: 0.6691  
1676659/1676659 [=====] - 2s 1us/step  
Train on 3353317 samples, validate on 221802 samples  
Epoch 1/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.8474 -  
mse: 0.8474 - val\_loss: 0.7914 - val\_mse: 0.7914  
Epoch 2/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7533 -  
mse: 0.7533 - val\_loss: 0.7923 - val\_mse: 0.7923  
Epoch 3/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7437 -  
mse: 0.7437 - val\_loss: 0.7993 - val\_mse: 0.7993  
Epoch 4/200  
3353317/3353317 [=====] - 8s 3us/step - loss: 0.7367 -  
mse: 0.7367 - val\_loss: 0.7868 - val\_mse: 0.7868  
Epoch 5/200  
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7301 -  
mse: 0.7301 - val\_loss: 0.7857 - val\_mse: 0.7857  
Epoch 6/200

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.7237 -
mse: 0.7237 - val_loss: 0.7819 - val_mse: 0.7819
Epoch 7/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7180 -
mse: 0.7180 - val_loss: 0.7767 - val_mse: 0.7767
Epoch 8/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7123 -
mse: 0.7123 - val_loss: 0.7702 - val_mse: 0.7702
Epoch 9/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7073 -
mse: 0.7073 - val_loss: 0.7707 - val_mse: 0.7707
Epoch 10/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.7032 -
mse: 0.7032 - val_loss: 0.7622 - val_mse: 0.7622
Epoch 11/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6990 -
mse: 0.6990 - val_loss: 0.7652 - val_mse: 0.7652
Epoch 12/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6959 -
mse: 0.6959 - val_loss: 0.7699 - val_mse: 0.7699
Epoch 13/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6926 -
mse: 0.6926 - val_loss: 0.7635 - val_mse: 0.7635
Epoch 14/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6899 -
mse: 0.6899 - val_loss: 0.7629 - val_mse: 0.7629
Epoch 15/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6879 -
mse: 0.6879 - val_loss: 0.7554 - val_mse: 0.7554
Epoch 16/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6860 -
mse: 0.6860 - val_loss: 0.7641 - val_mse: 0.7641
Epoch 17/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6839 -
mse: 0.6839 - val_loss: 0.7501 - val_mse: 0.7501
Epoch 18/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6826 -
mse: 0.6826 - val_loss: 0.7537 - val_mse: 0.7537
Epoch 19/200
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6810 -
mse: 0.6810 - val_loss: 0.7506 - val_mse: 0.7506
Epoch 20/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6793 -
mse: 0.6793 - val_loss: 0.7567 - val_mse: 0.7567
Epoch 21/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6785 -
mse: 0.6785 - val_loss: 0.7474 - val_mse: 0.7474
Epoch 22/200

```



```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6769 -
mse: 0.6769 - val_loss: 0.7445 - val_mse: 0.7445
Epoch 23/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6756 -
mse: 0.6756 - val_loss: 0.7497 - val_mse: 0.7497
Epoch 24/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6746 -
mse: 0.6746 - val_loss: 0.7595 - val_mse: 0.7595
Epoch 25/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6737 -
mse: 0.6737 - val_loss: 0.7601 - val_mse: 0.7601
Epoch 26/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6723 -
mse: 0.6723 - val_loss: 0.7431 - val_mse: 0.7431
Epoch 27/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6716 -
mse: 0.6716 - val_loss: 0.7416 - val_mse: 0.7416
Epoch 28/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6712 -
mse: 0.6712 - val_loss: 0.7700 - val_mse: 0.7700
Epoch 29/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6697 -
mse: 0.6697 - val_loss: 0.7411 - val_mse: 0.7411
Epoch 30/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6688 -
mse: 0.6688 - val_loss: 0.7497 - val_mse: 0.7497
Epoch 31/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6675 -
mse: 0.6675 - val_loss: 0.7486 - val_mse: 0.7486
Epoch 32/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6673 -
mse: 0.6673 - val_loss: 0.7568 - val_mse: 0.7568
Epoch 33/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6661 -
mse: 0.6661 - val_loss: 0.7392 - val_mse: 0.7392
Epoch 34/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6649 -
mse: 0.6649 - val_loss: 0.7375 - val_mse: 0.7375
Epoch 35/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6646 -
mse: 0.6646 - val_loss: 0.7383 - val_mse: 0.7383
Epoch 36/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6635 -
mse: 0.6635 - val_loss: 0.7404 - val_mse: 0.7404
Epoch 37/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6634 -
mse: 0.6634 - val_loss: 0.7375 - val_mse: 0.7375
Epoch 38/200

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6623 -
mse: 0.6623 - val_loss: 0.7383 - val_mse: 0.7383
Epoch 39/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6616 -
mse: 0.6616 - val_loss: 0.7330 - val_mse: 0.7330
Epoch 40/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6605 -
mse: 0.6605 - val_loss: 0.7386 - val_mse: 0.7386
Epoch 41/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6598 -
mse: 0.6598 - val_loss: 0.7348 - val_mse: 0.7348
Epoch 42/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6591 -
mse: 0.6591 - val_loss: 0.7330 - val_mse: 0.7330
Epoch 43/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6585 -
mse: 0.6585 - val_loss: 0.7380 - val_mse: 0.7380
Epoch 44/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6577 -
mse: 0.6577 - val_loss: 0.7370 - val_mse: 0.7370
Epoch 45/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6566 -
mse: 0.6566 - val_loss: 0.7292 - val_mse: 0.7292
Epoch 46/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6565 -
mse: 0.6565 - val_loss: 0.7439 - val_mse: 0.7439
Epoch 47/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6555 -
mse: 0.6555 - val_loss: 0.7350 - val_mse: 0.7350
Epoch 48/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6546 -
mse: 0.6546 - val_loss: 0.7574 - val_mse: 0.7574
Epoch 49/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6545 -
mse: 0.6545 - val_loss: 0.7295 - val_mse: 0.7295
Epoch 50/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6535 -
mse: 0.6535 - val_loss: 0.7332 - val_mse: 0.7332
Epoch 51/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6527 -
mse: 0.6527 - val_loss: 0.7353 - val_mse: 0.7353
Epoch 52/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6526 -
mse: 0.6526 - val_loss: 0.7258 - val_mse: 0.7258
Epoch 53/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6517 -
mse: 0.6517 - val_loss: 0.7316 - val_mse: 0.7316
Epoch 54/200

