ZS Data Science Challenge

Data Preparation -

Column Renaming

- If 2 columns had same, "_1" was added as suffix to second column
- All "-", "." And "/" in column name were replaced by "_"

Observation - Game Id has no missing data

Observation - Multiple columns of same name such as 'distance_of_shot'

- Both columns with same name have missing values
- Second column of the 2 has noisy data in form of decimal numbers identified by looking at variance
- Used values from second column that are not decimals to fill data in first column

Observation - Missing values are present in most features.

Handling Missing Data

- Visualise variances for continuous variables and histograms for categorical attributes
- For Columns with same names, some missing values were filled from second column that were not missing and were not decimal values
- Feature wise analysis on how missing values were handled
    1. **) match_event_id :** Processed based on previous and next row. If game_id of previous row is same as that of the row with the missing value then assign match_event_id as 1 + previous_match_id.
       Similar condition for next row.
       Remaining missing values are padded same as previous values.
    2.) **location_x :** Missing value is found using LinearRegression in which the training features were ['location_y', 'distance_of_shot', 'lower_range', 'upper_range']

3.) **location_y :** Missing value is found using LinearRegression in which the training features were [‘location_x’, ‘distance_of_shot’, ‘lower_range’, ‘upper_range’]
4.) **remaining_min** :
5.) **power_of_shot** : Missing Values were padded
6.) **game_season** : missing Values were padded
7.) **distance_of_shot** : missing values were replaced by mean
8.) **area_of_shot** : missing values were replaced by mode
9.) **shot_basics** : missing values were replaced by mode
10.) **lower_range** :missing values were replaced by mode
11.) **upper_range** :missing values were replaced by mode
12.) **date_of_game**:missing Values were padded
13.) **home**: missing Values were padded
14.) **lat_lng** : missing Values were padded
15.) **type_of_shot** : missing values were assigned a unique value which was not in the column
16.) **type_of_combined_shot** : missing values were assigned a unique value which was not in the column

EDA

Problem

We need to provide a probability to the dependent variable.

We can reduce this to a classification problem in which the dependent variable is binary. Classification algorithms have various probability thresholds for classification. We need to return these probabilities.

Data

Numerical Data -
[match_event_id, location_x, remaining_min, location_y, remaining_sec, distance_of_shot
]
Categorical Data-
[power_of_shot, knockout_match, area_of_shot, shot_basics, range_of_shot, home, lat_lng, type_of_shot, type_of_combined_shot
]

Dealing with missing data

Outliers

Feature Engineering

Transforming/Changing Column Values

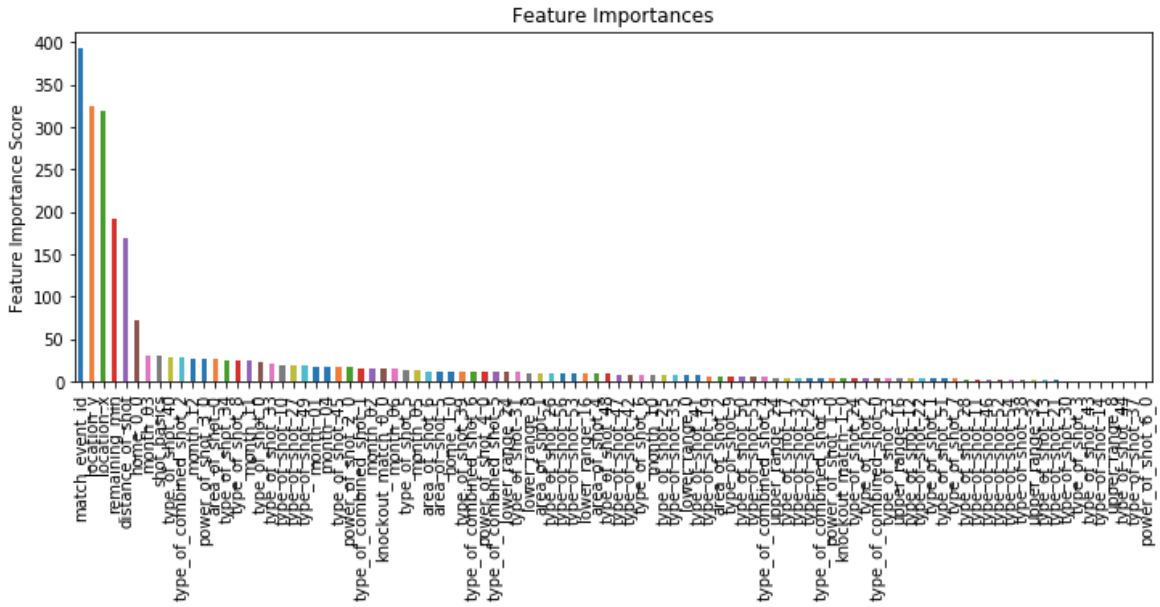
- **‘range_of_shot'** is split into **‘lower_range’** and **‘upper_range’**
- **date_of_game** is split into year, month, day
- **home/away** is transformed to **‘home’** which is boolean variable having values 1 or 0

