Team Performances and Winning Prediction

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GitHub link: https://github.com/Meenakshipooranik/NBA-Data-Analysis/blob/main/nba.ipynb

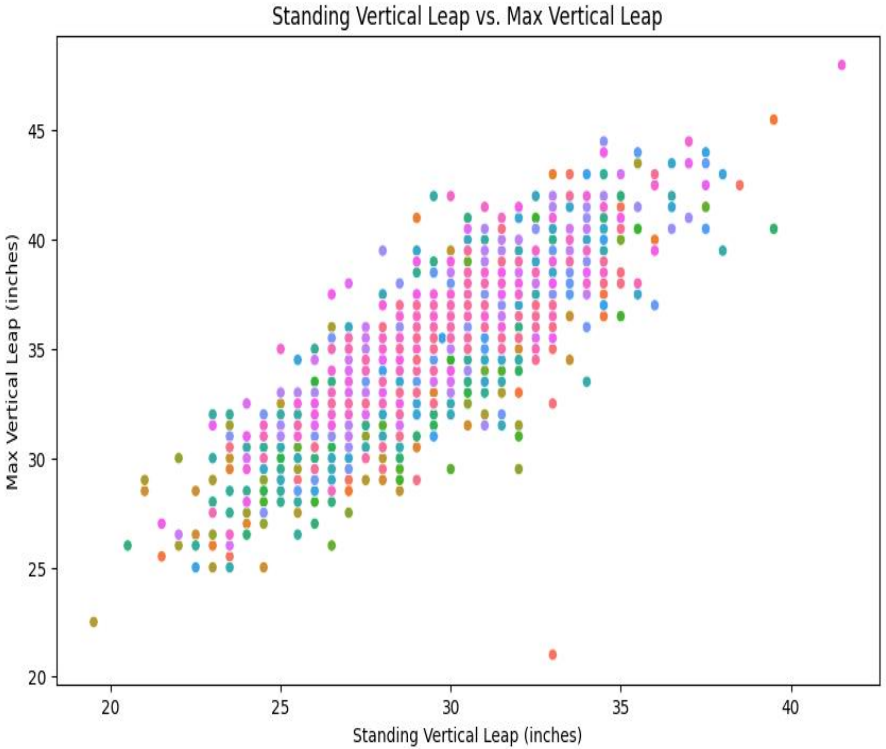
Goal

- What Factors determine Team Performances and Winning?
  - Field goal percentage (FG%)
  - 3-point field goal percentage (3P%)
  - Rebounds
  - Assists
  - Turnovers
  - Player Performances

Standing Vs Max Vertical Leap

- The strong correlation between standing and max vertical leaps suggests that targeted training on one metric can positively influence the other.

Recommendation: Teams can focus on improving standing vertical leaps during training to potentially enhance overall athletic performance.



Distribution of Player Heights

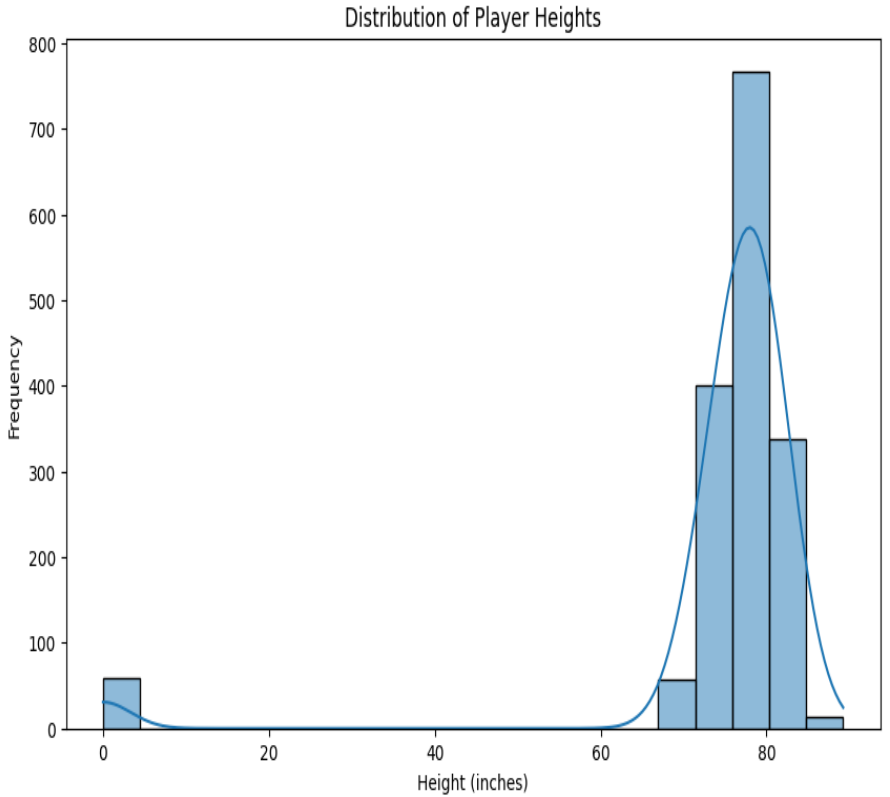
Peak Height Range: The majority of players fall within the range of approximately 75-85 inches (6’3” to 7’1”).

