# Zillow's Price Training

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## **Procedures Guide**

1.XGBoost

2.LightGBM

3. Neural Network

4.Linear Regression

Reporter: Chan Yu



### XGBoost - Extreme Gradient Boosting

- Regularization
- Parallel Processing
- High Flexibility
- Handling Missing Values

Tree Pruning

#### XGBoost - First Personal State Control Cat XXXDoc of Typer Parameters conductive contracts of the contract of the co Court Company of the

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### 1.XGBoost

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# XGBoost - First

### **Set XGBoost Hyper Parameters**

```
xgb params = {
    'eta': 0.037,
    'max depth': 5,
    'subsample': 0.80,
    'objective': 'reg:linear',
    'eval metric': 'mae',
    'lambda': 0.8,
    'alpha': 0.4,
    'base score': y mean,
    'silent': 1
num_boost_rounds = 250
```

```
First XGBoost predictions:

0
0 0.003354
1 0.008021
2 -0.002644
3 0.009713
4 -0.001039
```

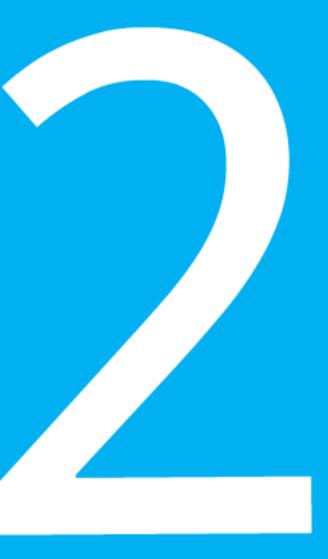
Validate For First XGBoost:

# **Combined XGBoost Predictions**

```
Combined XGBoost predictions:

0
0.003386
1 0.008179
2 -0.002297
3 0.009634
4 -0.000765
```

Validate For Combined XGBoost:



# LightGBM

1.XGBoost 2.LightGBM

3.Neural Network

4.Linear Regression

- Optimization in Speed and Memory Usage
- Optimization in Accuracy
- Optimization in Network Communication
- Optimization in Parallel Learning

#### Unadjusted LightGBM predictions:

-0

0 0.021860

1 0.022435

2 0.022740

3 0.021015

4 0.022069

### Validate For LightGBM



### Fitting neural network model...

0.0699696842884

Neura	al Network	prediction	S.				
	parcelid	201607	201608	201609	201707	201708	201709
782	14677191	0.004404	0.004402	0.004400	0.004405	0.004403	0.004401
968	11183209	0.004399	0.004403	0.004407	0.004400	0.004403	0.004407
1165	11554091	0.004373	0.004375	0.004378	0.004376	0.004377	0.004379
1351	11742566	0.004386	0.004388	0.004393	0.004387	0.004389	0.004394
1,609	14667297	0.004405	0.004404	0.004403	0.004406	0.004405	0.004404

Validate For NN

0.06760387642306702

### 1.XGBoost 2.LightGBM 3.Neural Network 4.Linear Regression

### Model Structure

Input
400 hidden units
relu
dropout 0.4
160 hidden units
relu
dropout 0.6
64 hidden units
relu
dropout 0.5
26 hidden units
relu
dropout 0.6

1 hidden units



1.XGBoost

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#### OLS predictions:

	parcelid	201607	201608	201609	201707	201708	201709
782	14677191	-0.006553	-0.008514	-0.010476	-0.002206	-0.004168	-0.006130
968	11183209	0.013480	0.011519	0.009557	0.017826	0.015865	0.013903
1165	11554091	-0.005324	-0.007286	-0.009248	-0.000978	-0.002940	-0.004901
1351	11742566	0.023170	0.021208	0.019246	0.027516	0.025554	0.023593
1609	14667297	-0.017631	-0.019592	-0.021554	-0.013284	-0.015246	-0.017208

Validate For OLS

### Combination

- Combining XGBoost, LightGBM, and baseline predictions...
- XGB\_WEIGHT = 0.6200
- BASELINE\_WEIGHT = 0.0100
- OLS\_WEIGHT = 0.0620
- NN\_WEIGHT = 0.0800

```
Combined XGB/LGB/baseline predictions:

0
0.007198
1.0.010301
2.0.003876
3.0.010879
4.0.004672
```

### Combination

- Combining with XGB/LGB/NN/OLS/baseline predictions...
- XGB\_WEIGHT = 0.6200
- BASELINE\_WEIGHT = 0.0100
- OLS\_WEIGHT = 0.0620
- NN\_WEIGHT = 0.0800

```
Combined XGB/LGB/NN/baseline/OLS
                                    predictions:
      parcelid
                 201607
                          201608
                                   201609
                                            201707
                                                     201708
                                                              201709
      14677191
782
                 0.0080
                          0.0079
                                   0.0077
                                            0.0083
                                                     0.0082
                                                              0.0080
                                            0.0132
968
      11183209
                 0.0129
                          0.0127
                                   0.0126
                                                     0.0130
                                                              0.0129
1165
      11554091
                 0.0044
                          0.0042
                                   0.0041
                                            0.0047
                                                     0.0045
                                                              0.0044
1351
      11742566
                 0.0142
                          0.0141
                                   0.0139
                                            0.0145
                                                     0.0144
                                                              0.0142
1609
      14667297
                 0.0044
                          0.0043
                                   0.0041
                                            0.0047
                                                     0.0046
                                                              0.0044
```