Rise of the 3-Point Shot in the NBA

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Problem Statement...

The popularity and usage of the 3 point shot has risen substantially in the NBA in the last 10+ years due in large part to higher reliance on analytics. The goal of my project is to see if this trend is accurate. Are 3 point shots more representative for success than 2 point shots? Are teams that attempt more 3 point shots than others more successful?

Data Collection –

1. The library `**basketball_reference_webscraper**` for player statistics from basketball-reference.com
2. The library `**selenium**` for player salary data from hoopshype.com
3. The library `**nba_api**` for full team statistics from stats.nba.com

Modeling

Linear Regression for Wins Prediction

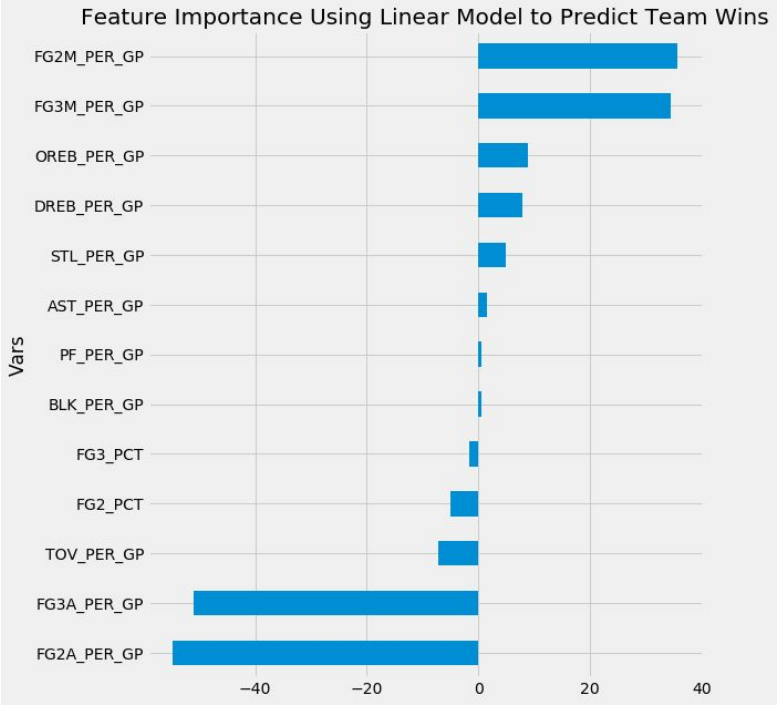
Attempt 1

- 2P% | 3P% | FT% | 2PA per game | 3PA per game | 3PA per 2PA
  - **Train R^2: 0.4028**
  - **Test R^2: 0.2947**

Linear Regression for Wins Prediction

Attempt 2

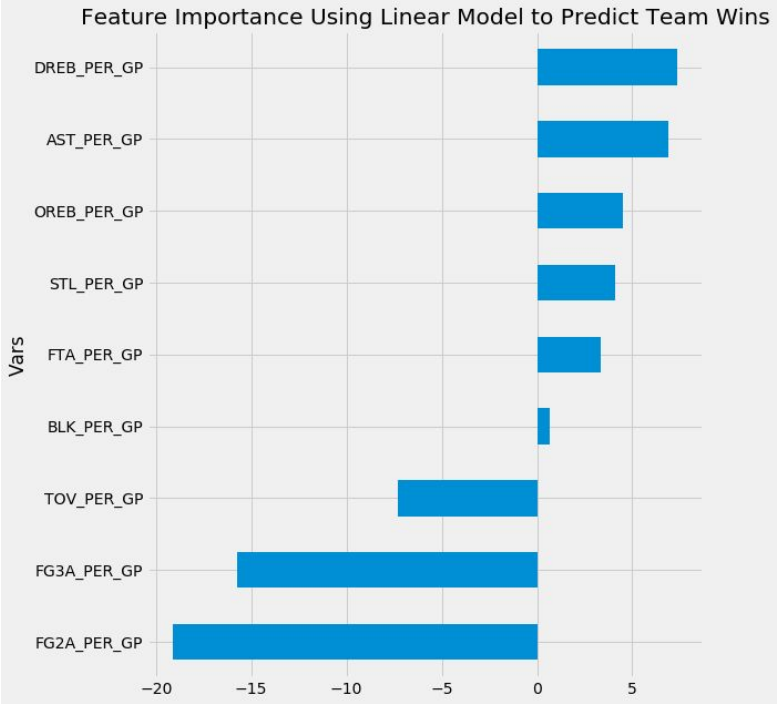
- 2P% | 3P% | FT% | 2PM per game | 2PA per game | 3PM per game | 3PA per game | FTM per game | FTA per game | OREB per game | DREB per game | AST per game | PF per game | STL per game | TOV per game | BLK per game
  - **Train R^2: 0.8049**
  - **Test R^2: 0.8293**