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6512 -
mse: 0.6512 - val_loss: 0.7355 - val_mse: 0.7355
Epoch 55/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6501 -
mse: 0.6501 - val_loss: 0.7248 - val_mse: 0.7248
Epoch 56/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6498 -
mse: 0.6498 - val_loss: 0.7279 - val_mse: 0.7279
Epoch 57/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6490 -
mse: 0.6490 - val_loss: 0.7247 - val_mse: 0.7247
Epoch 58/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6488 -
mse: 0.6488 - val_loss: 0.7245 - val_mse: 0.7245
Epoch 59/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6481 -
mse: 0.6481 - val_loss: 0.7310 - val_mse: 0.7310
Epoch 60/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6477 -
mse: 0.6477 - val_loss: 0.7228 - val_mse: 0.7228
Epoch 61/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6471 -
mse: 0.6471 - val_loss: 0.7322 - val_mse: 0.7322
Epoch 62/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6460 -
mse: 0.6460 - val_loss: 0.7364 - val_mse: 0.7364
Epoch 63/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6460 -
mse: 0.6460 - val_loss: 0.7248 - val_mse: 0.7248
Epoch 64/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6457 -
mse: 0.6457 - val_loss: 0.7265 - val_mse: 0.7265
Epoch 65/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6448 -
mse: 0.6448 - val_loss: 0.7244 - val_mse: 0.7244
Epoch 66/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6438 -
mse: 0.6438 - val_loss: 0.7450 - val_mse: 0.7450
Epoch 67/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6440 -
mse: 0.6440 - val_loss: 0.7231 - val_mse: 0.7231
Epoch 68/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6432 -
mse: 0.6432 - val_loss: 0.7203 - val_mse: 0.7203
Epoch 69/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6425 -
mse: 0.6425 - val_loss: 0.7226 - val_mse: 0.7226
Epoch 70/200

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6424 -
mse: 0.6424 - val_loss: 0.7235 - val_mse: 0.7235
Epoch 71/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6418 -
mse: 0.6418 - val_loss: 0.7219 - val_mse: 0.7219
Epoch 72/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6413 -
mse: 0.6413 - val_loss: 0.7196 - val_mse: 0.7196
Epoch 73/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6408 -
mse: 0.6408 - val_loss: 0.7198 - val_mse: 0.7198
Epoch 74/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6402 -
mse: 0.6402 - val_loss: 0.7379 - val_mse: 0.7379
Epoch 75/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6402 -
mse: 0.6402 - val_loss: 0.7216 - val_mse: 0.7216
Epoch 76/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6398 -
mse: 0.6398 - val_loss: 0.7213 - val_mse: 0.7213
Epoch 77/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6390 -
mse: 0.6390 - val_loss: 0.7193 - val_mse: 0.7193
Epoch 78/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6391 -
mse: 0.6391 - val_loss: 0.7243 - val_mse: 0.7243
Epoch 79/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6381 -
mse: 0.6381 - val_loss: 0.7237 - val_mse: 0.7237
Epoch 80/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6376 -
mse: 0.6376 - val_loss: 0.7318 - val_mse: 0.7318
Epoch 81/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6373 -
mse: 0.6373 - val_loss: 0.7164 - val_mse: 0.7164
Epoch 82/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6369 -
mse: 0.6369 - val_loss: 0.7147 - val_mse: 0.7147
Epoch 83/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6364 -
mse: 0.6364 - val_loss: 0.7372 - val_mse: 0.7372
Epoch 84/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6373 -
mse: 0.6373 - val_loss: 0.7240 - val_mse: 0.7240
Epoch 85/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6359 -
mse: 0.6359 - val_loss: 0.7169 - val_mse: 0.7169
Epoch 86/200

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6351 -
mse: 0.6351 - val_loss: 0.7165 - val_mse: 0.7165
Epoch 87/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6353 -
mse: 0.6353 - val_loss: 0.7176 - val_mse: 0.7176
Epoch 88/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6347 -
mse: 0.6347 - val_loss: 0.7227 - val_mse: 0.7227
Epoch 89/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6344 -
mse: 0.6344 - val_loss: 0.7168 - val_mse: 0.7168
Epoch 90/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6343 -
mse: 0.6343 - val_loss: 0.7144 - val_mse: 0.7144
Epoch 91/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6336 -
mse: 0.6336 - val_loss: 0.7143 - val_mse: 0.7143
Epoch 92/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6338 -
mse: 0.6338 - val_loss: 0.7224 - val_mse: 0.7224
Epoch 93/200
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6336 -
mse: 0.6336 - val_loss: 0.7175 - val_mse: 0.7175
Epoch 94/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6323 -
mse: 0.6323 - val_loss: 0.7226 - val_mse: 0.7226
Epoch 95/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6322 -
mse: 0.6322 - val_loss: 0.7135 - val_mse: 0.7135
Epoch 96/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6318 -
mse: 0.6318 - val_loss: 0.7133 - val_mse: 0.7133
Epoch 97/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6318 -
mse: 0.6318 - val_loss: 0.7121 - val_mse: 0.7121
Epoch 98/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6313 -
mse: 0.6313 - val_loss: 0.7136 - val_mse: 0.7136
Epoch 99/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6309 -
mse: 0.6309 - val_loss: 0.7135 - val_mse: 0.7135
Epoch 100/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6307 -
mse: 0.6307 - val_loss: 0.7219 - val_mse: 0.7219
Epoch 101/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6303 -
mse: 0.6303 - val_loss: 0.7070 - val_mse: 0.7070
Epoch 102/200

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6306 -
mse: 0.6306 - val_loss: 0.7139 - val_mse: 0.7139
Epoch 103/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6300 -
mse: 0.6300 - val_loss: 0.7212 - val_mse: 0.7212
Epoch 104/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6293 -
mse: 0.6293 - val_loss: 0.7197 - val_mse: 0.7197
Epoch 105/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6295 -
mse: 0.6295 - val_loss: 0.7152 - val_mse: 0.7152
Epoch 106/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6288 -
mse: 0.6288 - val_loss: 0.7193 - val_mse: 0.7193
Epoch 107/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6286 -
mse: 0.6286 - val_loss: 0.7103 - val_mse: 0.7103
Epoch 108/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6282 -
mse: 0.6282 - val_loss: 0.7166 - val_mse: 0.7166
Epoch 109/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6284 -
mse: 0.6284 - val_loss: 0.7174 - val_mse: 0.7174
Epoch 110/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6276 -
mse: 0.6276 - val_loss: 0.7140 - val_mse: 0.7140
Epoch 111/200
3353317/3353317 [=====] - 7s 2us/step - loss: 0.6277 -
mse: 0.6277 - val_loss: 0.7072 - val_mse: 0.7072
Epoch 112/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6272 -
mse: 0.6272 - val_loss: 0.7094 - val_mse: 0.7094
Epoch 113/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6270 -
mse: 0.6270 - val_loss: 0.7258 - val_mse: 0.7258
Epoch 114/200
3353317/3353317 [=====] - 10s 3us/step - loss: 0.6267 -
mse: 0.6267 - val_loss: 0.7142 - val_mse: 0.7142
Epoch 115/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6268 -
mse: 0.6268 - val_loss: 0.7104 - val_mse: 0.7104
Epoch 116/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6263 -
mse: 0.6263 - val_loss: 0.7112 - val_mse: 0.7112
Epoch 117/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6257 -
mse: 0.6257 - val_loss: 0.7098 - val_mse: 0.7098
Epoch 118/200