Most Common Height: The tallest bar indicates that the most frequent height is around 80 inches (6'8"), which is common for forwards and centers.

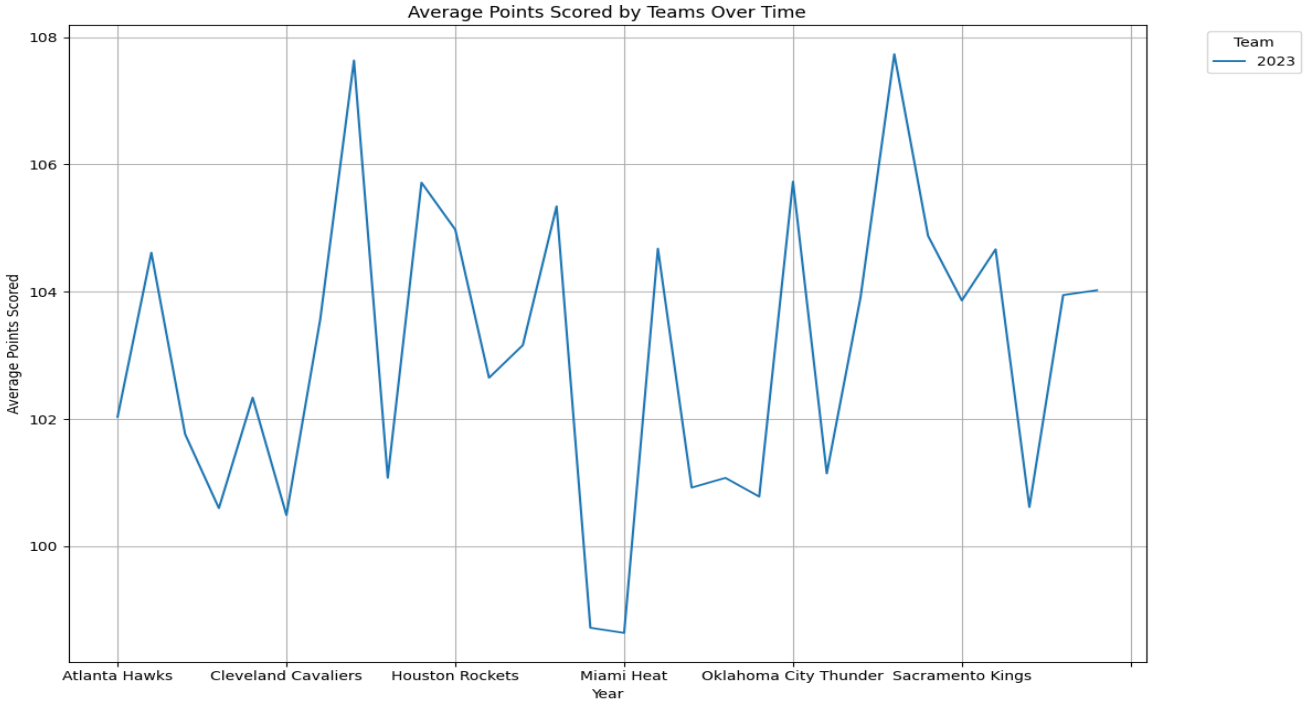
Skewness in Distribution: The data is slightly right-skewed, with a few outliers below the 60-inch range.

Player Roles and Height: Taller players typically play center or forward positions, while shorter players are more likely to be guards.