Linear Regression for Wins Prediction

Attempt 3

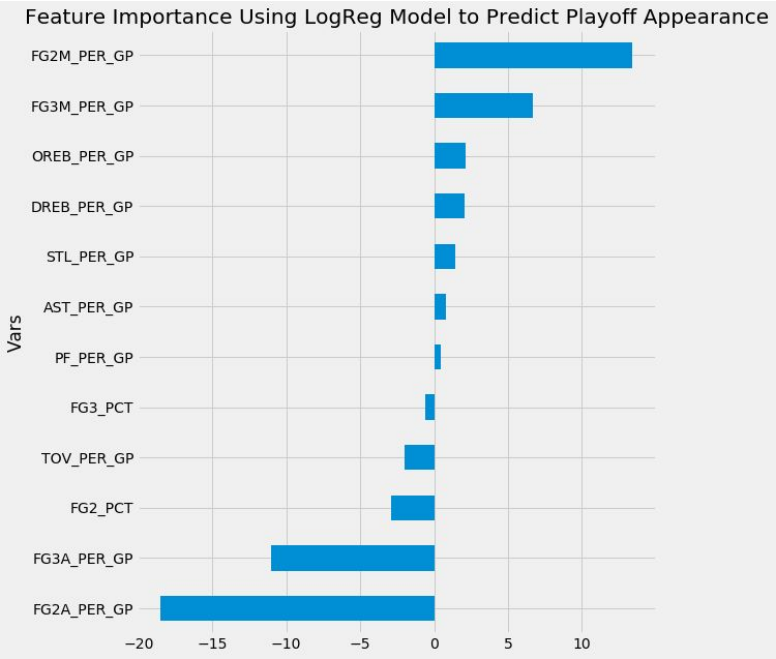
- 2PA per game | 3PA per game | FTA per game | OREB per game | DREB per game | AST per game | PF per game | STL per game | TOV per game | BLK per game
  - **Train R^2: 0.6248**
  - **Test R^2: 0.6649**



Logistic Regression for Playoffs Classification

Attempt 1: Predict Playoff Appearance

- 2P% | 3P% | FT% | 2PM per game | 2PA per game | 3PM per game | 3PA per game | FTM per game | FTA per game | OREB per game | DREB per game | AST per game | PF per game | STL per game | TOV per game | BLK per game
  - **Train Accuracy: 0.8459**
  - **Test Accuracy: 0.8307**

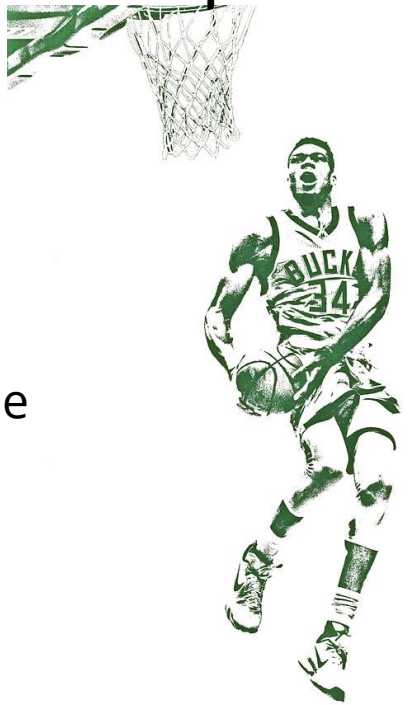


Logistic Regression for Playoffs Classification

Attempt 2: Predict NBA Championship

- 2P% | 3P% | FT% | 2PM per game | 2PA per game | 3PM per game | 3PA per game | FTM per game | FTA per game | OREB per game | DREB per game | AST per game | PF per game | STL per game | TOV per game | BLK per game
  - **Train Sensitivity: 0.0741**
  - **Test Sensitivity: 0.1111**