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6257 -
mse: 0.6257 - val_loss: 0.7199 - val_mse: 0.7199
Epoch 119/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6258 -
mse: 0.6258 - val_loss: 0.7119 - val_mse: 0.7119
Epoch 120/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6251 -
mse: 0.6251 - val_loss: 0.7172 - val_mse: 0.7172
Epoch 121/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6254 -
mse: 0.6254 - val_loss: 0.7198 - val_mse: 0.7198
Epoch 122/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6246 -
mse: 0.6246 - val_loss: 0.7097 - val_mse: 0.7097
Epoch 123/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6244 -
mse: 0.6244 - val_loss: 0.7142 - val_mse: 0.7142
Epoch 124/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6241 -
mse: 0.6241 - val_loss: 0.7109 - val_mse: 0.7109
Epoch 125/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6242 -
mse: 0.6242 - val_loss: 0.7073 - val_mse: 0.7073
Epoch 126/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6241 -
mse: 0.6241 - val_loss: 0.7180 - val_mse: 0.7180
Epoch 127/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6236 -
mse: 0.6236 - val_loss: 0.7276 - val_mse: 0.7276
Epoch 128/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6230 -
mse: 0.6230 - val_loss: 0.7160 - val_mse: 0.7160
Epoch 129/200
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6231 -
mse: 0.6231 - val_loss: 0.7099 - val_mse: 0.7099
Epoch 130/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6226 -
mse: 0.6226 - val_loss: 0.7108 - val_mse: 0.7108
Epoch 131/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6227 -
mse: 0.6227 - val_loss: 0.7272 - val_mse: 0.7272
Epoch 132/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6222 -
mse: 0.6222 - val_loss: 0.7062 - val_mse: 0.7062
Epoch 133/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6224 -
mse: 0.6224 - val_loss: 0.7077 - val_mse: 0.7077
Epoch 134/200

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6218 -
mse: 0.6218 - val_loss: 0.7056 - val_mse: 0.7056
Epoch 135/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6219 -
mse: 0.6219 - val_loss: 0.7166 - val_mse: 0.7166
Epoch 136/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6216 -
mse: 0.6216 - val_loss: 0.7213 - val_mse: 0.7213
Epoch 137/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6213 -
mse: 0.6213 - val_loss: 0.7080 - val_mse: 0.7080
Epoch 138/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6210 -
mse: 0.6210 - val_loss: 0.7109 - val_mse: 0.7109
Epoch 139/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6211 -
mse: 0.6211 - val_loss: 0.7039 - val_mse: 0.7039
Epoch 140/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6204 -
mse: 0.6204 - val_loss: 0.7056 - val_mse: 0.7056
Epoch 141/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6204 -
mse: 0.6204 - val_loss: 0.7048 - val_mse: 0.7048
Epoch 142/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6202 -
mse: 0.6202 - val_loss: 0.7150 - val_mse: 0.7150
Epoch 143/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6202 -
mse: 0.6202 - val_loss: 0.7041 - val_mse: 0.7041
Epoch 144/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6198 -
mse: 0.6198 - val_loss: 0.7096 - val_mse: 0.7096
Epoch 145/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6196 -
mse: 0.6196 - val_loss: 0.7115 - val_mse: 0.7115
Epoch 146/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6192 -
mse: 0.6192 - val_loss: 0.7087 - val_mse: 0.7087
Epoch 147/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6193 -
mse: 0.6193 - val_loss: 0.7135 - val_mse: 0.7135
Epoch 148/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6192 -
mse: 0.6192 - val_loss: 0.7077 - val_mse: 0.7077
Epoch 149/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6188 -
mse: 0.6188 - val_loss: 0.7025 - val_mse: 0.7025
Epoch 150/200

```



```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6196 -
mse: 0.6196 - val_loss: 0.7238 - val_mse: 0.7238
Epoch 151/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6185 -
mse: 0.6185 - val_loss: 0.7080 - val_mse: 0.7080
Epoch 152/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6183 -
mse: 0.6183 - val_loss: 0.7080 - val_mse: 0.7080
Epoch 153/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6180 -
mse: 0.6180 - val_loss: 0.7051 - val_mse: 0.7051
Epoch 154/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6181 -
mse: 0.6181 - val_loss: 0.7100 - val_mse: 0.7100
Epoch 155/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6174 -
mse: 0.6174 - val_loss: 0.7023 - val_mse: 0.7023
Epoch 156/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6176 -
mse: 0.6176 - val_loss: 0.7080 - val_mse: 0.7080
Epoch 157/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6171 -
mse: 0.6171 - val_loss: 0.7054 - val_mse: 0.7054
Epoch 158/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6172 -
mse: 0.6172 - val_loss: 0.7104 - val_mse: 0.7104
Epoch 159/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6172 -
mse: 0.6172 - val_loss: 0.7044 - val_mse: 0.7044
Epoch 160/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6164 -
mse: 0.6164 - val_loss: 0.7124 - val_mse: 0.7124
Epoch 161/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6172 -
mse: 0.6172 - val_loss: 0.7047 - val_mse: 0.7047
Epoch 162/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6166 -
mse: 0.6166 - val_loss: 0.7308 - val_mse: 0.7308
Epoch 163/200
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6163 -
mse: 0.6163 - val_loss: 0.7039 - val_mse: 0.7039
Epoch 164/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6162 -
mse: 0.6162 - val_loss: 0.7098 - val_mse: 0.7098
Epoch 165/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6159 -
mse: 0.6159 - val_loss: 0.6990 - val_mse: 0.6990
Epoch 166/200

```

```

3353317/3353317 [=====] - 8s 2us/step - loss: 0.6161 -
mse: 0.6161 - val_loss: 0.7014 - val_mse: 0.7014
Epoch 167/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6159 -
mse: 0.6159 - val_loss: 0.7026 - val_mse: 0.7026
Epoch 168/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6152 -
mse: 0.6152 - val_loss: 0.7037 - val_mse: 0.7037
Epoch 169/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6156 -
mse: 0.6156 - val_loss: 0.7029 - val_mse: 0.7029
Epoch 170/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6150 -
mse: 0.6150 - val_loss: 0.7073 - val_mse: 0.7073
Epoch 171/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6148 -
mse: 0.6148 - val_loss: 0.6997 - val_mse: 0.6997
Epoch 172/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6147 -
mse: 0.6147 - val_loss: 0.7028 - val_mse: 0.7028
Epoch 173/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6143 -
mse: 0.6143 - val_loss: 0.7035 - val_mse: 0.7035
Epoch 174/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6145 -
mse: 0.6145 - val_loss: 0.7065 - val_mse: 0.7065
Epoch 175/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6143 -
mse: 0.6143 - val_loss: 0.7020 - val_mse: 0.7020
Epoch 176/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6140 -
mse: 0.6140 - val_loss: 0.7033 - val_mse: 0.7033
Epoch 177/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6140 -
mse: 0.6140 - val_loss: 0.7037 - val_mse: 0.7037
Epoch 178/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6136 -
mse: 0.6136 - val_loss: 0.7015 - val_mse: 0.7015
Epoch 179/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6133 -
mse: 0.6133 - val_loss: 0.6989 - val_mse: 0.6989
Epoch 180/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6135 -
mse: 0.6135 - val_loss: 0.7152 - val_mse: 0.7152
Epoch 181/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6132 -
mse: 0.6132 - val_loss: 0.7132 - val_mse: 0.7132
Epoch 182/200

```

