

The 3-point shot in the NBA: Analysis of Trends and Correlations with Team Success



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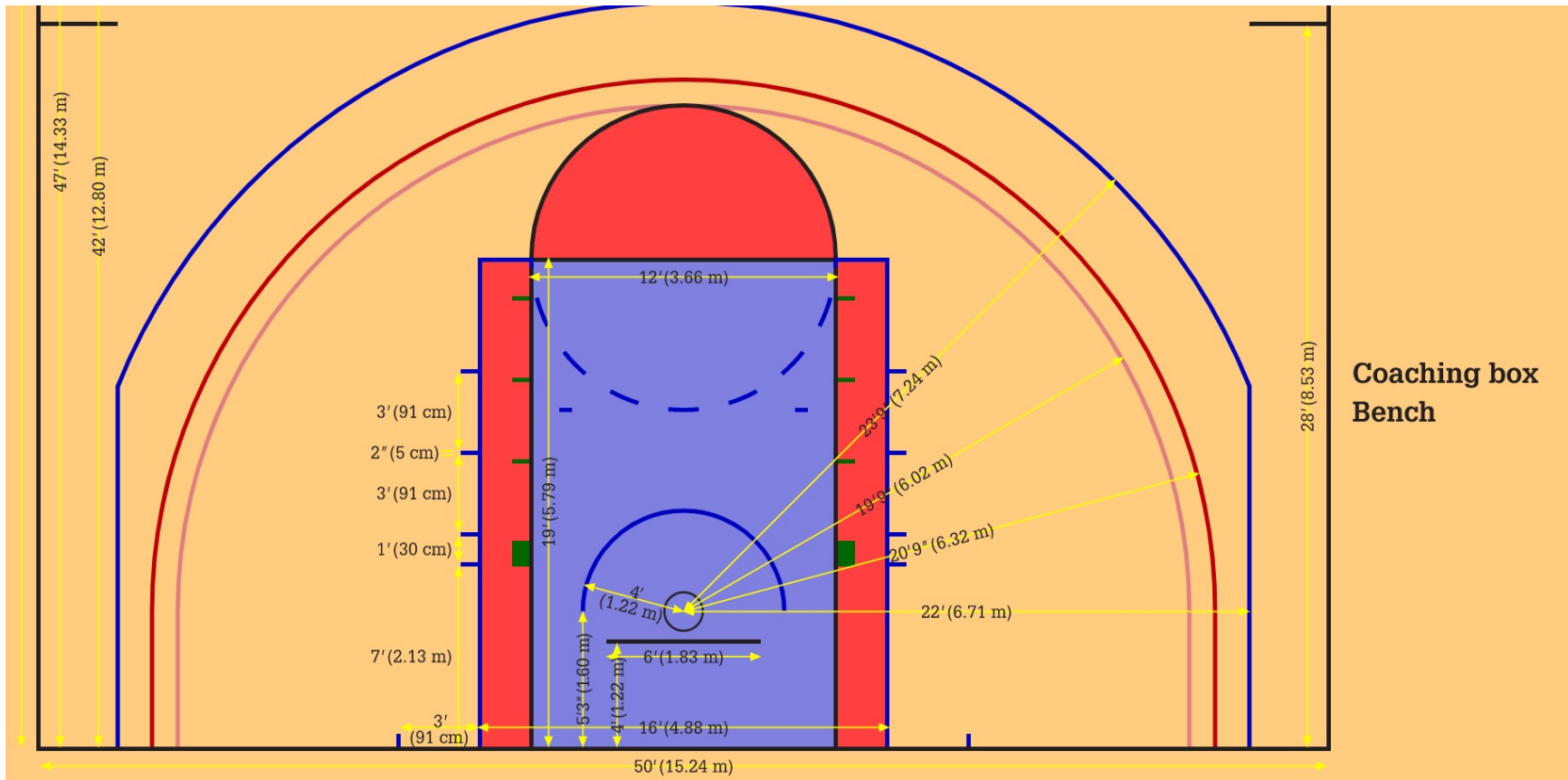
Research questions

- ▷ What types of shots are most efficient?
- ▷ What shot making strategies are correlated with more wins?

Stakeholders

- ▷ Team owners/General Managers/Scouts: Decision making on players to acquire
- ▷ Coaches: Decision making on offensive and defensive strategies
- ▷ Players: Decision making on what types of shots to practice and improve

