

NBA Game Outcome Classifier



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The Question

Can NBA game outcomes (W/L) be accurately predicted using game data from the first three quarters?

And, if so, how accurately?

The Data

Source: stats.nba.com

Seasons: 7 Seasons (2012 - 2019)

Games: 8,000+

Features: PTS, REBS, AST, STL, BLK,
TOV, FG%, +/-

Four Factors - Score, Protect, Crash & Attack

Effective Field Goal %

eFG% =

$$\frac{\text{FGM} + 0.5 * 3\text{PM}}{\text{FGA}}$$

Best relative measurement for points per field goal attempt.

Offensive Rebound %

OREB% =

$$\frac{\text{OREB}}{\text{OREB} + \text{OPP DREB}}$$

Extends possession, allows for second attempt

Free Throw Rate

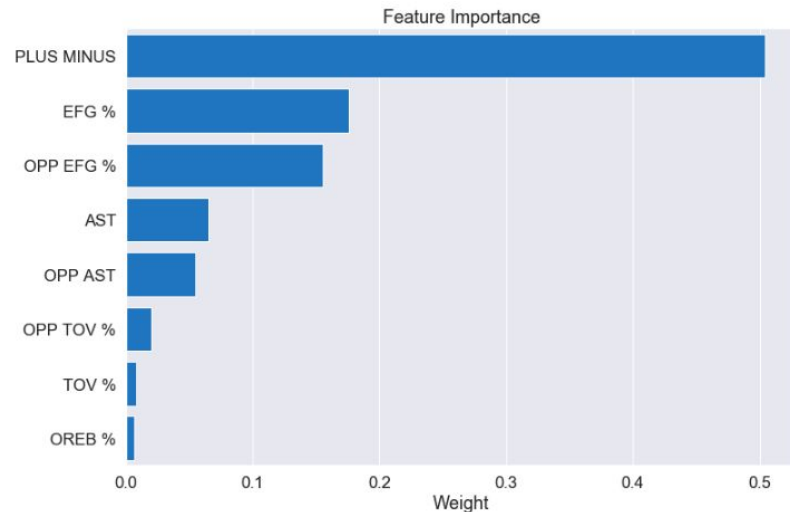
FT RATE =

$$\frac{\text{Free Throw Attempts}}{\text{Field Goal Attempts}}$$

Guaranteed attempts to score, limits opposing team's players

Feature Importance

What happened to Free Throw Rate?



Most Important: Plus/Minus

Secondary: EFG%, OPP EFG%

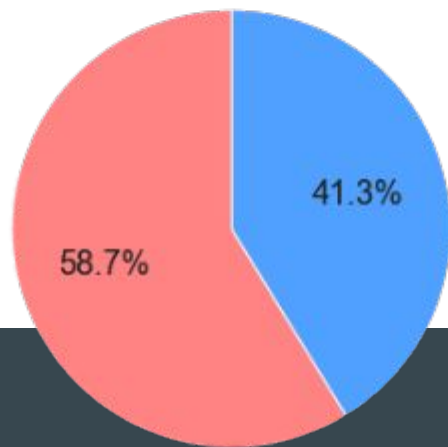
Low: AST, OPP AST

Minimal: OPP TOV%, TOV%, OREB%

WIN

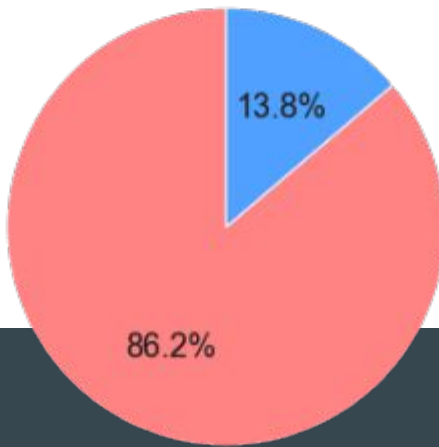
PLUS/MINUS @ 3RD QUARTER

LOSS



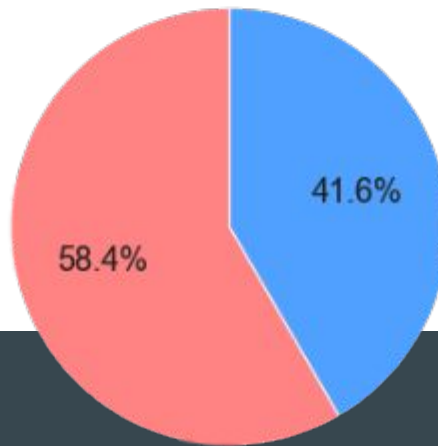
Overall W/L

Home Team won **58.7%** of the time over the last 7 seasons



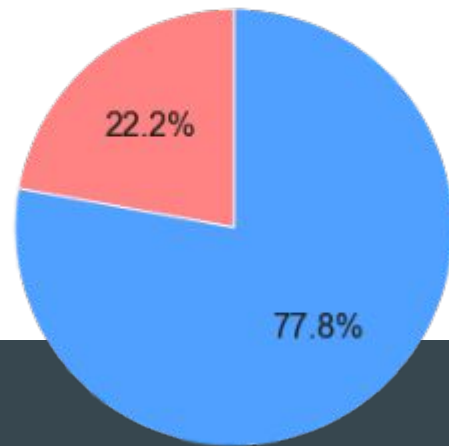
W/L (Up)

Home Team won **86.2%** of the time when leading at the end of the third.



W/L (Tie)

Home Team won **58.4%** of the time when tied at the end of the third.



W/L (Down)

Home Team won **22.2%** of the time when losing at the end of the third.

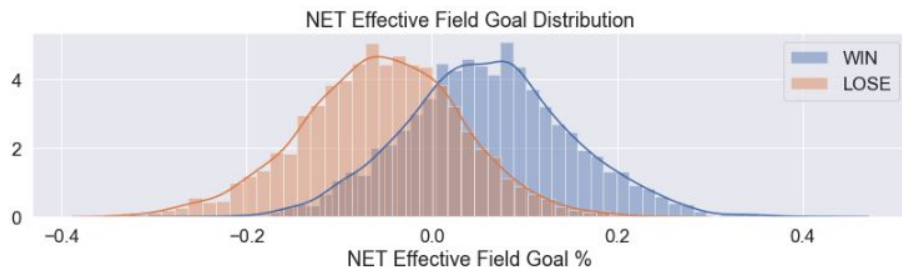
Shooting

Key Takeaways:

Shooting isn't everything

NET Pos EFG % != Guaranteed Win

NET Neg EFG % != Guaranteed Loss



Model Performance: 82% Accuracy Score

TRUE POSITIVE

(Pred: W, Act: W)

- 87% Correctly Predicted

FALSE NEGATIVE

(Pred: L, Act: W)

- 13% Incorrectly Predicted (Type II Error)

TRUE NEGATIVE

(Pred: L, Act: L)

- 75% Correctly Predicted

FALSE POSITIVE

(Pred: W, Act: L)

- 25% Incorrectly Predicted (Type I Error)

Key Takeaways

#1 CURRENT +/-

- The 3rd quarter +/- is the most determining metric - *should be intuitive*

#2 SHOOTING & PROTECTING

- Shooting % Tier II Metric, followed by Turnover % (+1 TOVs => You -1 Chance, Opp. +1 Chance)

#3 OTHER GAME STATS

- Surprisingly, most other team statistics have very little impact (BLK, AST, FREE THROW RATE...)

FUTURE WORK

- Model that only predicts when 95% confident
- Incorporate other popular advanced metrics

Any Questions?

Thanks!