```

3353317/3353317 [=====] - 9s 3us/step - loss: 0.6136 -
mse: 0.6136 - val_loss: 0.7023 - val_mse: 0.7023
Epoch 183/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6129 -
mse: 0.6129 - val_loss: 0.7036 - val_mse: 0.7036
Epoch 184/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6129 -
mse: 0.6129 - val_loss: 0.7022 - val_mse: 0.7022
Epoch 185/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6126 -
mse: 0.6126 - val_loss: 0.7019 - val_mse: 0.7019
Epoch 186/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6125 -
mse: 0.6125 - val_loss: 0.7044 - val_mse: 0.7044
Epoch 187/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6123 -
mse: 0.6123 - val_loss: 0.6996 - val_mse: 0.6996
Epoch 188/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6119 -
mse: 0.6119 - val_loss: 0.7090 - val_mse: 0.7090
Epoch 189/200
3353317/3353317 [=====] - 8s 3us/step - loss: 0.6121 -
mse: 0.6121 - val_loss: 0.7045 - val_mse: 0.7045
Epoch 190/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6115 -
mse: 0.6115 - val_loss: 0.7084 - val_mse: 0.7084
Epoch 191/200
3353317/3353317 [=====] - 9s 3us/step - loss: 0.6119 -
mse: 0.6119 - val_loss: 0.7001 - val_mse: 0.7001
Epoch 192/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6117 -
mse: 0.6117 - val_loss: 0.6997 - val_mse: 0.6997
Epoch 193/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6112 -
mse: 0.6112 - val_loss: 0.7017 - val_mse: 0.7017
Epoch 194/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6117 -
mse: 0.6117 - val_loss: 0.7042 - val_mse: 0.7042
Epoch 195/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6110 -
mse: 0.6110 - val_loss: 0.7189 - val_mse: 0.7189
Epoch 196/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6108 -
mse: 0.6108 - val_loss: 0.7024 - val_mse: 0.7024
Epoch 197/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6108 -
mse: 0.6108 - val_loss: 0.7092 - val_mse: 0.7092
Epoch 198/200

```

```

3353317/3353317 [=====] - 8s 3us/step - loss: 0.6106 -
mse: 0.6106 - val_loss: 0.7011 - val_mse: 0.7011
Epoch 199/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6106 -
mse: 0.6106 - val_loss: 0.6996 - val_mse: 0.6996
Epoch 200/200
3353317/3353317 [=====] - 8s 2us/step - loss: 0.6104 -
mse: 0.6104 - val_loss: 0.6980 - val_mse: 0.6980
1676659/1676659 [=====] - 2s 1us/step
Train on 3353318 samples, validate on 221802 samples
Epoch 1/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.9931 -
mse: 0.9931 - val_loss: 0.7999 - val_mse: 0.7999
Epoch 2/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8588 -
mse: 0.8588 - val_loss: 0.8195 - val_mse: 0.8195
Epoch 3/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8398 -
mse: 0.8398 - val_loss: 0.8339 - val_mse: 0.8339
Epoch 4/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8269 -
mse: 0.8269 - val_loss: 0.8323 - val_mse: 0.8323
Epoch 5/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8169 -
mse: 0.8169 - val_loss: 0.8293 - val_mse: 0.8293
Epoch 6/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8083 -
mse: 0.8083 - val_loss: 0.8258 - val_mse: 0.8258
Epoch 7/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.8008 -
mse: 0.8008 - val_loss: 0.8293 - val_mse: 0.8293
Epoch 8/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7934 -
mse: 0.7934 - val_loss: 0.8075 - val_mse: 0.8075
Epoch 9/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7876 -
mse: 0.7876 - val_loss: 0.8040 - val_mse: 0.8040
Epoch 10/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7826 -
mse: 0.7826 - val_loss: 0.7985 - val_mse: 0.7985
Epoch 11/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7776 -
mse: 0.7776 - val_loss: 0.8176 - val_mse: 0.8176
Epoch 12/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7736 -
mse: 0.7736 - val_loss: 0.7884 - val_mse: 0.7884
Epoch 13/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7701 -

```

```

mse: 0.7701 - val_loss: 0.7985 - val_mse: 0.7985
Epoch 14/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7665 -
mse: 0.7665 - val_loss: 0.7778 - val_mse: 0.7778
Epoch 15/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7633 -
mse: 0.7633 - val_loss: 0.7839 - val_mse: 0.7839
Epoch 16/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7603 -
mse: 0.7603 - val_loss: 0.7813 - val_mse: 0.7813
Epoch 17/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7585 -
mse: 0.7585 - val_loss: 0.7724 - val_mse: 0.7724
Epoch 18/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7558 -
mse: 0.7558 - val_loss: 0.7731 - val_mse: 0.7731
Epoch 19/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7536 -
mse: 0.7536 - val_loss: 0.7706 - val_mse: 0.7706
Epoch 20/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7520 -
mse: 0.7520 - val_loss: 0.7798 - val_mse: 0.7798
Epoch 21/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7495 -
mse: 0.7495 - val_loss: 0.7757 - val_mse: 0.7757
Epoch 22/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7476 -
mse: 0.7476 - val_loss: 0.7653 - val_mse: 0.7653
Epoch 23/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7462 -
mse: 0.7462 - val_loss: 0.7642 - val_mse: 0.7642
Epoch 24/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7446 -
mse: 0.7446 - val_loss: 0.7767 - val_mse: 0.7767
Epoch 25/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7432 -
mse: 0.7432 - val_loss: 0.7596 - val_mse: 0.7596
Epoch 26/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7412 -
mse: 0.7412 - val_loss: 0.7799 - val_mse: 0.7799
Epoch 27/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7403 -
mse: 0.7403 - val_loss: 0.7592 - val_mse: 0.7592
Epoch 28/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7384 -
mse: 0.7384 - val_loss: 0.7675 - val_mse: 0.7675
Epoch 29/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7379 -

```

```

mse: 0.7379 - val_loss: 0.7636 - val_mse: 0.7636
Epoch 30/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7361 -
mse: 0.7361 - val_loss: 0.7786 - val_mse: 0.7786
Epoch 31/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.7351 -
mse: 0.7351 - val_loss: 0.7501 - val_mse: 0.7501
Epoch 32/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.7340 -
mse: 0.7340 - val_loss: 0.7819 - val_mse: 0.7819
Epoch 33/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.7328 -
mse: 0.7328 - val_loss: 0.7561 - val_mse: 0.7561
Epoch 34/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7320 -
mse: 0.7320 - val_loss: 0.7519 - val_mse: 0.7519
Epoch 35/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7309 -
mse: 0.7309 - val_loss: 0.7533 - val_mse: 0.7533
Epoch 36/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7293 -
mse: 0.7293 - val_loss: 0.8014 - val_mse: 0.8014
Epoch 37/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7287 -
mse: 0.7287 - val_loss: 0.7604 - val_mse: 0.7604
Epoch 38/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7276 -
mse: 0.7276 - val_loss: 0.7486 - val_mse: 0.7486
Epoch 39/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.7266 -
mse: 0.7266 - val_loss: 0.7897 - val_mse: 0.7897
Epoch 40/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.7256 -
mse: 0.7256 - val_loss: 0.7669 - val_mse: 0.7669
Epoch 41/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.7249 -
mse: 0.7249 - val_loss: 0.7819 - val_mse: 0.7819
Epoch 42/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7236 -
mse: 0.7236 - val_loss: 0.7651 - val_mse: 0.7651
Epoch 43/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7225 -
mse: 0.7225 - val_loss: 0.8074 - val_mse: 0.8074
Epoch 44/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7220 -
mse: 0.7220 - val_loss: 0.7669 - val_mse: 0.7669
Epoch 45/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7207 -

```