NBA 3-Point Measurements

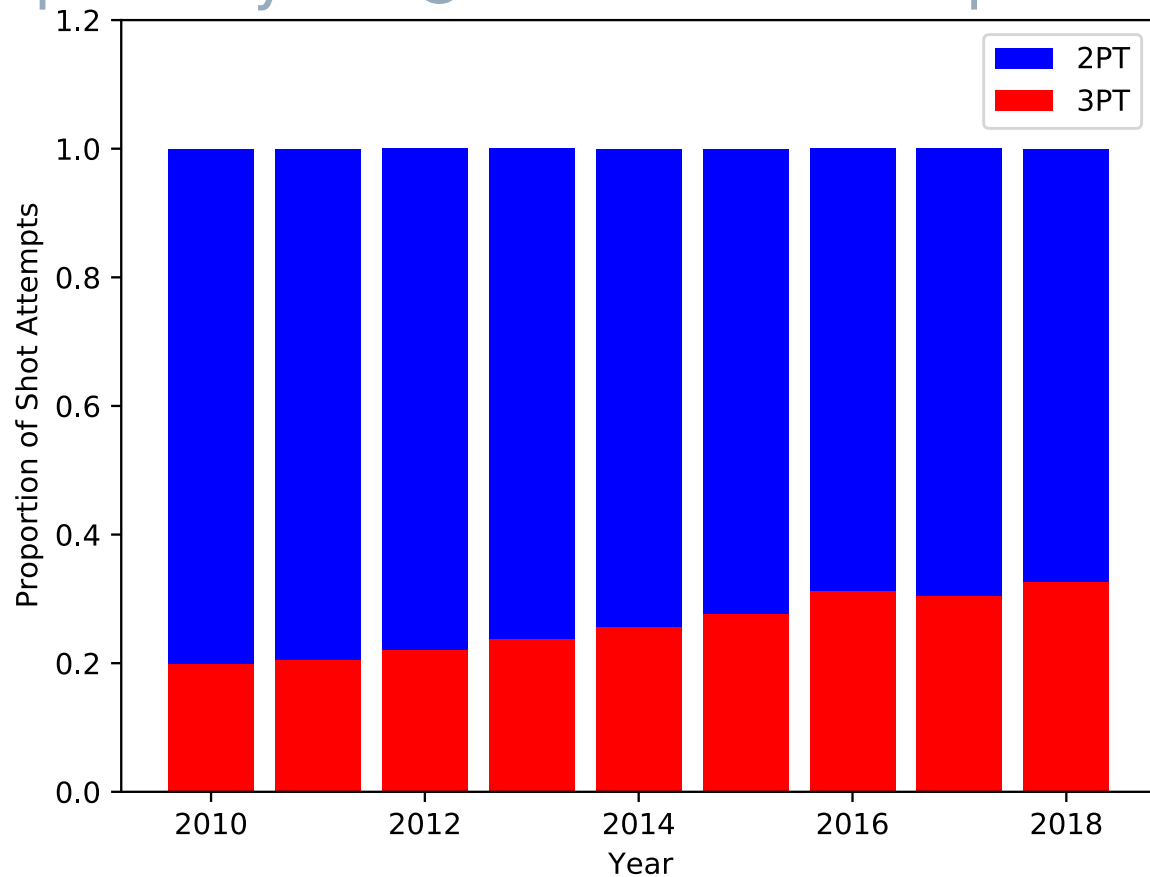


Effective Field Goal (EFG) %

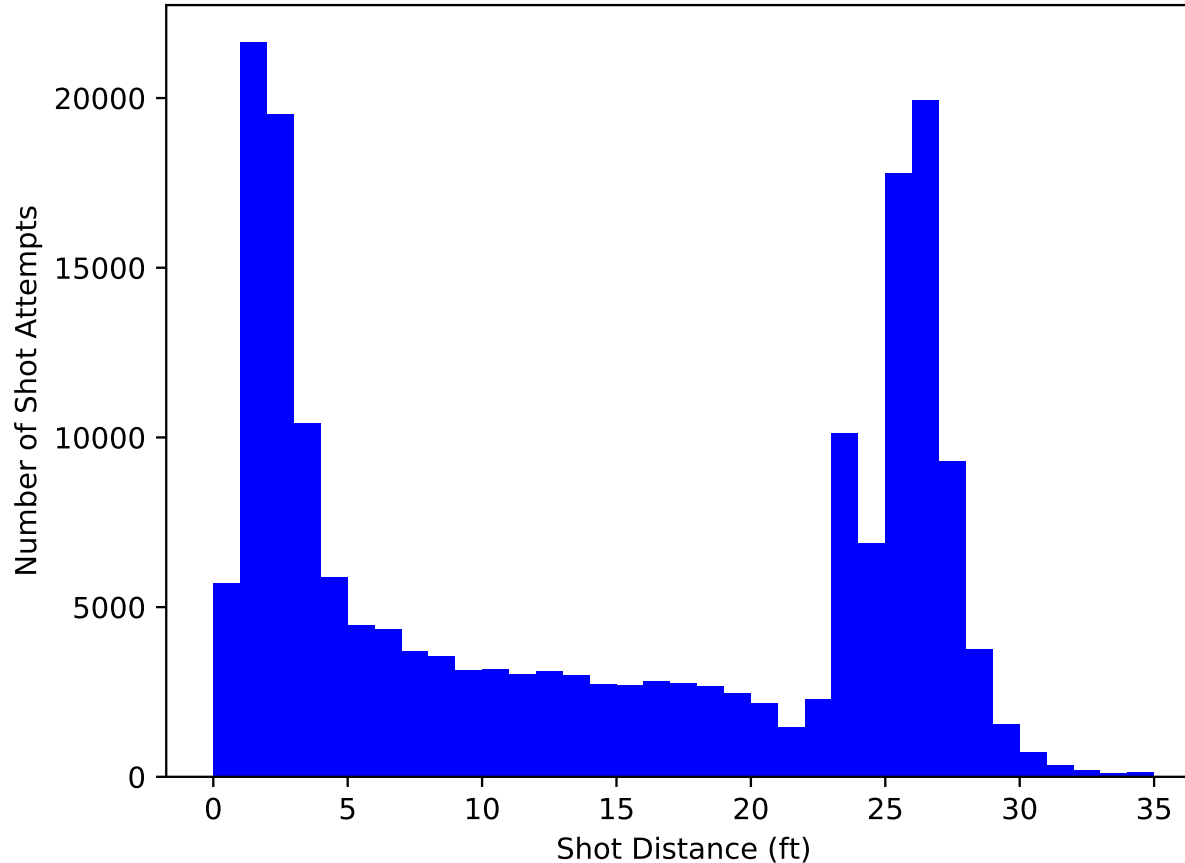
- ▷ Weighted average of 2-point shots and 3-point shots (expected value)

$$EFG = \frac{2pt_{makes} + 3pt_{makes} * 1.5}{2pt_{attempts} + 3pt_{attempts}}$$