Logistic Regression for Playoffs Classification



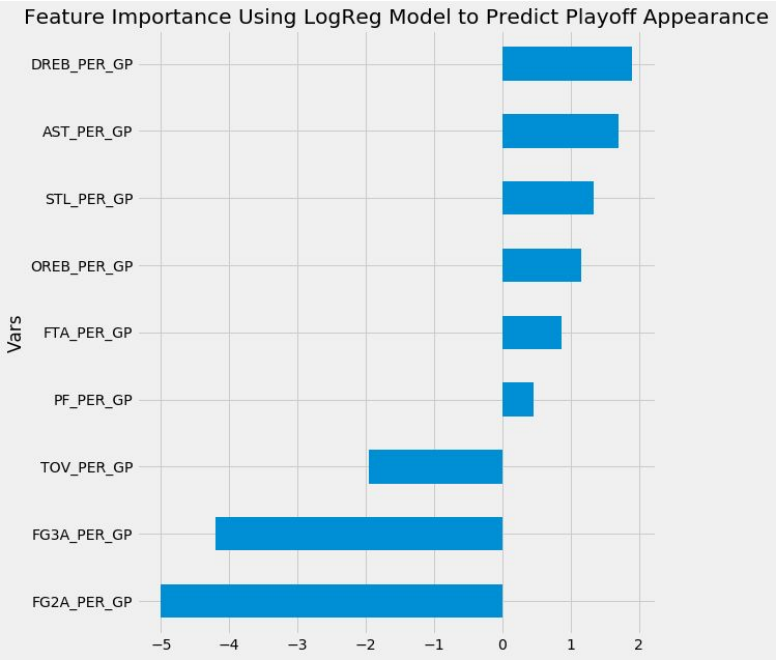
<u>Attempt 3:</u> Predict NBA Finals Appearance

- 2P% | 3P% | FT% | 2PM per game | 2PA per game | 3PM per game | 3PA per game | FTM per game | FTA per game | OREB per game | DREB per game | AST per game | PF per game | STL per game | TOV per game | BLK per game
  - **Train Sensitivity: 0.0741**
  - **Test Sensitivity: 0.1111**

Logistic Regression for Playoffs Classification

Attempt 4: Predict Playoff Appearance

- 2PA per game | 3PA per game | FTA per game | OREB per game | DREB per game | AST per game | PF per game | STL per game | TOV per game | BLK per game
  - **Train Accuracy: 0.8142**
  - **Test Accuracy: 0.7717**

