Predicting NBA Game Outcomes

Analysis for prospective/new NBA Analysts

Noah-John Hizon
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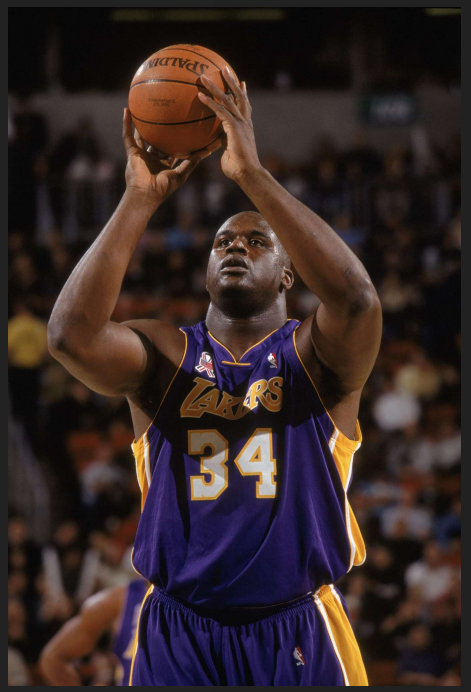
Outline

- Business Problem
- Data Understanding
- Classifier Model
- Classifier Results
- Recommendations
- Next Steps

Introduction

What factors affect the outcome of an NBA game?

- Game Statistics
  - Shooting percentages
  - Rebound rates
  - Assist rates
- External factors
  - Rivalries
  - Media scrutiny
  - Injury



Business Problem

In an ever-fluctuating game state, analysts may be flustered when events occur that discount their game predictions.

- Mid-game injuries, coaching changes, and mid-season trades
- Misinterpretation of game stats
- Discounted credibility

Current prominent NBA analysts: Shaquille O'neal, Ernie Johnson, Kenny Smith, Charles Barkley, Stephen A. Smith, and Max Kellerman

Data Understanding

SOURCE: NBA Game Data 2019-2022

- Each row in the table represents a unique game, with performance summarized for both Home/Away teams

- **Columns of interest: Top 50 Contract Players, Double-doubles, FT% 3PT% 2PT%, Assists, Rebounds, Blocks, Turnovers, Steals**
- **Excluded columns: AVG Plus/Minus, Offensive Rating, Defensive Rating, Point Difference**

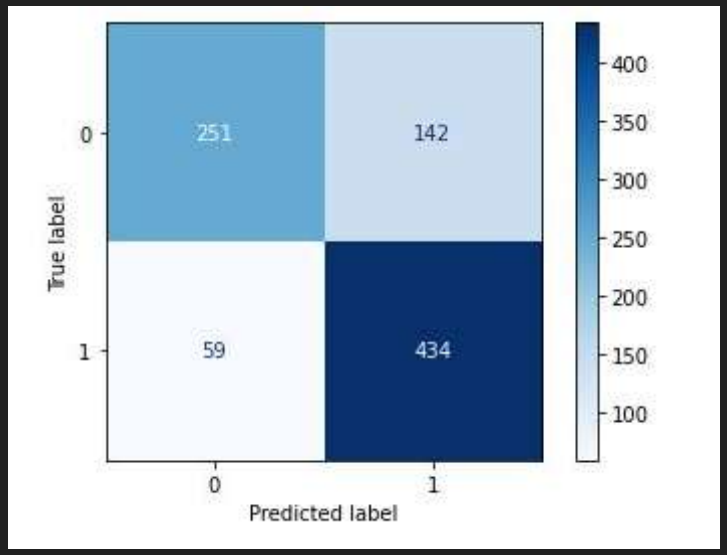
Model Record Count: **3,544.**

Regression Modeling

An iterative process of classifier model comparison was used to collectively assess the effect of relevant game metrics. The classification model predicts game results through a binary outcome variable, **GAME RESULT,** represented by 0 or 1.