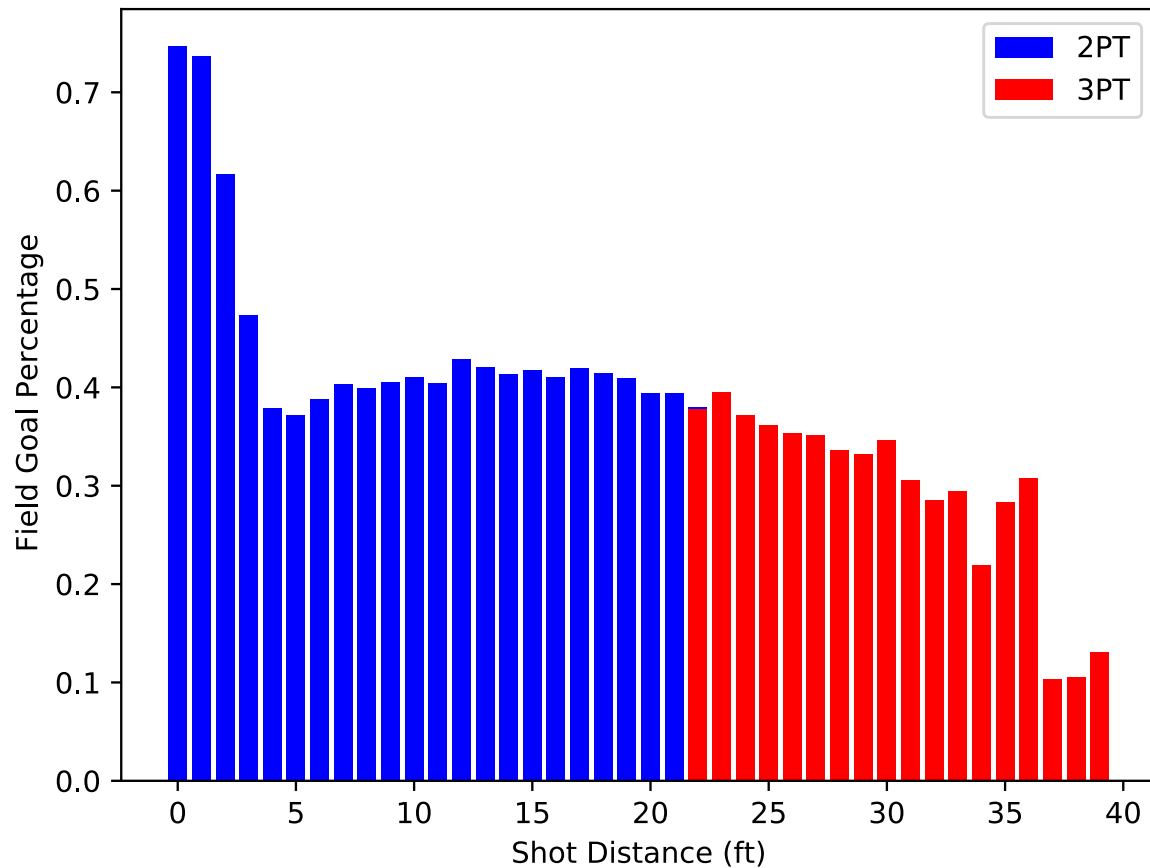
Frequency of 3-Point Attempts



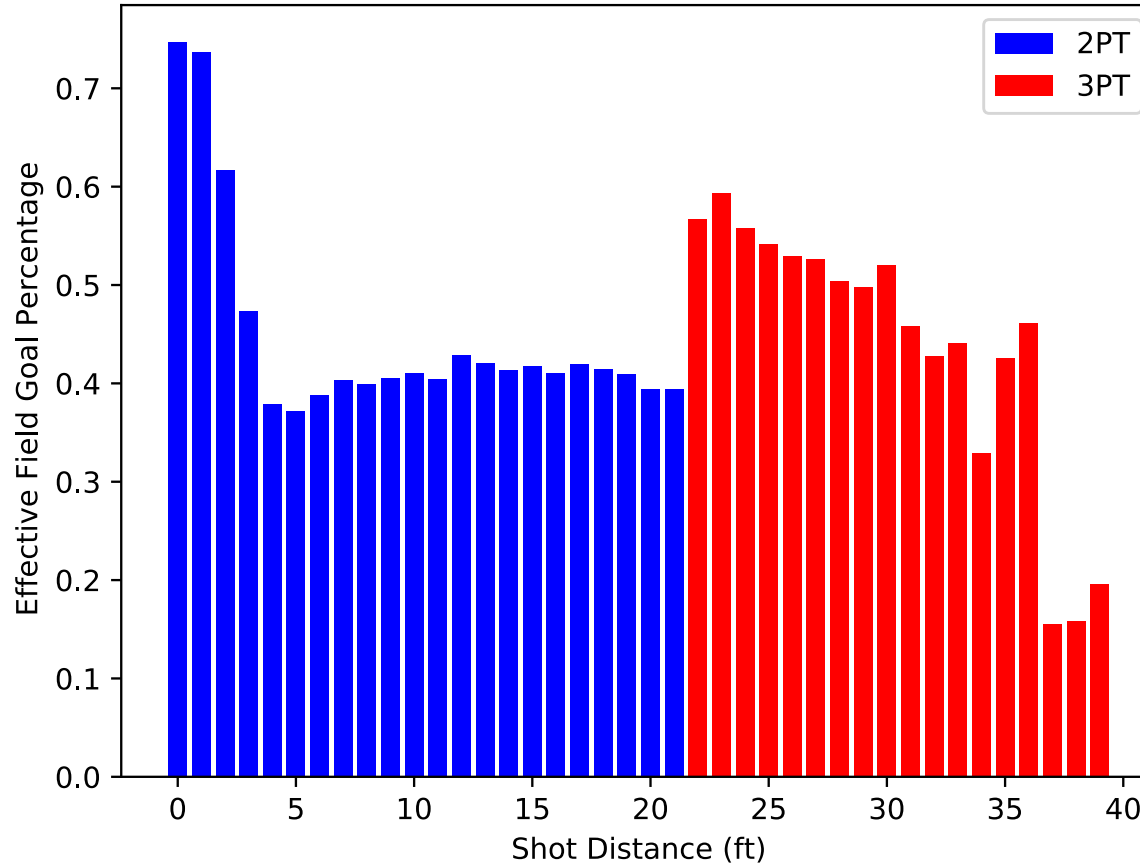
Distribution of Shot Attempts: 2019-20



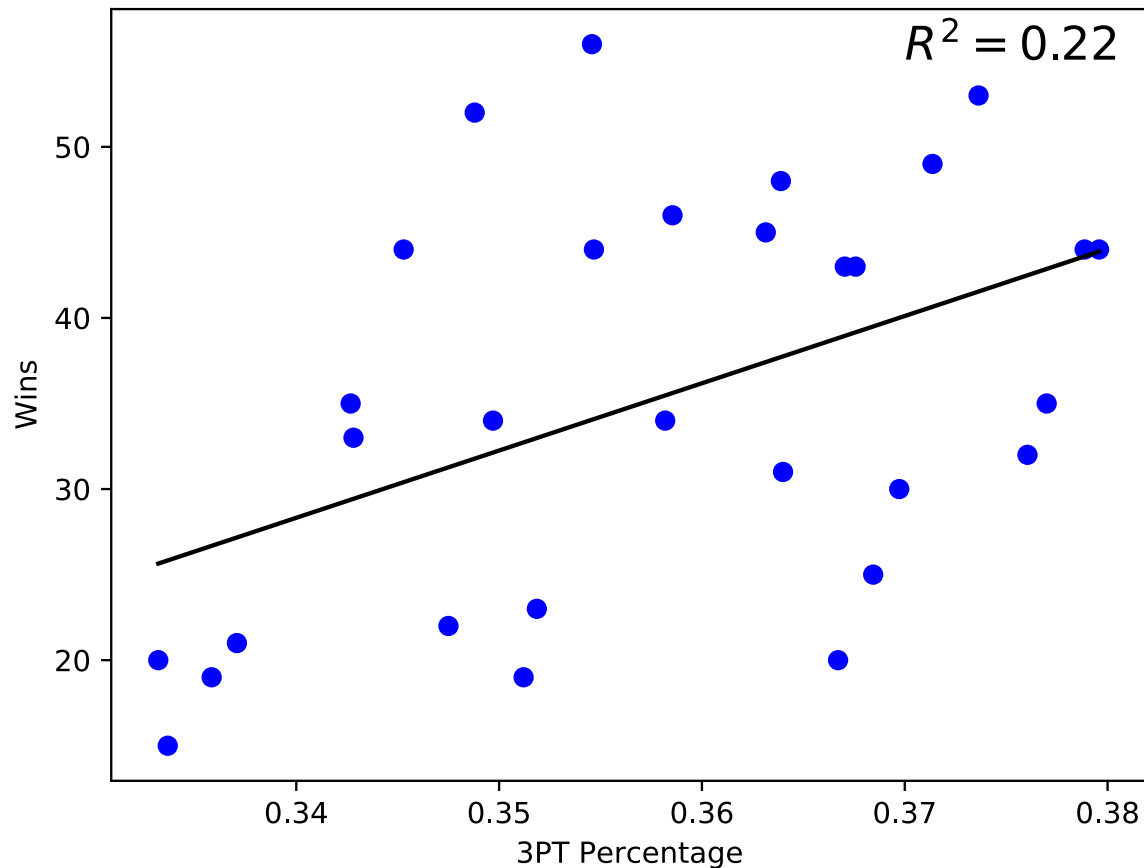
Distribution of Field Goal %



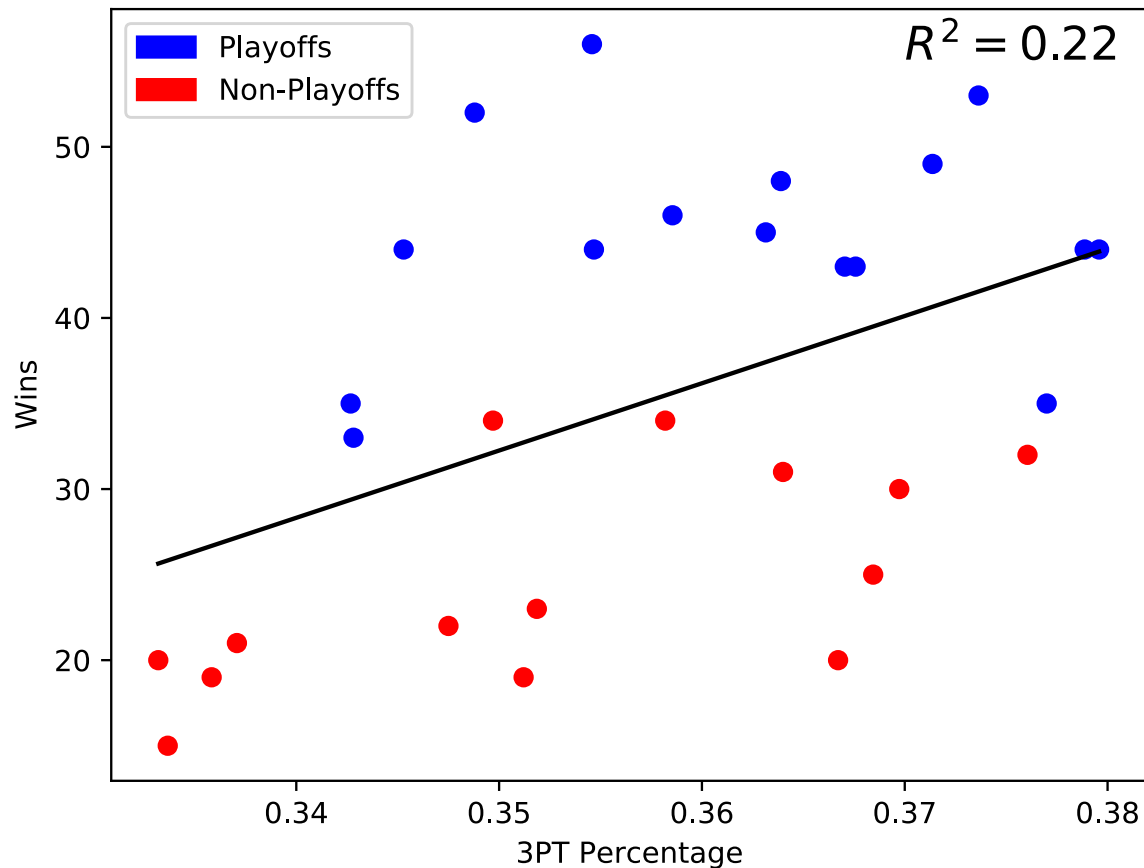
Distribution of Effective Field Goal %



