

# Predicting the 2025 NBA Champion Using Machine Learning

## Overview

This project uses historical NBA team statistics to predict the 2025 NBA Champion. Leveraging classification models like Random Forest and Neural Networks, we evaluate how regular season performance metrics contribute to playoff success and championship outcomes.

## Goals

- Predict whether a team will become NBA Champion (binary classification).
- Identify key statistical patterns and features correlated with championship teams.
- Compare model accuracy, precision, and feature importance.
- Convert probabilities into visual formats like pie charts and money lines.

## Data

- Source: [Basketball-Reference](#)
- Seasons: 2014–2025
- Stats include:
  - Offensive stats: FG%, 3PA, 3P%, AST, TRB, PTS
  - Defensive stats (opponent allowed): o3P%, o2P%, oPTS
  - Labels: Champion (1 if team won title that year, else 0)

## Models Used

### Random Forest Classifier

- Best performing classifier so far
- Handles nonlinear feature interactions

- Useful for identifying most important predictive features

## **Prediction Output**

- 2025 playoff teams ranked by predicted probability
- Chart visualization of championship chances
- Money line conversion based on model probabilities

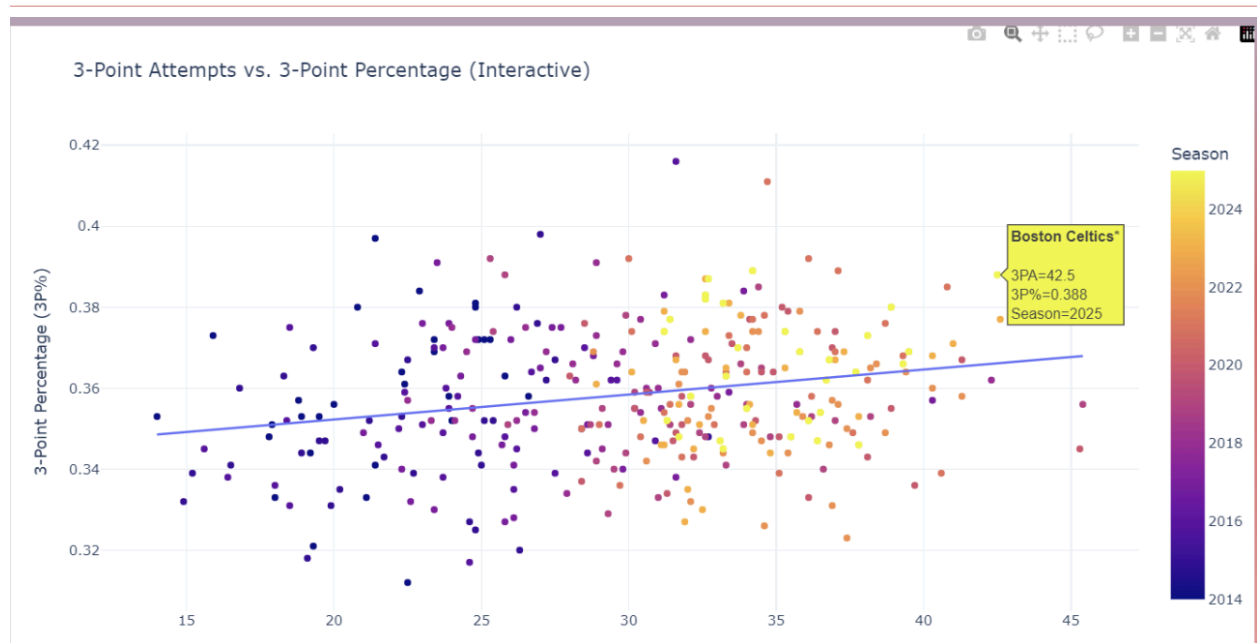
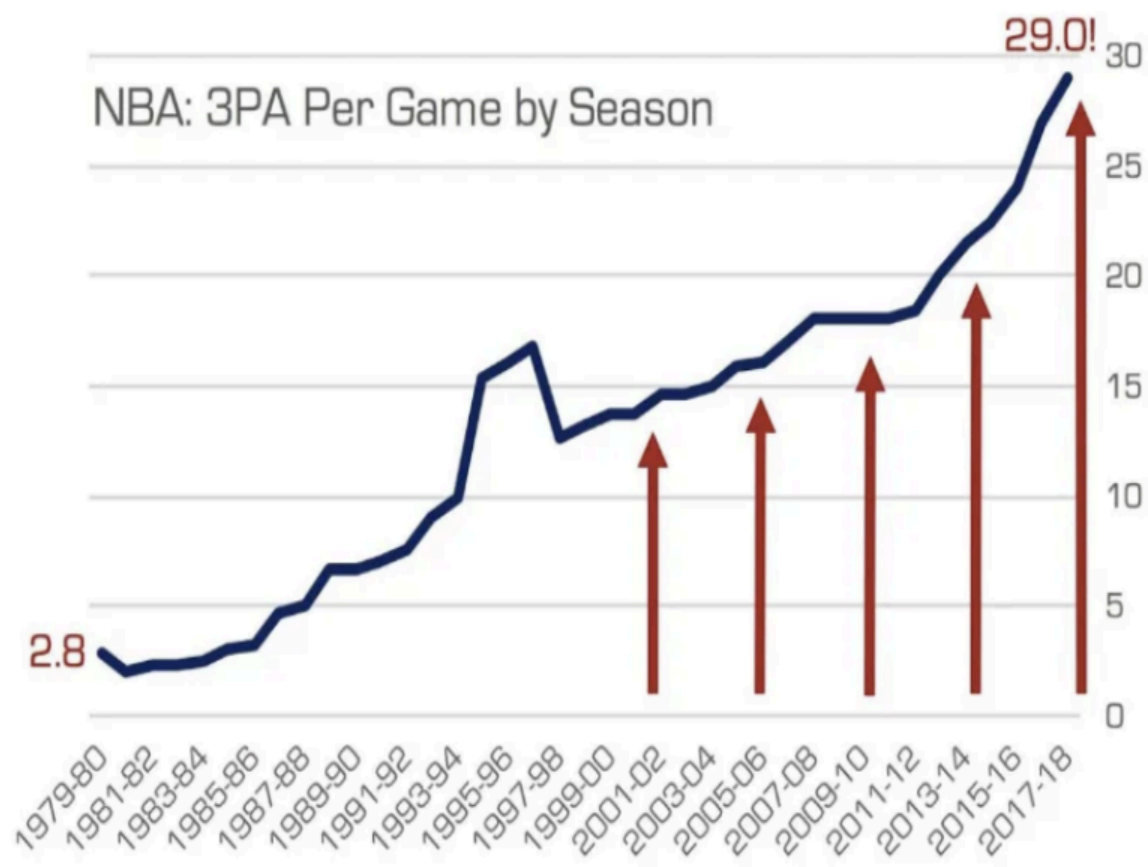
## **Files**