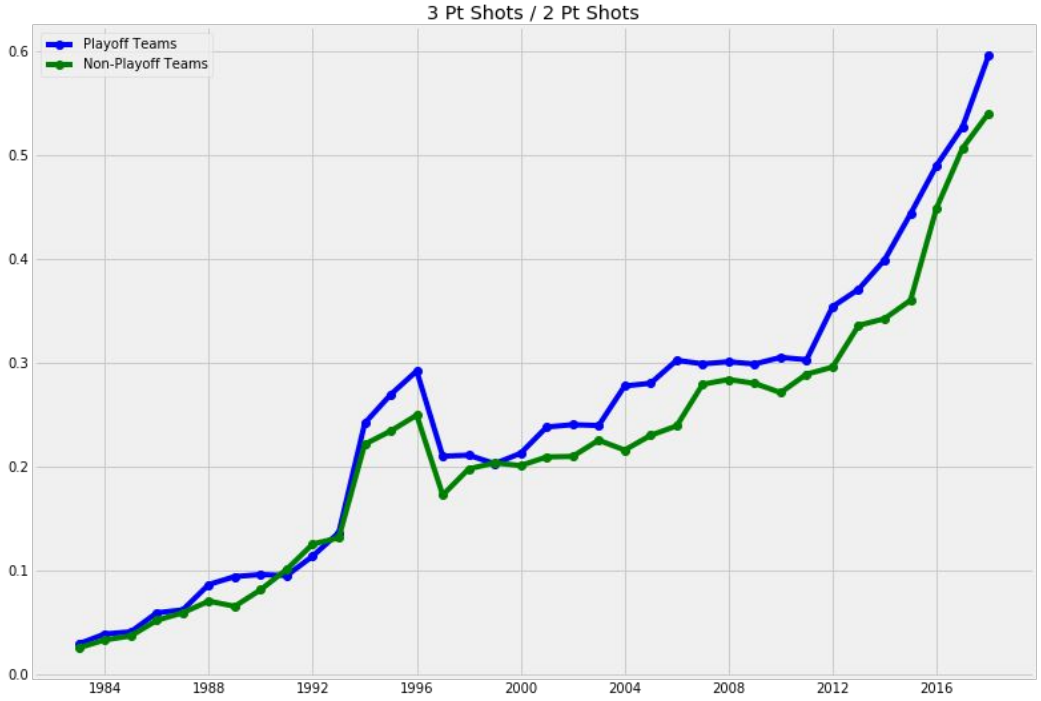


Conclusions & Visualizations

3 Pointers Win!

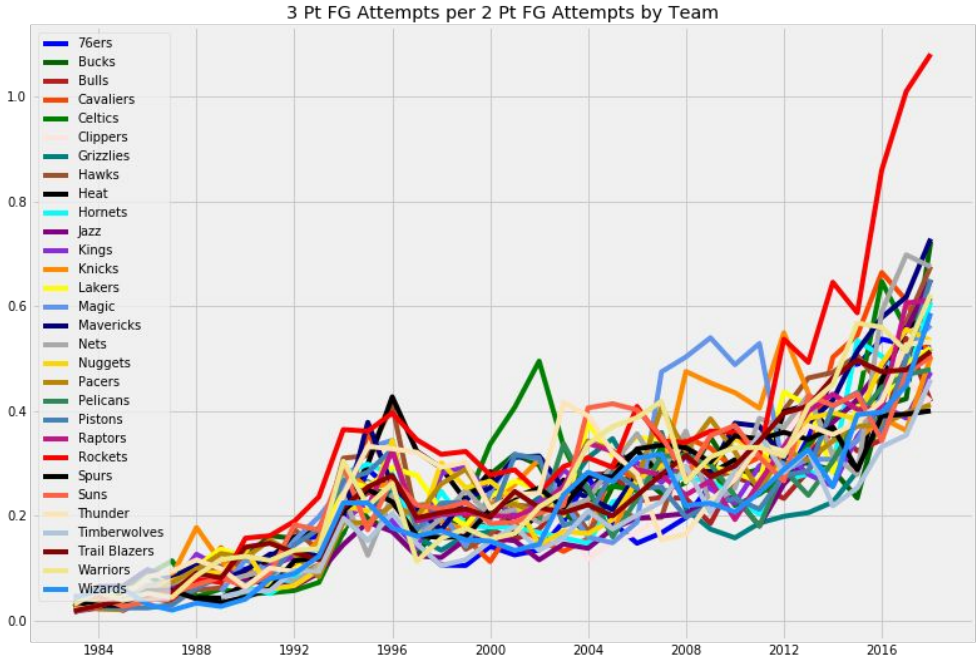
- Logistic Regression model attempt 4 has best combination of interpretability and accuracy
  - 3 point attempts per game had a smaller negative impact on playoff appearance prediction than 2 point attempts per game
  - 3 pointers contribute more to success
  - Same evaluation was shown in Linear Regression example

The NBA Seems to Agree...



- 3 Point Attempts per 2 Point Attempt across the entire league, broken up by playoff teams and non-playoff teams
- Demonstrates an increasing trust in the 3 point shot
- Illustrates how playoff teams almost always almost always have the higher ratio

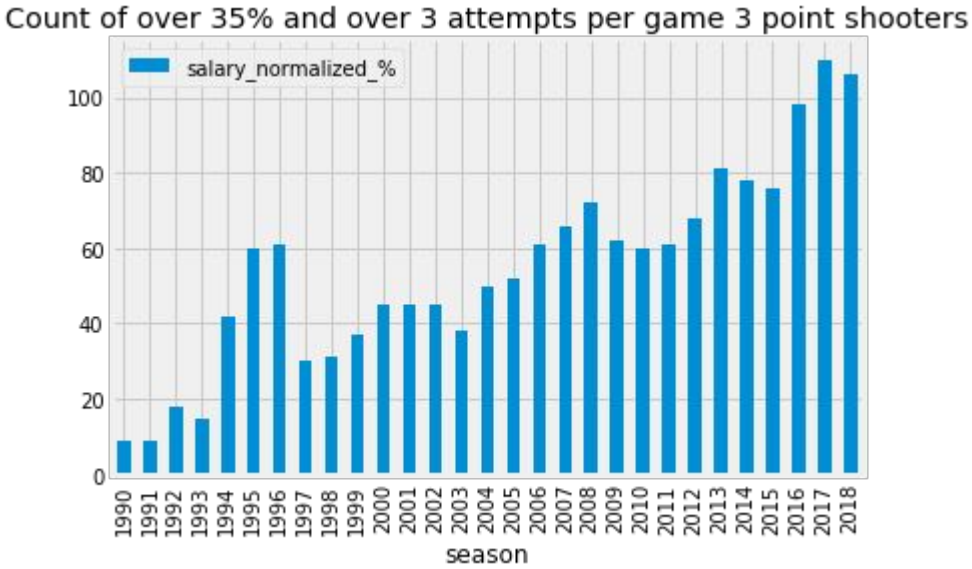
...With One Team Agreeing More Than Most



- Houston Rockets are leaps and bounds above the rest of the league
- First team ever to finish a season with more 3 point attempts than 2 point attempts
- Did so both of the last 2 seasons

	All Teams	Top Ten FG3A/FG2A (All Seasons)	Top Ten FG3A/FG2A (Since 2010)
Make Playoffs	57.35%	70.28%	72.22%
Finals Appearance	7.11%	11.67%	16.67%
NBA Championship	3.55%	5.28%	6.67%

3 Point Specialists Are Increasing, But Their Salaries Aren't



Thanks!