```

mse: 0.7207 - val_loss: 0.7645 - val_mse: 0.7645
Epoch 46/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7200 -
mse: 0.7200 - val_loss: 0.7939 - val_mse: 0.7939
Epoch 47/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.7192 -
mse: 0.7192 - val_loss: 0.7734 - val_mse: 0.7734
Epoch 48/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7179 -
mse: 0.7179 - val_loss: 0.7648 - val_mse: 0.7648
Epoch 49/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7179 -
mse: 0.7179 - val_loss: 0.7573 - val_mse: 0.7573
Epoch 50/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7163 -
mse: 0.7163 - val_loss: 0.7589 - val_mse: 0.7589
Epoch 51/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7156 -
mse: 0.7156 - val_loss: 0.7663 - val_mse: 0.7663
Epoch 52/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7148 -
mse: 0.7148 - val_loss: 0.7856 - val_mse: 0.7856
Epoch 53/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7139 -
mse: 0.7139 - val_loss: 0.7878 - val_mse: 0.7878
Epoch 54/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7127 -
mse: 0.7127 - val_loss: 0.7694 - val_mse: 0.7694
Epoch 55/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.7122 -
mse: 0.7122 - val_loss: 0.7529 - val_mse: 0.7529
Epoch 56/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7124 -
mse: 0.7124 - val_loss: 0.7745 - val_mse: 0.7745
Epoch 57/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7106 -
mse: 0.7106 - val_loss: 0.7849 - val_mse: 0.7849
Epoch 58/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7099 -
mse: 0.7099 - val_loss: 0.7593 - val_mse: 0.7593
Epoch 59/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7096 -
mse: 0.7096 - val_loss: 0.7560 - val_mse: 0.7560
Epoch 60/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7087 -
mse: 0.7087 - val_loss: 0.7596 - val_mse: 0.7596
Epoch 61/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7077 -

```

```

mse: 0.7077 - val_loss: 0.7725 - val_mse: 0.7725
Epoch 62/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7071 -
mse: 0.7071 - val_loss: 0.7639 - val_mse: 0.7639
Epoch 63/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7067 -
mse: 0.7067 - val_loss: 0.7658 - val_mse: 0.7658
Epoch 64/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7062 -
mse: 0.7062 - val_loss: 0.7809 - val_mse: 0.7809
Epoch 65/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7049 -
mse: 0.7049 - val_loss: 0.7664 - val_mse: 0.7664
Epoch 66/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7047 -
mse: 0.7047 - val_loss: 0.7759 - val_mse: 0.7759
Epoch 67/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7035 -
mse: 0.7035 - val_loss: 0.7558 - val_mse: 0.7558
Epoch 68/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7036 -
mse: 0.7036 - val_loss: 0.7688 - val_mse: 0.7688
Epoch 69/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.7025 -
mse: 0.7025 - val_loss: 0.7749 - val_mse: 0.7749
Epoch 70/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.7015 -
mse: 0.7015 - val_loss: 0.7635 - val_mse: 0.7635
Epoch 71/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7008 -
mse: 0.7008 - val_loss: 0.7762 - val_mse: 0.7762
Epoch 72/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.7004 -
mse: 0.7004 - val_loss: 0.7534 - val_mse: 0.7534
Epoch 73/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6997 -
mse: 0.6997 - val_loss: 0.7644 - val_mse: 0.7644
Epoch 74/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6994 -
mse: 0.6994 - val_loss: 0.7634 - val_mse: 0.7634
Epoch 75/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6988 -
mse: 0.6988 - val_loss: 0.7677 - val_mse: 0.7677
Epoch 76/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6977 -
mse: 0.6977 - val_loss: 0.7482 - val_mse: 0.7482
Epoch 77/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6973 -

```



```

mse: 0.6973 - val_loss: 0.7618 - val_mse: 0.7618
Epoch 78/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6967 -
mse: 0.6967 - val_loss: 0.7629 - val_mse: 0.7629
Epoch 79/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6957 -
mse: 0.6957 - val_loss: 0.7752 - val_mse: 0.7752
Epoch 80/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6951 -
mse: 0.6951 - val_loss: 0.7651 - val_mse: 0.7651
Epoch 81/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6952 -
mse: 0.6952 - val_loss: 0.7669 - val_mse: 0.7669
Epoch 82/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6942 -
mse: 0.6942 - val_loss: 0.7578 - val_mse: 0.7578
Epoch 83/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6932 -
mse: 0.6932 - val_loss: 0.7606 - val_mse: 0.7606
Epoch 84/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.6923 -
mse: 0.6923 - val_loss: 0.7694 - val_mse: 0.7694
Epoch 85/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6926 -
mse: 0.6926 - val_loss: 0.7552 - val_mse: 0.7552
Epoch 86/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6921 -
mse: 0.6921 - val_loss: 0.7517 - val_mse: 0.7517
Epoch 87/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6911 -
mse: 0.6911 - val_loss: 0.7556 - val_mse: 0.7556
Epoch 88/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6904 -
mse: 0.6904 - val_loss: 0.7589 - val_mse: 0.7589
Epoch 89/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6904 -
mse: 0.6904 - val_loss: 0.7480 - val_mse: 0.7480
Epoch 90/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6897 -
mse: 0.6897 - val_loss: 0.7591 - val_mse: 0.7591
Epoch 91/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6889 -
mse: 0.6889 - val_loss: 0.7533 - val_mse: 0.7533
Epoch 92/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6882 -
mse: 0.6882 - val_loss: 0.7669 - val_mse: 0.7669
Epoch 93/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6874 -

```

```

mse: 0.6874 - val_loss: 0.7548 - val_mse: 0.7548
Epoch 94/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6872 -
mse: 0.6872 - val_loss: 0.7608 - val_mse: 0.7608
Epoch 95/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6866 -
mse: 0.6866 - val_loss: 0.7526 - val_mse: 0.7526
Epoch 96/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6864 -
mse: 0.6864 - val_loss: 0.7516 - val_mse: 0.7516
Epoch 97/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6850 -
mse: 0.6850 - val_loss: 0.7644 - val_mse: 0.7644
Epoch 98/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6849 -
mse: 0.6849 - val_loss: 0.7542 - val_mse: 0.7542
Epoch 99/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6845 -
mse: 0.6845 - val_loss: 0.7720 - val_mse: 0.7720
Epoch 100/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6833 -
mse: 0.6833 - val_loss: 0.7593 - val_mse: 0.7593
Epoch 101/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6836 -
mse: 0.6836 - val_loss: 0.7623 - val_mse: 0.7623
Epoch 102/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6829 -
mse: 0.6829 - val_loss: 0.7607 - val_mse: 0.7607
Epoch 103/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6826 -
mse: 0.6826 - val_loss: 0.7566 - val_mse: 0.7566
Epoch 104/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6820 -
mse: 0.6820 - val_loss: 0.7595 - val_mse: 0.7595
Epoch 105/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6813 -
mse: 0.6813 - val_loss: 0.7607 - val_mse: 0.7607
Epoch 106/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6810 -
mse: 0.6810 - val_loss: 0.7710 - val_mse: 0.7710
Epoch 107/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6805 -
mse: 0.6805 - val_loss: 0.7703 - val_mse: 0.7703
Epoch 108/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6802 -
mse: 0.6802 - val_loss: 0.7609 - val_mse: 0.7609
Epoch 109/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6791 -

```