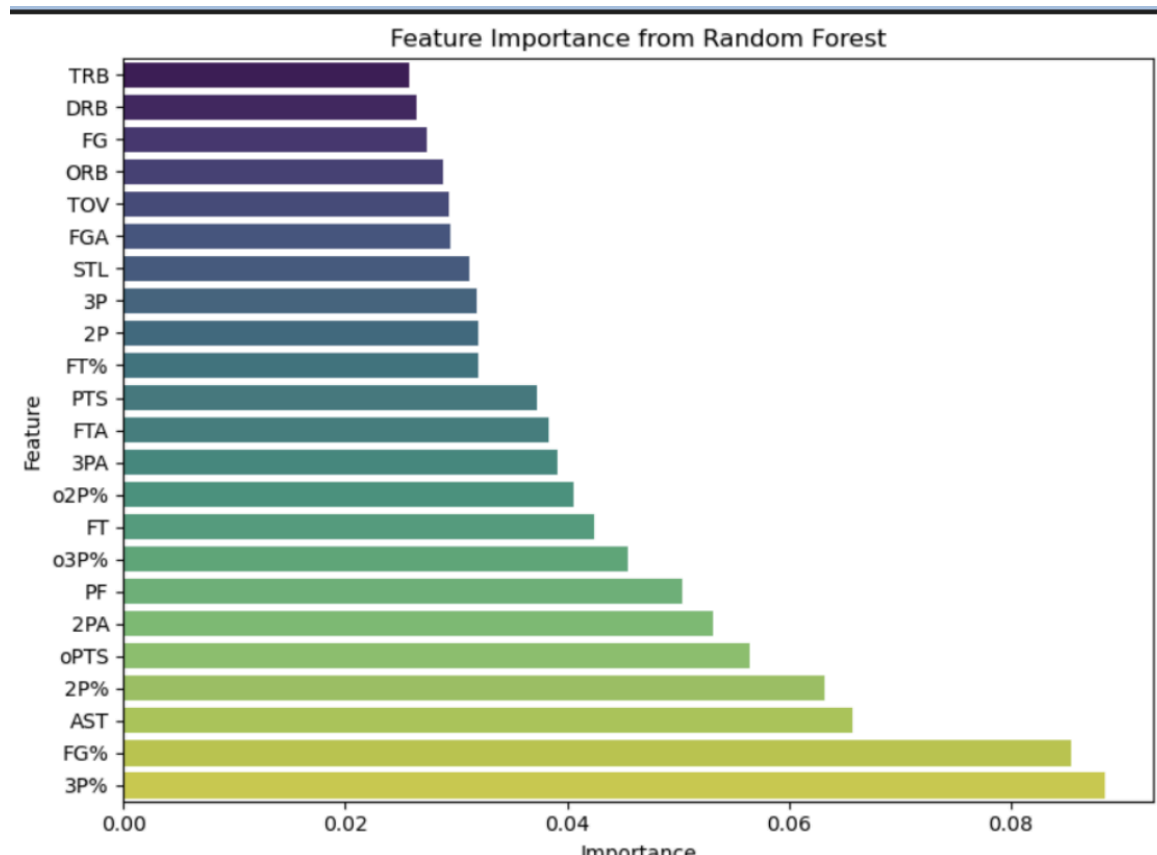
- project.ipynb: Main notebook containing data processing, model training, evaluation, and prediction
- /Resources/: Cleaned historical CSVs with added Season and Champion columns
- /resources/nba\_train\_2014\_2024\_with\_champion.csv: Training set
- /resources/nba\_playoffs\_2025.csv: Test set for champion prediction

## **Main Components of the Code**

- Data Aggregation & Labeling
  - All team stats from 2014 to 2025 are combined into a single dataset.
  - A new column Champion is added, labeled 1 for the actual NBA champion of each season and 0 for all others.
- Feature Engineering
  - Both offensive and opponent/defensive stats are used (e.g., 3PA, FG%, oPTS).
  - Features are selected to train machine learning models.
- Model Training
  - A Random Forest Classifier is trained on 2014–2024 data to predict the Champion.

- The model outputs probabilities of each team being the 2025 champion.
- Evaluation
  - Accuracy, precision, recall, and F1-score are calculated on a validation split.
  - A confusion matrix helps visualize the model's performance.
- Prediction Output
  - 2025 team probabilities are ranked.
  - A pie chart visualizes the top teams by title odds.
  - Moneyline odds are calculated and printed for easy comparison to public betting lines.





Team	Our Super Accurate NBA Index	Bet MGM Index
Boston Celtics	-171	+200
OKC Thunder	+270	+185
Indiana Pacers	+335	+8000
LA Lakers	+488	+1000
Denver Nuggets	+900	+3500
Cleveland Cavaliers	+3233	+550
LA Clippers	+4900	+2500