- **Why ML?**
- **Final Model: Random Forest Classifier**

Confusion matrix depicting final model performance on test data



LEGEND:

0 in True label, 0 in Predicted label - True Negative

0 in True label, 1 in Predicted label - False Positive

1 in True label, 1 in Predicted label - True Positive

1 in True label, 0 in Predicted label - False Negative

Regression Results

Final classifier shows that the variables most impactful towards NBA Home team game wins are (in order): 3PT%, 2PT%, Rebounds, and Assists

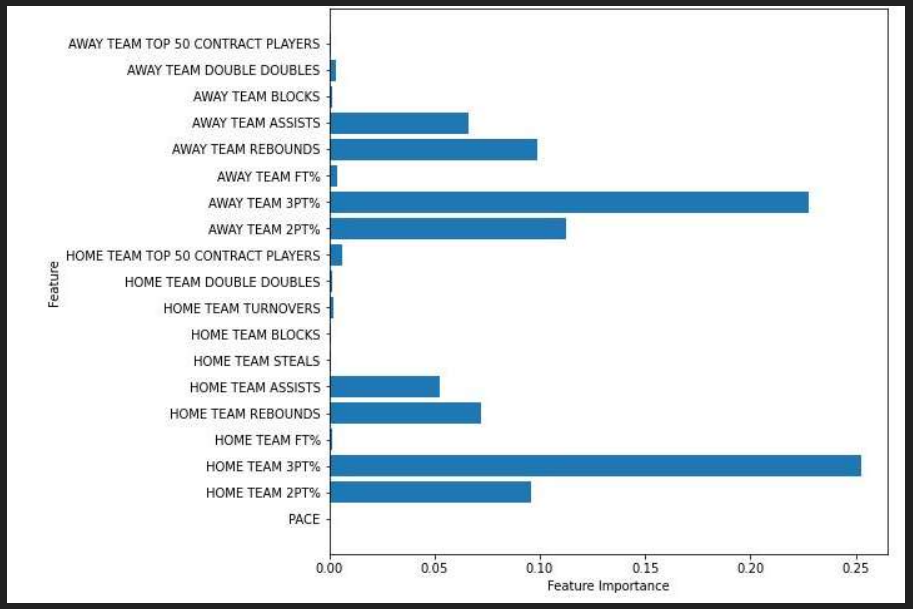
This makes sense, given the nature of the metrics

Created model was able to predict game outcomes with an accuracy of 77%

Model is also relatively accurate in the face of new data

Random Forest Classifier Results

- As seen, 3PT% is seen to have the largest scale of importance.
- Rebounds and 2PT% are similar in scope
- Top 50 Contract Players and Double-doubles have slight importance.



Random Forest Classifier Results

- Model has similar performance on the data used to train it, and in the face of new data
- Accuracy of 77% on test data (new), and 80% on training data
- Recall is relatively low on predicted losses

Test Data Classification Report

	precision	recall	f1-score	support
0	0.81	0.64	0.71	393
1	0.75	0.88	0.81	493
accuracy			0.77	886
macro avg	0.78	0.76	0.76	886
weighted avg	0.78	0.77	0.77	886

Training Data Classification Report

	precision	recall	f1-score	support
0	0.82	0.72	0.77	1217
1	0.79	0.87	0.83	1441
accuracy			0.80	2658
macro avg	0.81	0.80	0.80	2658
weighted avg	0.80	0.80	0.80	2658

Recommendations

When predicting nightly game outcomes, analysts should consider (in order of priority):

- Team 3PT%
- Team 2PT%
- Average Team Rebounds
- Average Team Assists

In addition, young NBA players that were exceptional in one/many of these metrics prior to being drafted should be scrutinized for potential future star talent

Next Steps

- Analyzing EFG%
- Offensive Rebounds
- Injury Count/Contract Consideration
- Quantify intangible factors that involve NBA players
  - Player/Team Rivalries
  - Media Scrutiny

Thank You!

Email: noahiz917@gmail.com

Github: noahiz917

LinkedIn: linkedin.com/in/noah-john-hizon/