Project Short Report
Collin Travasos
NBA Single Player Stat Game Outcome Prediction Model

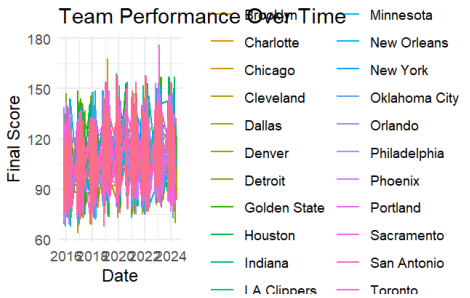
I will be creating a model that can be used to predict the outcome of a game given a single player's performance. This model will have two distinct applications: coaching and gambling.

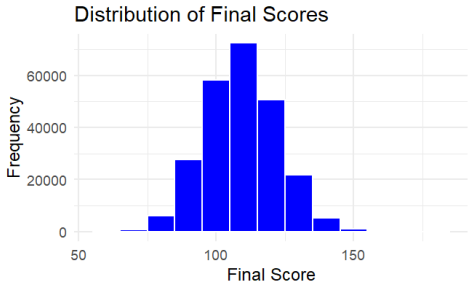
For coaching purposes, this will be useful in player decision making. Does player X need to shoot more, or maybe less? Does player Y need to get to the free throw line more often? Does star player Z need to score 24 points at minimum for the team to win?Conversely, does the opposing team want to limit player A's three point shots, or should they let them shoot? Does player B scoring more actually lower the team's winning percentage or do they need to be doubled? Does player C taking more free throws increase their chances so the team needs to be more conscious about not fouling and making him score on their drives? This will be useful in pregame film and gameplaning as well as mid game adjustments. Coaches will be able to encourage players to be more mindful about reaching or not exceeding various benchmarks prior to tip off. They will also be able to adjust rotations and call different plays based on how the game is going.

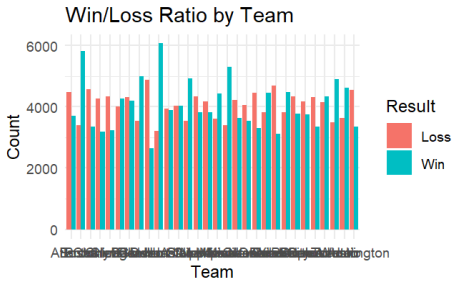
In regards to gambling, this can be a useful tool for both the book and the gambler. It could be helpful for creating or adjusting odds for parlays. If a bettor is planning on betting on a team to win, they might as well include the stats of players that lead to a win. Similarly if a bookie knows that teams are successful when certain players reach certain benchmarks, combining those in a parlay can be devalued. This model also applies to live betting. If at any point during the game a player has the appropriate stats for that time in the game that are needed to win, it might encourage a bettor to put a bet in. Conversely the bookie can properly adjust the lines. Using this model as a tool can help maximize earnings.

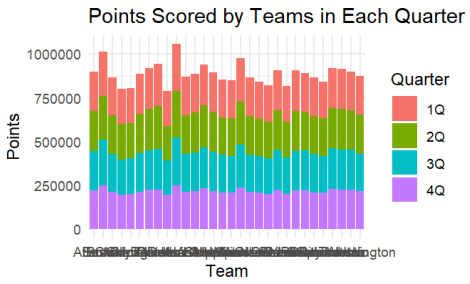
The data for this model is individual game statistics from all players from the 2015-16 season to 2023-24. It includes minutes played, field goals made, field goals attempted, three-point field goals made, three-point field goals attempted, free throws made, free throws attempted, offensive rebounds, defensive rebounds, total rebounds, assists, personal fouls, steals, turnovers, blocks, and points scored. While compiling and adjusting the dataset, I had to add a win loss column and merge player statistics with team data. I also removed blowouts from the dataset, games with a margin of over 25 points are outliers and, in many ways, are not applicable to the model. I gave Copilot, an ai program, the dataset summary statistics and had it spit out 5 visualizations to give a better understanding of the data I will be using. These visualizations are not necessarily relevant to the model I will create for this project, but are attached below to display some characteristics of the data.

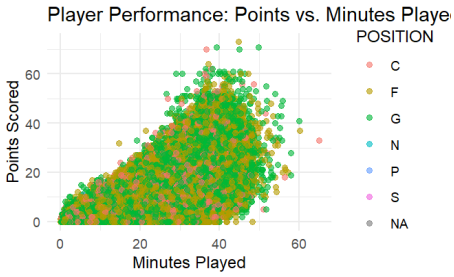
With a more comprehensive dataset, I would love to have the ability to include player stats at a more granular level rather than at the end of each game. Even having their stats after each quarter would offer extra insight. Additionally, more niche stats such as passes, screen assists, and loose ball recoveries could prove beneficial to the model. If I were to expand the scope of the project, I would factor in the teams playing. This might include using Elo rankings, offensive and defensive efficiency, pace, and even player matchups.


Team Performance Over Time
Final Score
180
150
120
90
60
2016
2018
2020
2022
2024
Date
Brooklyn
Charlotte
Chicago
Cleveland
Dallas
Denver
Detroit
Golden State
Houston
Indiana
LA Clippers
Minnesota
New Orleans
New York
Oklahoma City
Orlando
Philadelphia
Phoenix
Portland
Sacramento
San Antonio
Toronto


Distribution of Final Scores
Frequency
60000
40000
20000
0
50
100
150
Final Score


Win/Loss Ratio by Team
Count
6000
4000
2000
0
Team
Result
Loss
Win


Points Scored by Teams in Each Quarter
Points
1000000
750000
500000
250000
0
Team
Quarter
1Q
2Q
3Q
4Q


Player Performance: Points vs. Minutes Playe
Points Scored
60
40
20
0
0
20
40
60
Minutes Played
POSITION
C
F
G
N
P
S
NA