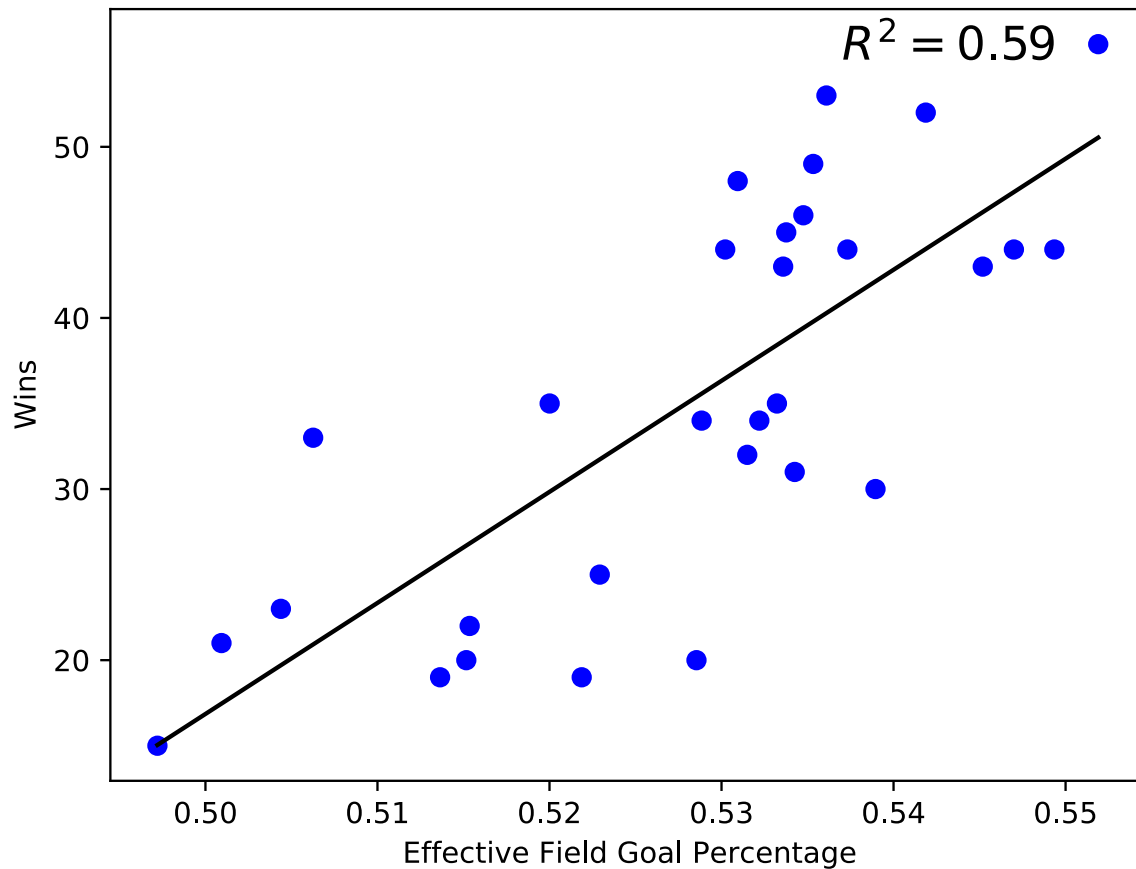
3PT % Correlation with Wins: 2019-20



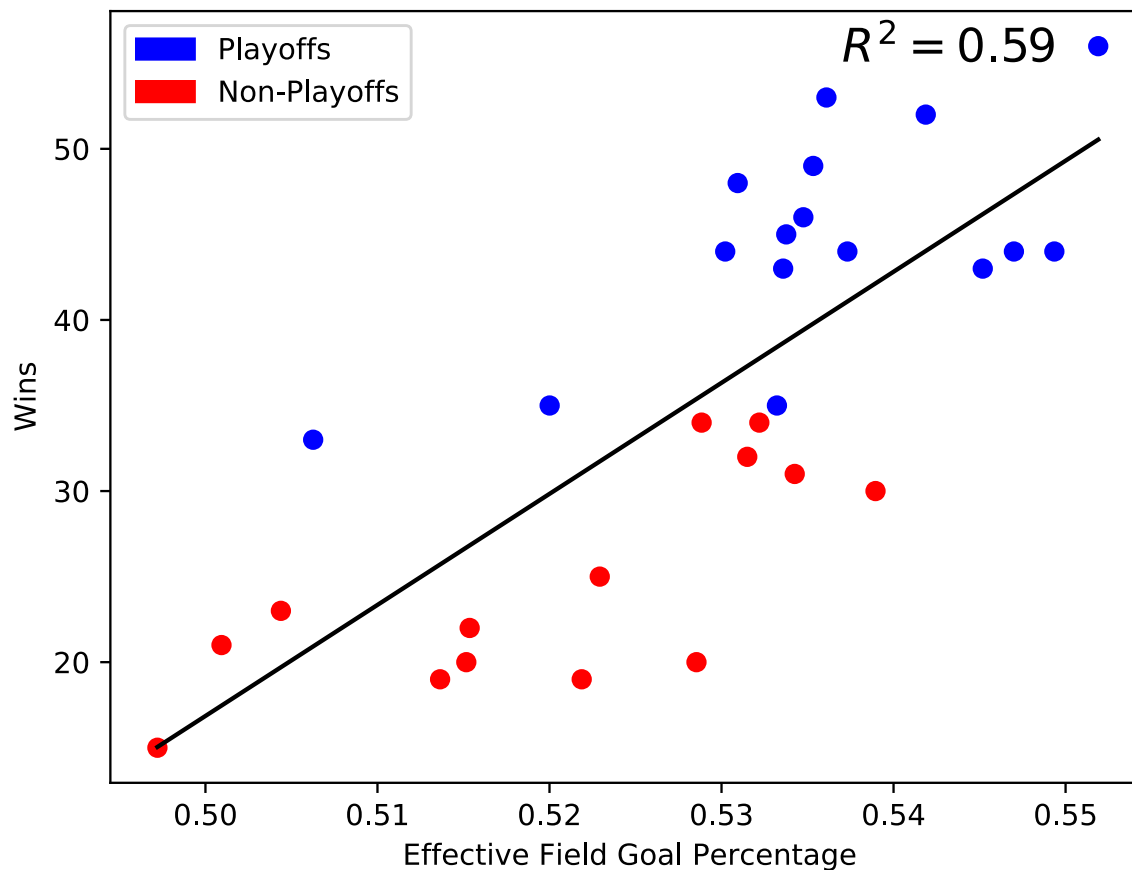
3PT % Correlation with Wins: 2019-20



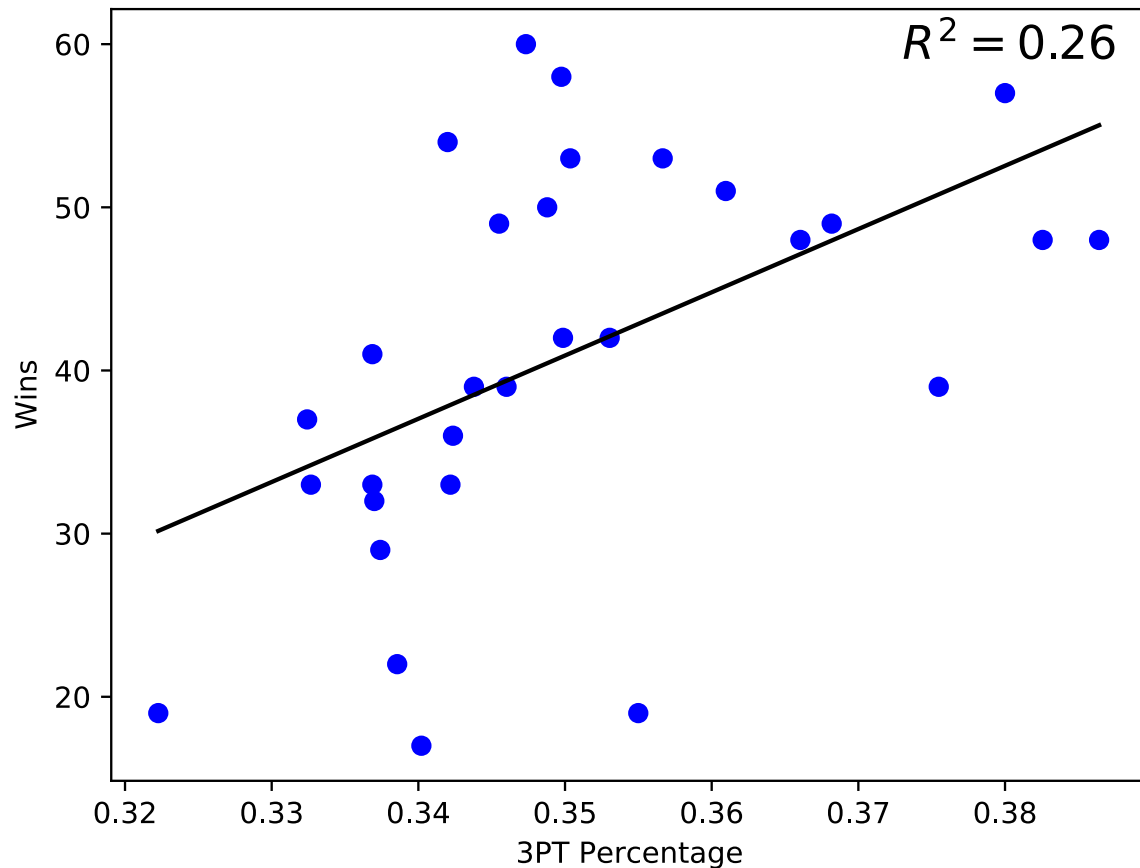
EFG % Correlation with Wins: 2019-20



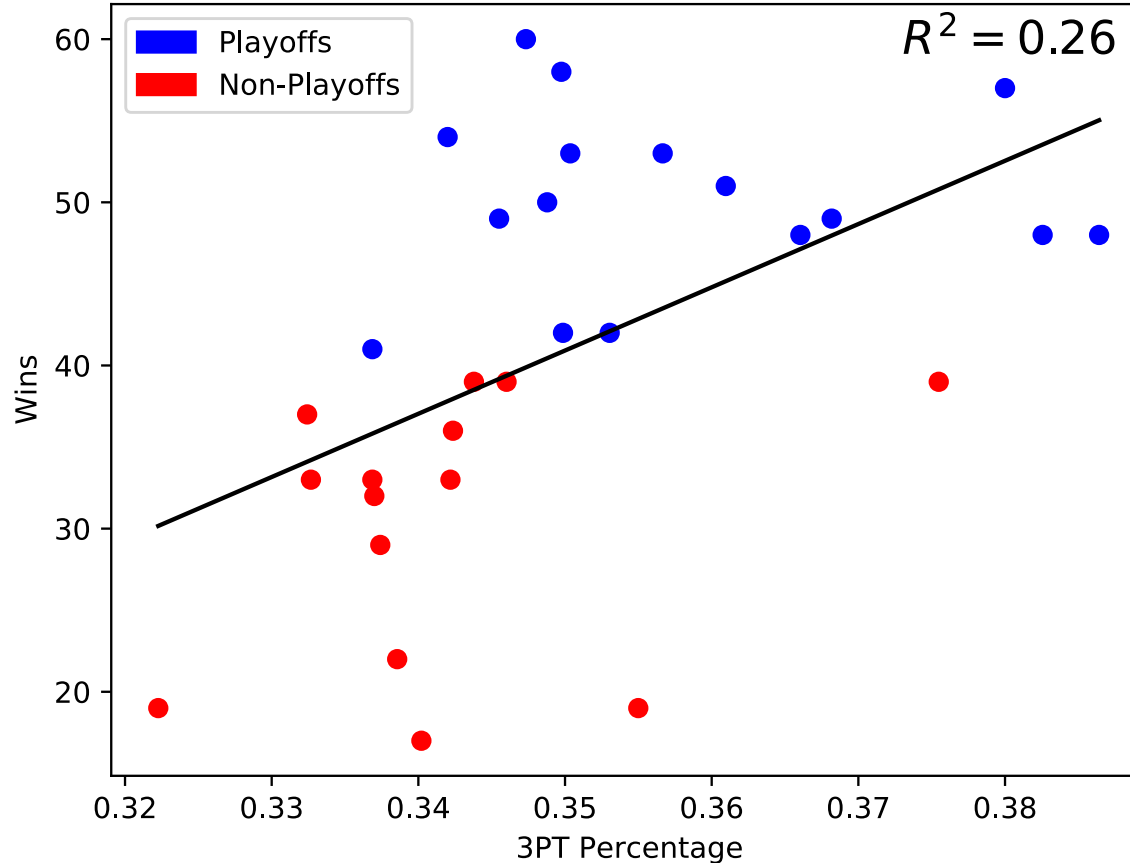
EFG % Correlation with Wins: 2019-20



