

NBA 2018 Play-offs & Champion Prediction

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Introduction

- The final champion of the NBA every season is one of the greatest events for the whole world. Our primary objective is to predict the outcomes of all games in the 2018 League and finally predict the play-offs and Championship Finals.
- We plan to do this by scoring each player based on the relevant features and assessing his contribution to the team, then adding this calculated score for all players in the team and taking a average for the team.
- This calculated data is then fed to our Algorithm to make a prediction for a winner team.

Data Understanding & Preparation

- We collected the last 3 years basic data and the current season's salary of each player from the website “basketball-reference” as our row data. There are 1058 rows and 34 columns in our data. The “Team” column represents the players' current team in 2017-2018 season, the numeric data is the basic data.

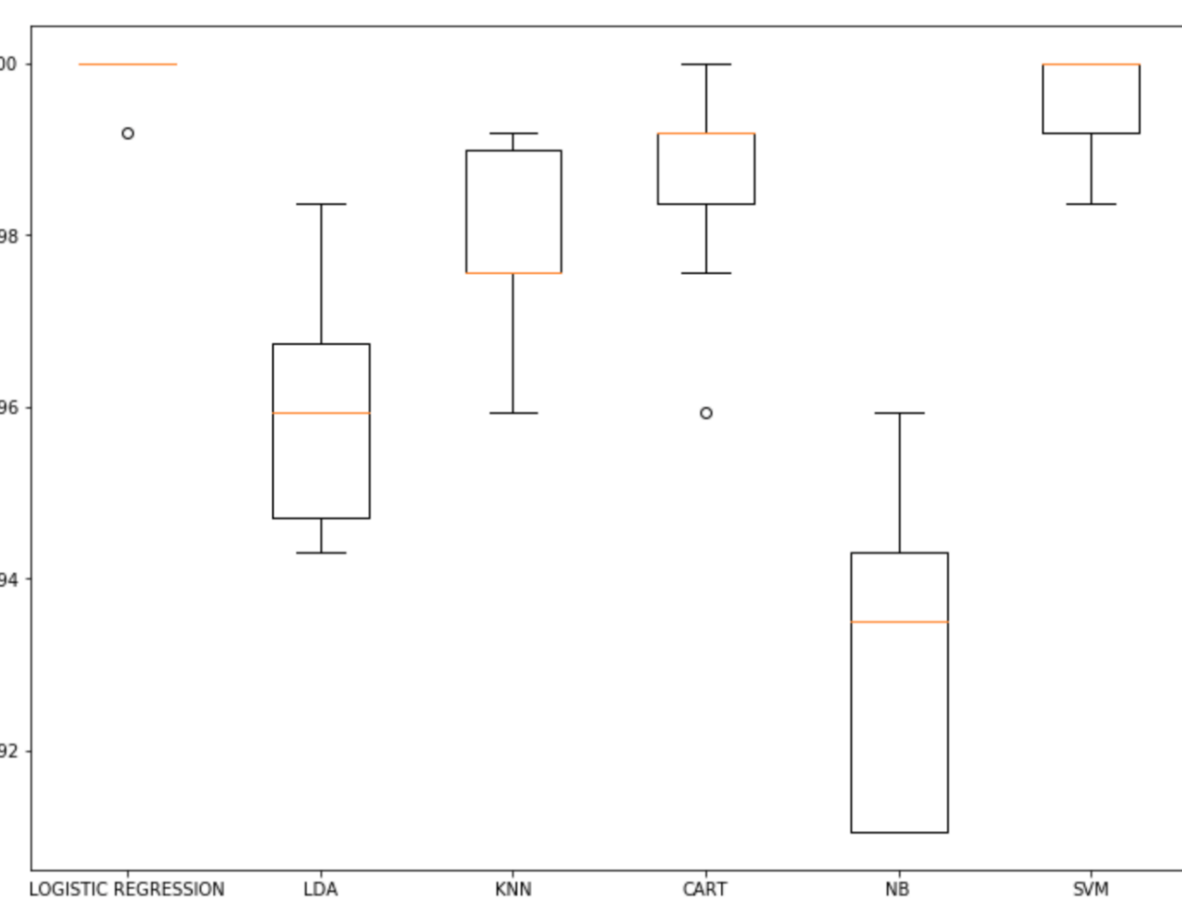
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1	Angela	Female	2000-01-01	1960	170	65	48	28.2	4.3	11	0.04	1.6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.																																																																																																																																																																																																																																																																																																									

- Missing value in the row data of every feature means the player didn't make any effort for this feature, so we filled in the missing values with 0 instead of deleting them.
- Then we calculated the mean value for every single feature of player data. Since there were more than 20 features and we only needed 10 features, we further calculated the correlations between all the features and player current salary and chose the first 10 features that are highly useful for prediction.