```

mse: 0.6791 - val_loss: 0.7619 - val_mse: 0.7619
Epoch 110/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6786 -
mse: 0.6786 - val_loss: 0.7561 - val_mse: 0.7561
Epoch 111/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6787 -
mse: 0.6787 - val_loss: 0.7618 - val_mse: 0.7618
Epoch 112/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6778 -
mse: 0.6778 - val_loss: 0.7660 - val_mse: 0.7660
Epoch 113/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6771 -
mse: 0.6771 - val_loss: 0.7615 - val_mse: 0.7615
Epoch 114/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6766 -
mse: 0.6766 - val_loss: 0.7612 - val_mse: 0.7612
Epoch 115/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6760 -
mse: 0.6760 - val_loss: 0.7668 - val_mse: 0.7668
Epoch 116/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6757 -
mse: 0.6757 - val_loss: 0.7541 - val_mse: 0.7541
Epoch 117/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.6754 -
mse: 0.6754 - val_loss: 0.7592 - val_mse: 0.7592
Epoch 118/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6746 -
mse: 0.6746 - val_loss: 0.7683 - val_mse: 0.7683
Epoch 119/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6749 -
mse: 0.6749 - val_loss: 0.7635 - val_mse: 0.7635
Epoch 120/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6746 -
mse: 0.6746 - val_loss: 0.7623 - val_mse: 0.7623
Epoch 121/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6735 -
mse: 0.6735 - val_loss: 0.7619 - val_mse: 0.7619
Epoch 122/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6731 -
mse: 0.6731 - val_loss: 0.7585 - val_mse: 0.7585
Epoch 123/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6727 -
mse: 0.6727 - val_loss: 0.7629 - val_mse: 0.7629
Epoch 124/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.6722 -
mse: 0.6722 - val_loss: 0.7608 - val_mse: 0.7608
Epoch 125/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6714 -

```

```

mse: 0.6714 - val_loss: 0.7551 - val_mse: 0.7551
Epoch 126/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6711 -
mse: 0.6711 - val_loss: 0.7689 - val_mse: 0.7689
Epoch 127/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6708 -
mse: 0.6708 - val_loss: 0.7582 - val_mse: 0.7582
Epoch 128/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6705 -
mse: 0.6705 - val_loss: 0.7618 - val_mse: 0.7618
Epoch 129/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6698 -
mse: 0.6698 - val_loss: 0.7548 - val_mse: 0.7548
Epoch 130/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6699 -
mse: 0.6699 - val_loss: 0.7526 - val_mse: 0.7526
Epoch 131/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6693 -
mse: 0.6693 - val_loss: 0.7682 - val_mse: 0.7682
Epoch 132/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6688 -
mse: 0.6688 - val_loss: 0.7716 - val_mse: 0.7716
Epoch 133/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6681 -
mse: 0.6681 - val_loss: 0.7560 - val_mse: 0.7560
Epoch 134/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6677 -
mse: 0.6677 - val_loss: 0.7582 - val_mse: 0.7582
Epoch 135/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6670 -
mse: 0.6670 - val_loss: 0.7653 - val_mse: 0.7653
Epoch 136/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6669 -
mse: 0.6669 - val_loss: 0.7693 - val_mse: 0.7693
Epoch 137/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6666 -
mse: 0.6666 - val_loss: 0.7542 - val_mse: 0.7542
Epoch 138/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6660 -
mse: 0.6660 - val_loss: 0.7611 - val_mse: 0.7611
Epoch 139/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6657 -
mse: 0.6657 - val_loss: 0.7642 - val_mse: 0.7642
Epoch 140/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6653 -
mse: 0.6653 - val_loss: 0.7586 - val_mse: 0.7586
Epoch 141/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.6645 -

```

```

mse: 0.6645 - val_loss: 0.7597 - val_mse: 0.7597
Epoch 142/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6642 -
mse: 0.6642 - val_loss: 0.7622 - val_mse: 0.7622
Epoch 143/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6636 -
mse: 0.6636 - val_loss: 0.7589 - val_mse: 0.7589
Epoch 144/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6637 -
mse: 0.6637 - val_loss: 0.7681 - val_mse: 0.7681
Epoch 145/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6633 -
mse: 0.6633 - val_loss: 0.7610 - val_mse: 0.7610
Epoch 146/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6627 -
mse: 0.6627 - val_loss: 0.7702 - val_mse: 0.7702
Epoch 147/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6624 -
mse: 0.6624 - val_loss: 0.7644 - val_mse: 0.7644
Epoch 148/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6615 -
mse: 0.6615 - val_loss: 0.7556 - val_mse: 0.7556
Epoch 149/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6617 -
mse: 0.6617 - val_loss: 0.7648 - val_mse: 0.7648
Epoch 150/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6607 -
mse: 0.6607 - val_loss: 0.7798 - val_mse: 0.7798
Epoch 151/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6606 -
mse: 0.6606 - val_loss: 0.7617 - val_mse: 0.7617
Epoch 152/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6606 -
mse: 0.6606 - val_loss: 0.7632 - val_mse: 0.7632
Epoch 153/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6598 -
mse: 0.6598 - val_loss: 0.7634 - val_mse: 0.7634
Epoch 154/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6597 -
mse: 0.6597 - val_loss: 0.7691 - val_mse: 0.7691
Epoch 155/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6592 -
mse: 0.6592 - val_loss: 0.7598 - val_mse: 0.7598
Epoch 156/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6588 -
mse: 0.6588 - val_loss: 0.7612 - val_mse: 0.7612
Epoch 157/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6586 -

```

```

mse: 0.6586 - val_loss: 0.7750 - val_mse: 0.7750
Epoch 158/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6582 -
mse: 0.6582 - val_loss: 0.7784 - val_mse: 0.7784
Epoch 159/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6577 -
mse: 0.6577 - val_loss: 0.7780 - val_mse: 0.7780
Epoch 160/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6576 -
mse: 0.6576 - val_loss: 0.7752 - val_mse: 0.7752
Epoch 161/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6571 -
mse: 0.6571 - val_loss: 0.7687 - val_mse: 0.7687
Epoch 162/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6564 -
mse: 0.6564 - val_loss: 0.7880 - val_mse: 0.7880
Epoch 163/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6558 -
mse: 0.6558 - val_loss: 0.7831 - val_mse: 0.7831
Epoch 164/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6556 -
mse: 0.6556 - val_loss: 0.7737 - val_mse: 0.7737
Epoch 165/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6558 -
mse: 0.6558 - val_loss: 0.7719 - val_mse: 0.7719
Epoch 166/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6549 -
mse: 0.6549 - val_loss: 0.7807 - val_mse: 0.7807
Epoch 167/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6543 -
mse: 0.6543 - val_loss: 0.7796 - val_mse: 0.7796
Epoch 168/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6542 -
mse: 0.6542 - val_loss: 0.8408 - val_mse: 0.8408
Epoch 169/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6540 -
mse: 0.6540 - val_loss: 0.8067 - val_mse: 0.8067
Epoch 170/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6538 -
mse: 0.6538 - val_loss: 0.7777 - val_mse: 0.7777
Epoch 171/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6534 -
mse: 0.6534 - val_loss: 0.8081 - val_mse: 0.8081
Epoch 172/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6534 -
mse: 0.6534 - val_loss: 0.7912 - val_mse: 0.7912
Epoch 173/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6522 -

```