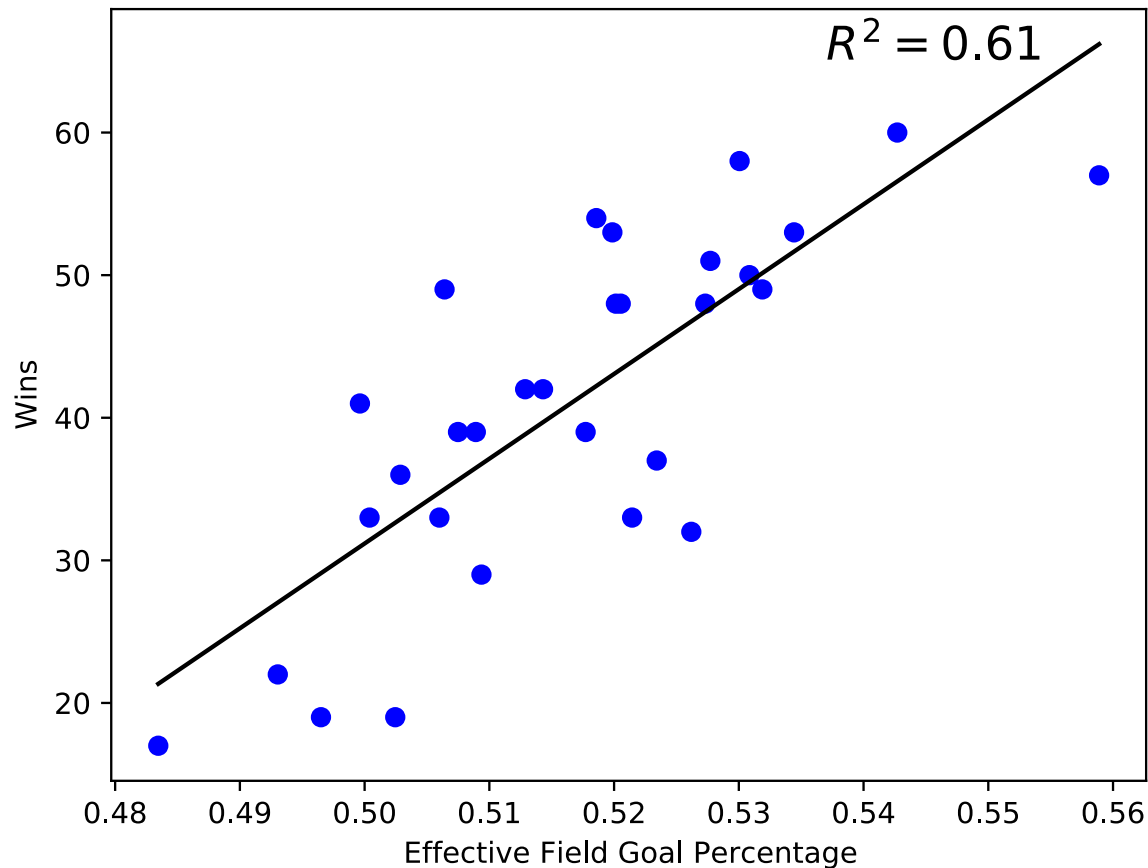
3PT % Correlation with Wins: 2018-19



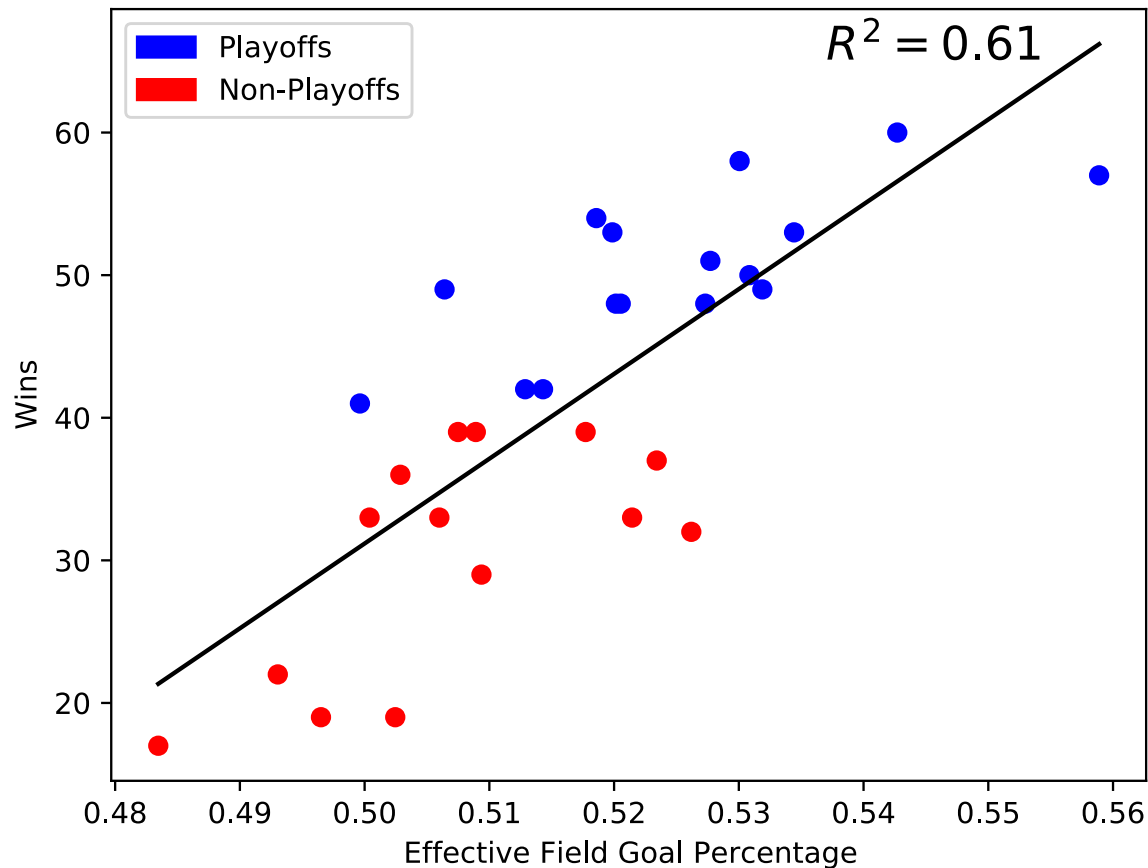
3PT % Correlation with Wins: 2018-19



EFG % Correlation with Wins: 2018-19



EFG % Correlation with Wins: 2018-19



Conclusions

- ▷ Shots at or near the rim (2 feet or less) are the most efficient shot
- ▷ Otherwise, 3-pointers offer a better return
- ▷ 3PT% does not correlate well with wins
- ▷ EFG% does correlate with wins, especially at the extreme values

Future Work

- ▷ This dataset
 - ▷ Include other statistical categories (turnovers, FT%, rebounds, etc.) in correlations with wins
 - ▷ Analyze individual players' shooting abilities/tendencies, especially at the end of games (using time and score)
- ▷ Additional datasets
 - ▷ Location of shot attempts and nearest defender
 - ▷ Predictive model of FG% (on an individual and team basis) as a function of location and nearest defender