Modeling

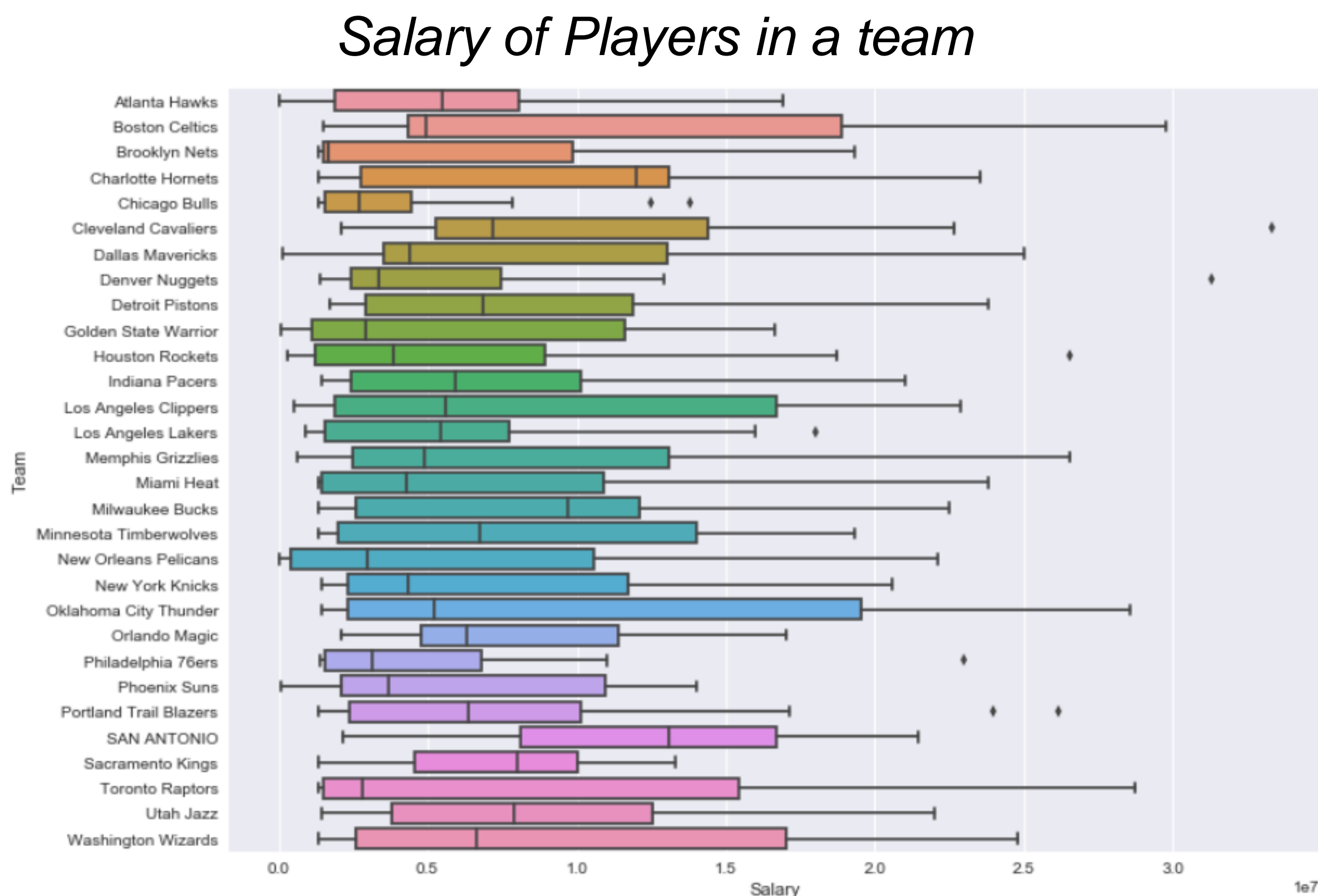
- We have used Logistic Regression to predict the winner for each match.
- The formula for Logistic regression is as follow:
$$P = \frac{e^{a+bX}}{1 + e^{a+bX}}$$
- We created our own formula to score each player based on their performance. The player score data is then added & averaged to create a team score.
- This data is then fed to the Logistic Regression Algorithm to obtain our prediction.
- Comparison of different Algorithms:

LOGISTIC REGRESSION: 0.999187
LDA: 0.959350 (0.012595)
KNN: 0.979675 (0.009790)
CART: 0.986179 (0.010938)
NB: 0.930894 (0.017905)
SVM: 0.995122 (0.006504)



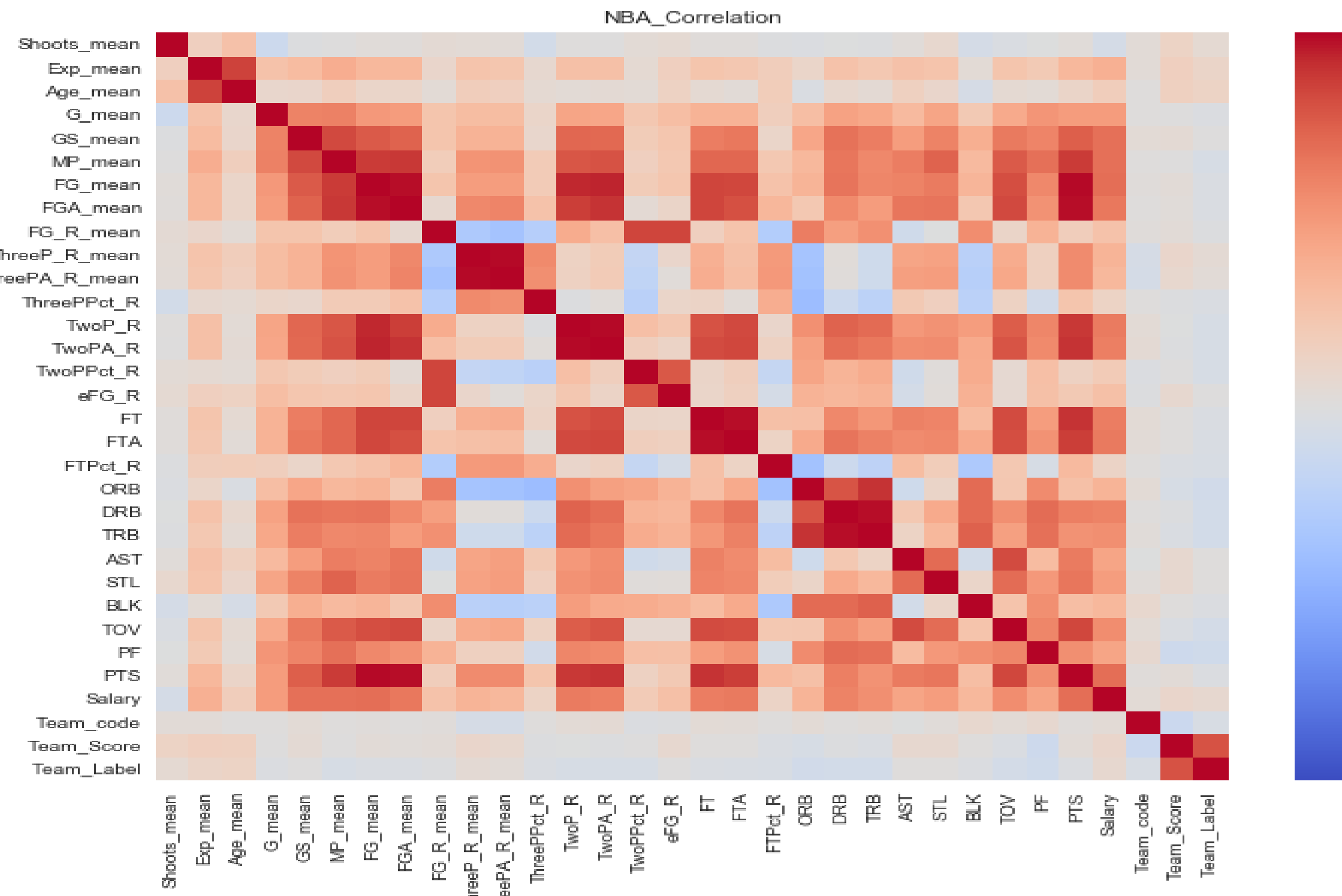
Results & Evaluation

- This graph is to give a quick look too see the salary level of each team.