```

mse: 0.6522 - val_loss: 0.8098 - val_mse: 0.8098
Epoch 174/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6520 -
mse: 0.6520 - val_loss: 0.7909 - val_mse: 0.7909
Epoch 175/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6522 -
mse: 0.6522 - val_loss: 0.7931 - val_mse: 0.7931
Epoch 176/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6516 -
mse: 0.6516 - val_loss: 0.7968 - val_mse: 0.7968
Epoch 177/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6511 -
mse: 0.6511 - val_loss: 0.7958 - val_mse: 0.7958
Epoch 178/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6510 -
mse: 0.6510 - val_loss: 0.7867 - val_mse: 0.7867
Epoch 179/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6509 -
mse: 0.6509 - val_loss: 0.8052 - val_mse: 0.8052
Epoch 180/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6506 -
mse: 0.6506 - val_loss: 0.7928 - val_mse: 0.7928
Epoch 181/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6496 -
mse: 0.6496 - val_loss: 0.7824 - val_mse: 0.7824
Epoch 182/200
3353318/3353318 [=====] - 12s 4us/step - loss: 0.6496 -
mse: 0.6496 - val_loss: 0.8013 - val_mse: 0.8013
Epoch 183/200
3353318/3353318 [=====] - 12s 3us/step - loss: 0.6487 -
mse: 0.6487 - val_loss: 0.8155 - val_mse: 0.8155
Epoch 184/200
3353318/3353318 [=====] - 10s 3us/step - loss: 0.6486 -
mse: 0.6486 - val_loss: 0.7967 - val_mse: 0.7967
Epoch 185/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6490 -
mse: 0.6490 - val_loss: 0.8191 - val_mse: 0.8191
Epoch 186/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6484 -
mse: 0.6484 - val_loss: 0.7903 - val_mse: 0.7903
Epoch 187/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6479 -
mse: 0.6479 - val_loss: 0.8130 - val_mse: 0.8130
Epoch 188/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.6476 -
mse: 0.6476 - val_loss: 0.8351 - val_mse: 0.8351
Epoch 189/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6472 -

```

```

mse: 0.6472 - val_loss: 0.8130 - val_mse: 0.8130
Epoch 190/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6473 -
mse: 0.6473 - val_loss: 0.8050 - val_mse: 0.8050
Epoch 191/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6470 -
mse: 0.6470 - val_loss: 0.8135 - val_mse: 0.8135
Epoch 192/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6463 -
mse: 0.6463 - val_loss: 0.8032 - val_mse: 0.8032
Epoch 193/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6470 -
mse: 0.6470 - val_loss: 0.8175 - val_mse: 0.8175
Epoch 194/200
3353318/3353318 [=====] - 8s 2us/step - loss: 0.6456 -
mse: 0.6456 - val_loss: 0.8118 - val_mse: 0.8118
Epoch 195/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6454 -
mse: 0.6454 - val_loss: 0.8140 - val_mse: 0.8140
Epoch 196/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6452 -
mse: 0.6452 - val_loss: 0.8095 - val_mse: 0.8095
Epoch 197/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.6448 -
mse: 0.6448 - val_loss: 0.7983 - val_mse: 0.7983
Epoch 198/200
3353318/3353318 [=====] - 8s 3us/step - loss: 0.6446 -
mse: 0.6446 - val_loss: 0.8022 - val_mse: 0.8022
Epoch 199/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6440 -
mse: 0.6440 - val_loss: 0.8215 - val_mse: 0.8215
Epoch 200/200
3353318/3353318 [=====] - 9s 3us/step - loss: 0.6437 -
mse: 0.6437 - val_loss: 0.8282 - val_mse: 0.8282
1676658/1676658 [=====] - 3s 2us/step
Train on 5029976 samples, validate on 221802 samples
Epoch 1/50
5029976/5029976 [=====] - 22s 4us/step - loss: 0.8559 -
mse: 0.8559 - val_loss: 0.7739 - val_mse: 0.7739
Epoch 2/50
5029976/5029976 [=====] - 22s 4us/step - loss: 0.7889 -
mse: 0.7889 - val_loss: 0.7772 - val_mse: 0.7772
Epoch 3/50
5029976/5029976 [=====] - 21s 4us/step - loss: 0.7701 -
mse: 0.7701 - val_loss: 0.7548 - val_mse: 0.7548
Epoch 4/50
5029976/5029976 [=====] - 22s 4us/step - loss: 0.7551 -
mse: 0.7551 - val_loss: 0.7545 - val_mse: 0.7545

```



Epoch 5/50  
5029976/5029976 [=====] - 22s 4us/step - loss: 0.7436 -  
mse: 0.7436 - val\_loss: 0.7420 - val\_mse: 0.7420

Epoch 6/50  
5029976/5029976 [=====] - 22s 4us/step - loss: 0.7345 -  
mse: 0.7345 - val\_loss: 0.7422 - val\_mse: 0.7422

Epoch 7/50  
5029976/5029976 [=====] - 22s 4us/step - loss: 0.7273 -  
mse: 0.7273 - val\_loss: 0.7305 - val\_mse: 0.7305

Epoch 8/50  
5029976/5029976 [=====] - 22s 4us/step - loss: 0.7217 -  
mse: 0.7217 - val\_loss: 0.7382 - val\_mse: 0.7382

Epoch 9/50  
5029976/5029976 [=====] - 23s 5us/step - loss: 0.7167 -  
mse: 0.7167 - val\_loss: 0.7240 - val\_mse: 0.7240

Epoch 10/50  
5029976/5029976 [=====] - 22s 4us/step - loss: 0.7127 -  
mse: 0.7127 - val\_loss: 0.7227 - val\_mse: 0.7227

Epoch 11/50  
5029976/5029976 [=====] - 21s 4us/step - loss: 0.7092 -  
mse: 0.7092 - val\_loss: 0.7162 - val\_mse: 0.7162

Epoch 12/50  
5029976/5029976 [=====] - 21s 4us/step - loss: 0.7061 -  
mse: 0.7061 - val\_loss: 0.7189 - val\_mse: 0.7189

Epoch 13/50  
5029976/5029976 [=====] - 21s 4us/step - loss: 0.7033 -  
mse: 0.7033 - val\_loss: 0.7102 - val\_mse: 0.7102

Epoch 14/50  
5029976/5029976 [=====] - 23s 5us/step - loss: 0.7004 -  
mse: 0.7004 - val\_loss: 0.7052 - val\_mse: 0.7052

Epoch 15/50  
5029976/5029976 [=====] - 21s 4us/step - loss: 0.6984 -  
mse: 0.6984 - val\_loss: 0.7128 - val\_mse: 0.7128

Epoch 16/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6957 -  
mse: 0.6957 - val\_loss: 0.7034 - val\_mse: 0.7034

Epoch 17/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6938 -  
mse: 0.6938 - val\_loss: 0.7215 - val\_mse: 0.7215

Epoch 18/50  
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6916 -  
mse: 0.6916 - val\_loss: 0.7084 - val\_mse: 0.7084

Epoch 19/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6895 -  
mse: 0.6895 - val\_loss: 0.7053 - val\_mse: 0.7053

Epoch 20/50  
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6877 -  
mse: 0.6877 - val\_loss: 0.6994 - val\_mse: 0.6994

Epoch 21/50  
5029976/5029976 [=====] - 21s 4us/step - loss: 0.6856 -  
mse: 0.6856 - val\_loss: 0.7010 - val\_mse: 0.7010

Epoch 22/50  
5029976/5029976 [=====] - 21s 4us/step - loss: 0.6836 -  
mse: 0.6836 - val\_loss: 0.7306 - val\_mse: 0.7306

Epoch 23/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6816 -  
mse: 0.6816 - val\_loss: 0.6977 - val\_mse: 0.6977

Epoch 24/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6805 -  
mse: 0.6805 - val\_loss: 0.6932 - val\_mse: 0.6932

Epoch 25/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6785 -  
mse: 0.6785 - val\_loss: 0.6995 - val\_mse: 0.6995

Epoch 26/50  
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6769 -  
mse: 0.6769 - val\_loss: 0.7002 - val\_mse: 0.7002

Epoch 27/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6754 -  
mse: 0.6754 - val\_loss: 0.7241 - val\_mse: 0.7241

Epoch 28/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6737 -  
mse: 0.6737 - val\_loss: 0.7058 - val\_mse: 0.7058

Epoch 29/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6723 -  
mse: 0.6723 - val\_loss: 0.6904 - val\_mse: 0.6904

Epoch 30/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6711 -  
mse: 0.6711 - val\_loss: 0.6986 - val\_mse: 0.6986

Epoch 31/50  
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6695 -  
mse: 0.6695 - val\_loss: 0.7130 - val\_mse: 0.7130

Epoch 32/50  
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6681 -  
mse: 0.6681 - val\_loss: 0.6999 - val\_mse: 0.6999

Epoch 33/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6666 -  
mse: 0.6666 - val\_loss: 0.6947 - val\_mse: 0.6947

Epoch 34/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6655 -  
mse: 0.6655 - val\_loss: 0.7027 - val\_mse: 0.7027

Epoch 35/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6638 -  
mse: 0.6638 - val\_loss: 0.7033 - val\_mse: 0.7033

Epoch 36/50  
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6624 -  
mse: 0.6624 - val\_loss: 0.6947 - val\_mse: 0.6947