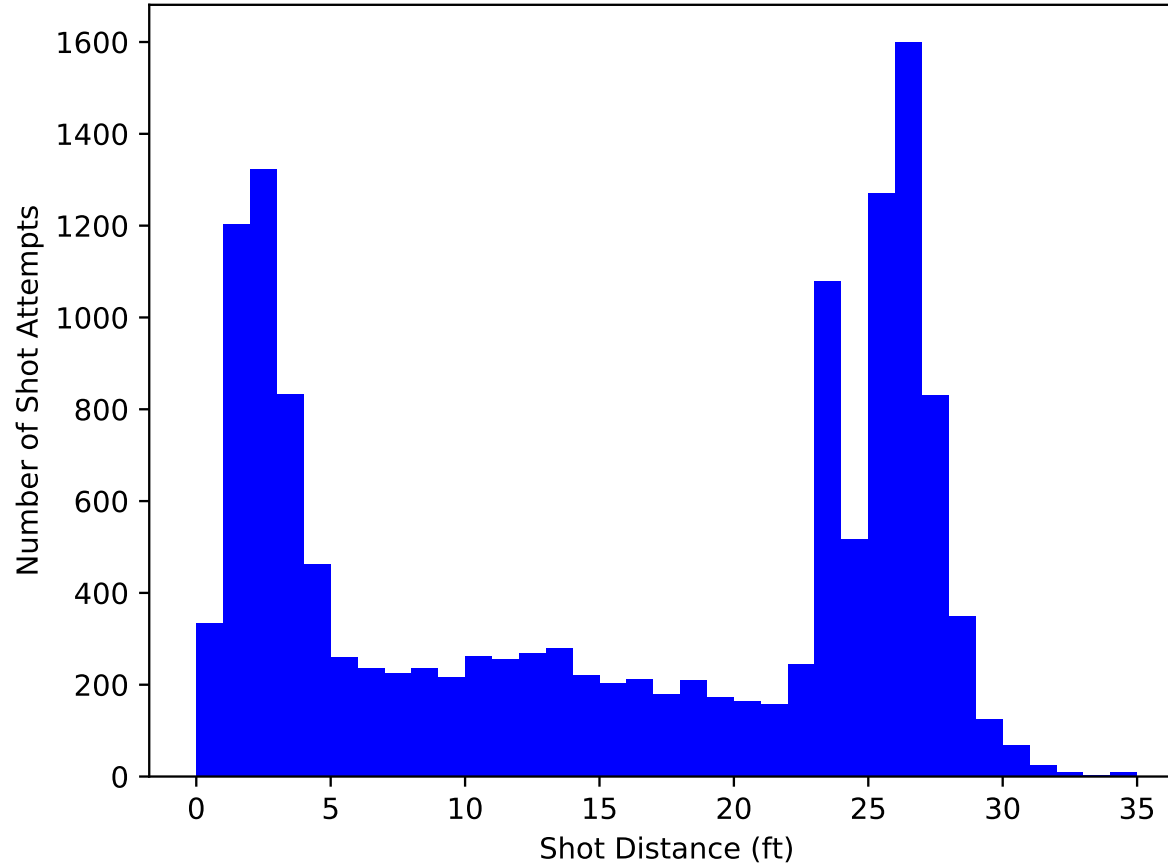
Questions?

Data and Methods

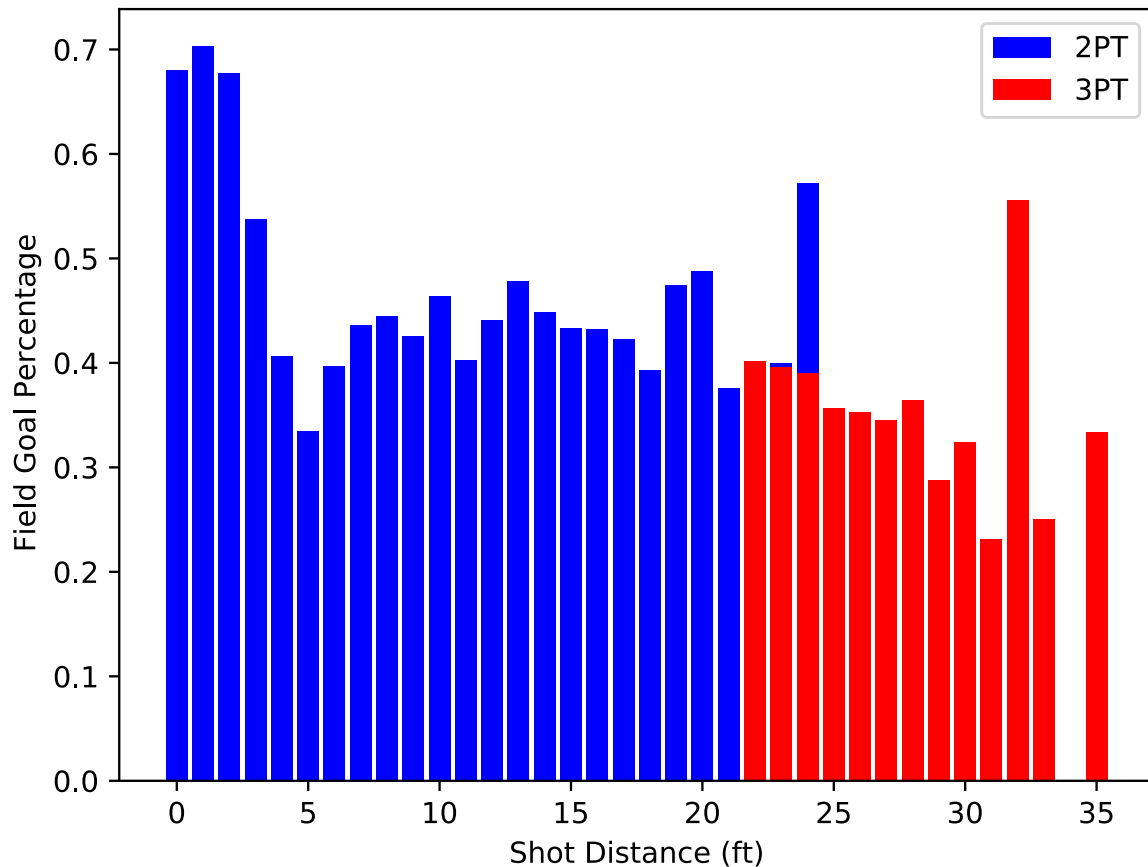
- ▶ Datasets: csv files for every NBA season, each containing every play
- ▶ Pandas DataFrame
- ▶ Text parsing (RegEx, e.g.)

PERIOD	HOMEDescription	VISITORDescription	PLAYER1_NAME	PLAYER1_TEAM_ABBREVIATION
1	nan	nan	nan	nan
1	Jump Ball Ayton vs. Faried: Tip to Okobo	nan	Deandre Ayton	PHX
1	Jackson Bad Pass Turnover (P1.T1)	Harden STEAL (1 STL)	Josh Jackson	PHX
1	nan	Harden 3' Driving Layup (2 PTS)	James Harden	HOU
1	Bridges S.FOUL (P1.T1) (E.Dalen)	nan	Mikal Bridges	PHX
1	nan	MISS Harden Free Throw 1 of 1	James Harden	HOU
1	Booker REBOUND (Off:0 Def:1)	nan	Devin Booker	PHX
1	nan	Harden P.FOUL (P1.T1) (T.Maddox)	James Harden	HOU
1	Okobo Bad Pass Turnover (P1.T2)	Ennis III STEAL (1 STL)	Elie Okobo	PHX
1	nan	Ennis III 1' Running Dunk (2 PTS)	James Ennis III	HOU

Distribution of Shot Attempts: 2019-20 Playoffs



Distribution of Field Goal %: 2019-20 Playoffs



Distribution of EFG %: 2019-20 Playoffs