- And this graph below is the correlation matrix based on the data we cleaned.

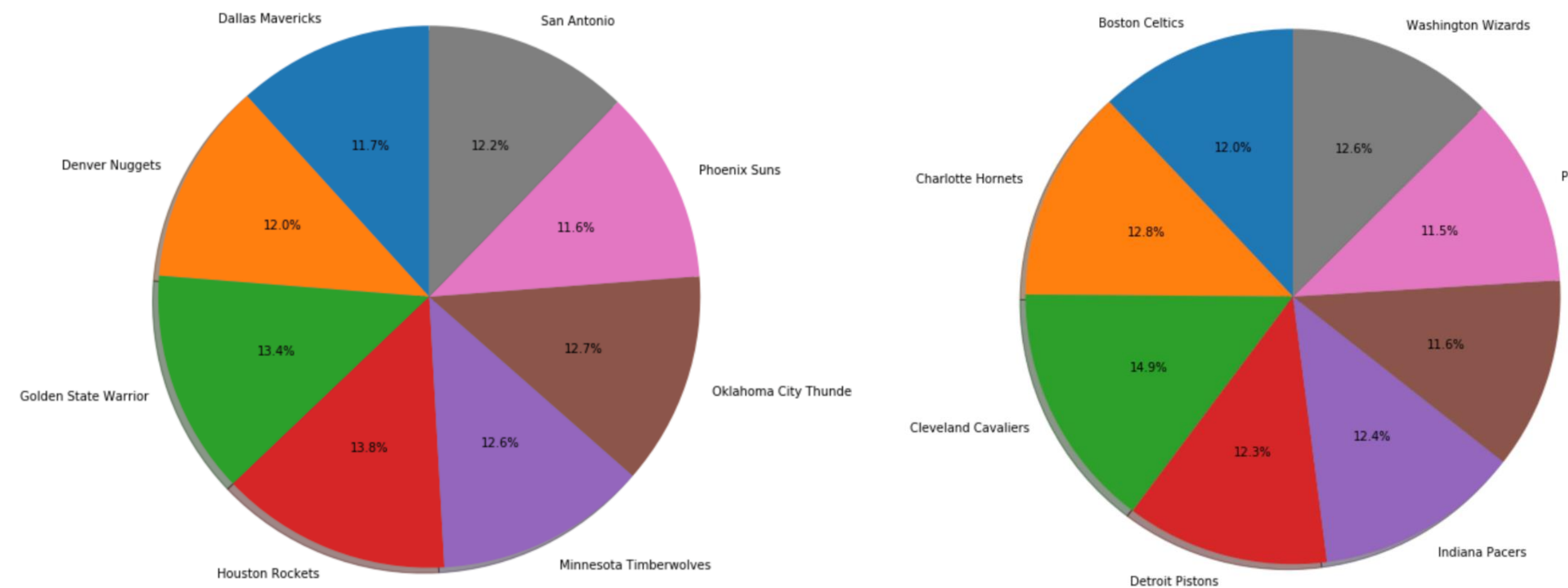
Correlation Matrix to Determine Dominant Feature set



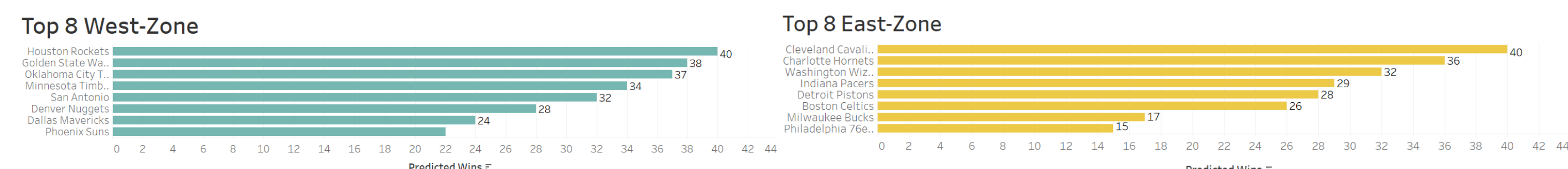
Conclusion

- We have made our predictions using Logistic Regression Model and would be comparing them with actual games as they happen to see whether the accuracy is high.

Play-offs Prediction



Win Counts



- From the graphs above, we can see that which team would be in the play-offs and which team has the highest chance to win the championship in this season.
- It seems like the Huston Rockets and Cleveland Cavaliers are the strongest contenders of the champion.