Feature Contribution

	Specs	Score
16	upper_range	210.617427
15	lower_range	210.617427
9	shot_basics	173.074551
8	area_of_shot	82.023326
7	distance_of_shot	77.158125
2	location_y	35.575411
0	match_event_id	4.725222
17	home	4.008968
3	remaining_min	3.917512
4	power_of_shot	3.793183
6	game_season	1.291374
12	type_of_combined_shot	0.763052
10	lat_lng	0.684391
11	type_of_shot	0.271351
13	month	0.188948
14	year	0.066180
1	location_x	0.052376
5	knockout_match	0.000766

'''
learning_rate = 0.1
Estimators = 149,
Accuracy : 0.6602
AUC Score (Train): 0.727088

learning_rate = 0.5
Estimators = 63,



Accuracy : 0.6528
AUC Score (Train): 0.695635

learning_rate = 0.3
Estimators = 77
Accuracy : 0.6568
AUC Score (Train): 0.710403

'''

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```
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[139]  train-auc:0.70788+0.00139126 test-auc:0.65114+0.00296943

Model Report
Accuracy : 0.6499
AUC Score (Train): 0.702410
Out[51]:
```

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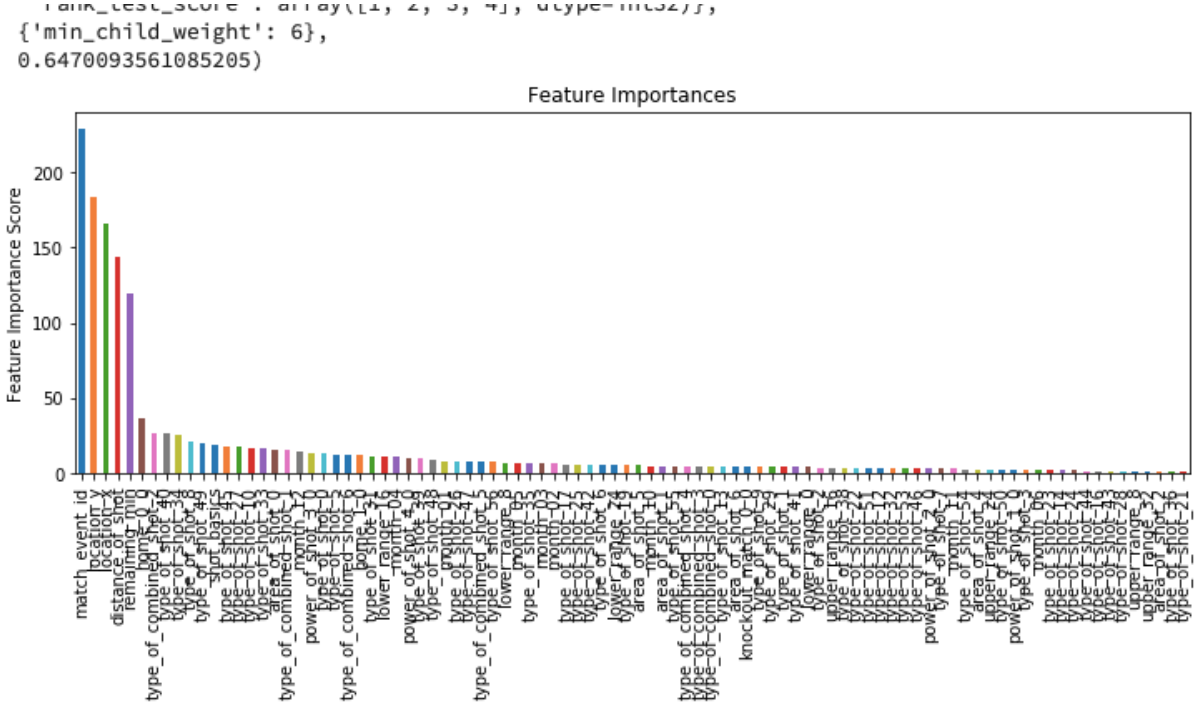

GAMMAGAM

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GAMMA

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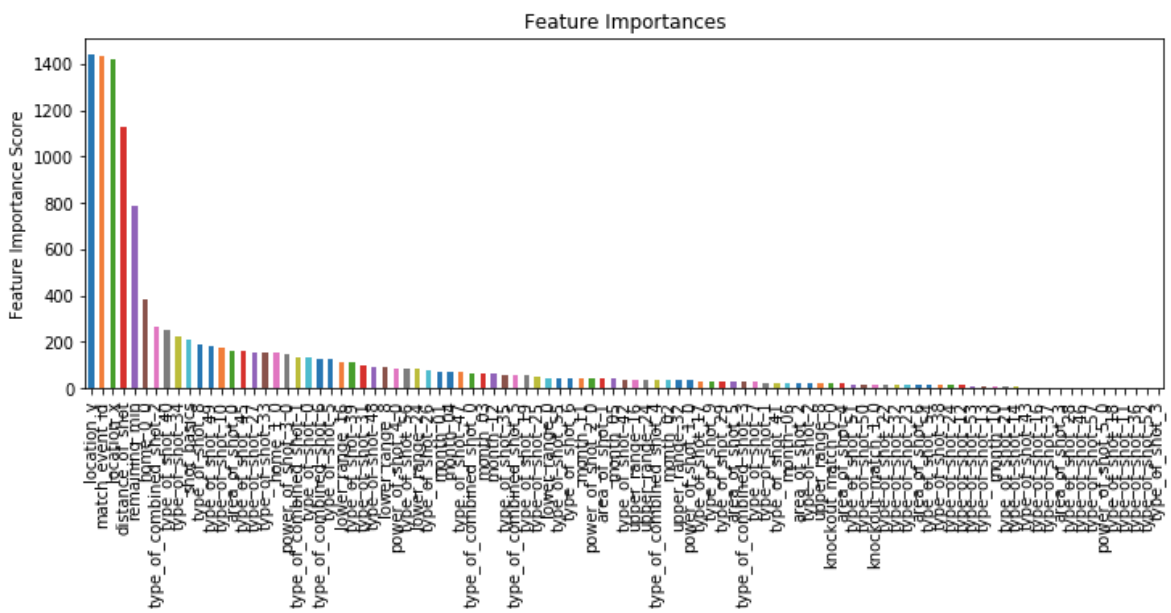
```
xgb4 = XGBClassifier(
 learning_rate =0.01,
 n_estimators=5000,
 max_depth=4,
 min_child_weight=5,
 gamma=0.3,
 subsample=0.9,
 colsample_bytree=0.55,
 reg_alpha=0.1,
 objective= 'binary:logistic',
 nthread=4,
 scale_pos_weight=1,
 seed=27)
modelfit(xgb4, train, predictors)
```

[1154]train-auc:0.700428+0.000768312 test-auc:0.650449+0.00381668

Model Report
Accuracy : 0.6485
AUC Score (Train): 0.692643



[[1157 197]
 [708 381]]
 0.6295538272615636

 [[10648 1548]
 [6075 3715]]
 0.653279359592468

Precision Recall Score = 0.5204261614465217

Classification Report

	precision	recall	f1-score	support
0.0	0.62	0.85	0.72	1354
1.0	0.66	0.35	0.46	1089
accuracy			0.63	2443
macro avg	0.64	0.60	0.59	2443
weighted avg	0.64	0.63	0.60	2443