```

Epoch 37/50
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6615 -
mse: 0.6615 - val_loss: 0.7110 - val_mse: 0.7110
Epoch 38/50
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6603 -
mse: 0.6603 - val_loss: 0.6865 - val_mse: 0.6865
Epoch 39/50
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6592 -
mse: 0.6592 - val_loss: 0.6936 - val_mse: 0.6936
Epoch 40/50
5029976/5029976 [=====] - 20s 4us/step - loss: 0.6574 -
mse: 0.6574 - val_loss: 0.6861 - val_mse: 0.6861
Epoch 41/50
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6567 -
mse: 0.6567 - val_loss: 0.6915 - val_mse: 0.6915
Epoch 42/50
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6553 -
mse: 0.6553 - val_loss: 0.6880 - val_mse: 0.6880
Epoch 43/50
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6547 -
mse: 0.6547 - val_loss: 0.6945 - val_mse: 0.6945
Epoch 44/50
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6533 -
mse: 0.6533 - val_loss: 0.6850 - val_mse: 0.6850
Epoch 45/50
5029976/5029976 [=====] - 18s 4us/step - loss: 0.6527 -
mse: 0.6527 - val_loss: 0.6850 - val_mse: 0.6850
Epoch 46/50
5029976/5029976 [=====] - 18s 4us/step - loss: 0.6514 -
mse: 0.6514 - val_loss: 0.6824 - val_mse: 0.6824
Epoch 47/50
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6506 -
mse: 0.6506 - val_loss: 0.7025 - val_mse: 0.7025
Epoch 48/50
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6494 -
mse: 0.6494 - val_loss: 0.6840 - val_mse: 0.6840
Epoch 49/50
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6488 -
mse: 0.6488 - val_loss: 0.6803 - val_mse: 0.6803
Epoch 50/50
5029976/5029976 [=====] - 19s 4us/step - loss: 0.6477 -
mse: 0.6477 - val_loss: 0.6807 - val_mse: 0.6807
0.8572210474710048
{'activation': 'tanh', 'activation2': 'relu', 'batch_size': 5000,
'dropout_rate': 0.0, 'epochs': 50, 'init': 'he_normal', 'neurons': 200,
'optimizer': 'Adam'}

```

```
[28]: keras_params = grid_result.best_params_  
keras_params
```

```
[28]: {'activation': 'tanh',  
      'activation2': 'relu',  
      'batch_size': 5000,  
      'dropout_rate': 0.0,  
      'epochs': 50,  
      'init': 'he_normal',  
      'neurons': 200,  
      'optimizer': 'Adam'}
```

```
[29]: # Save untrained model to file  
  
Pkl_Filename = "Keras_Params.pkl"  
  
with open(Pkl_Filename, 'wb') as file:  
    pickle.dump(keras_params, file)
```

## 1.5 SGDRegressor

```
[32]: from sklearn.linear_model import SGDRegressor  
  
model = SGDRegressor(early_stopping=True, n_iter_no_change=10)  
param_grid={  
    'penalty': ['l2', 'l1', 'elasticnet'],  
    'alpha': [0.0001, 0.001, 0.01],  
    'random_state': [0]  
}  
  
model, pred = algorithm_pipeline(X_train, X_valid, Y_train, Y_valid, model,  
                                param_grid, cv=3)  
  
print(np.sqrt(-model.best_score_))  
print(model.best_params_)
```

Fitting 3 folds for each of 9 candidates, totalling 27 fits

```
[Parallel(n_jobs=-1)]: Using backend LokyBackend with 16 concurrent workers.  
[Parallel(n_jobs=-1)]: Done 10 out of 27 | elapsed: 13.8min remaining: 23.5min  
[Parallel(n_jobs=-1)]: Done 24 out of 27 | elapsed: 15.1min remaining: 1.9min  
[Parallel(n_jobs=-1)]: Done 27 out of 27 | elapsed: 15.1min finished
```

0.9206571766665913

{'alpha': 0.0001, 'penalty': 'l1', 'random\_state': 0}

```
[33]: sgd_params = model.best_params_  
sgd_params
```

```
[33]: {'alpha': 0.0001, 'penalty': 'l1', 'random_state': 0}
```

```
[34]: # Save untrained model to file  
  
Pkl_Filename = "SGD_Params.pkl"  
  
with open(Pkl_Filename, 'wb') as file:  
    pickle.dump(sgd_params, file)
```

```
[ ]:
```