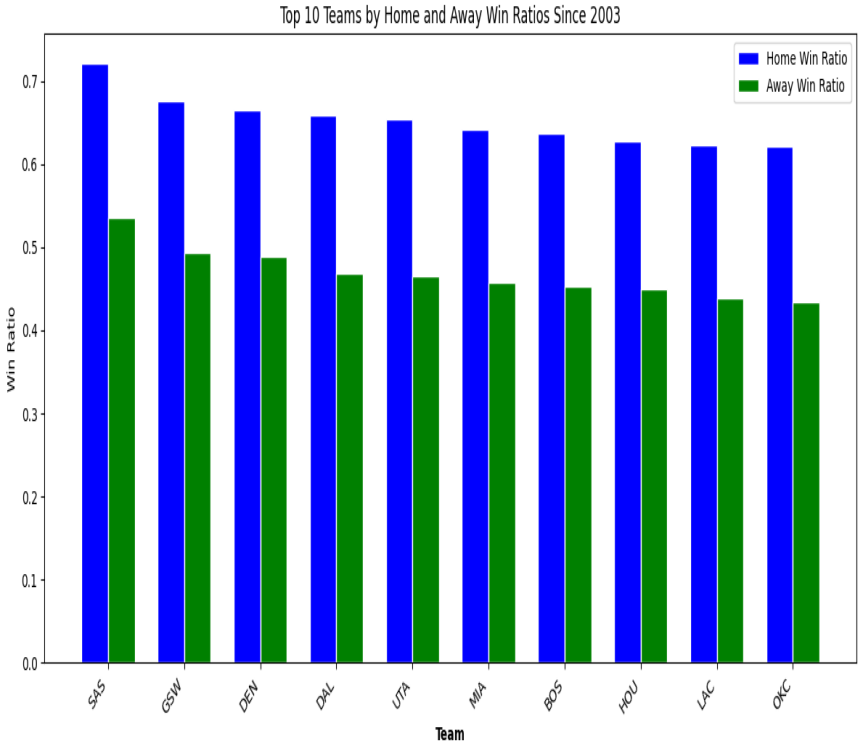
NBA Height Trends: This distribution aligns with the traditional emphasis on height in basketball for key roles like rebounding and shot-blocking.

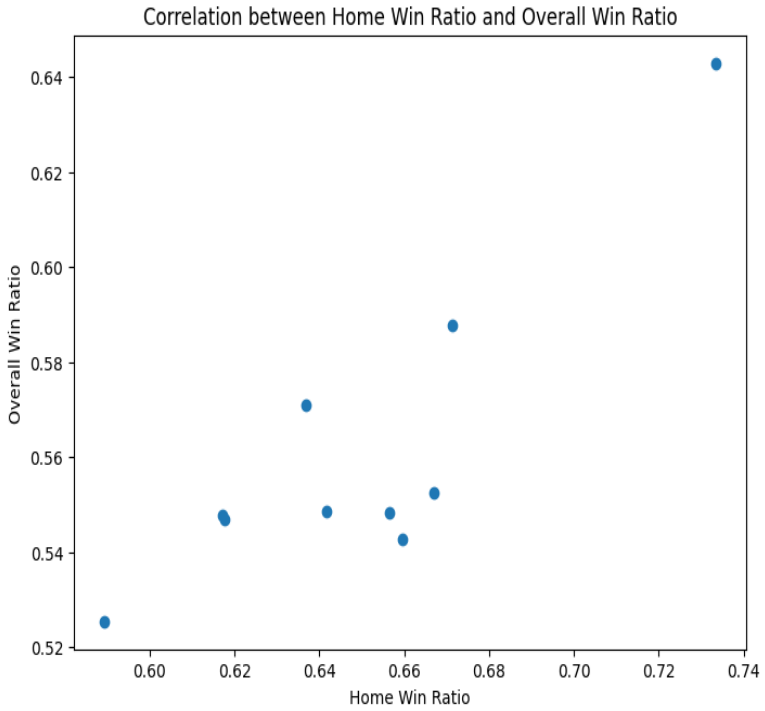


Average Points Scored by Each Team



Win Ratios


Top 10 Teams by Home and Away Win Ratios Since 2003
Home Win Ratio
Away Win Ratio
Win Ratio
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
SAS
GSW
DEN
DAL
UTA
MIA
BOS
HOU
LAC
OKC
Team


Correlation between Home Win Ratio and Overall Win Ratio
Overall Win Ratio
0.52
0.54
0.56
0.58
0.60
0.62
0.64
0.60
0.62
0.64
0.66
0.68
0.70
0.72
0.74
Home Win Ratio

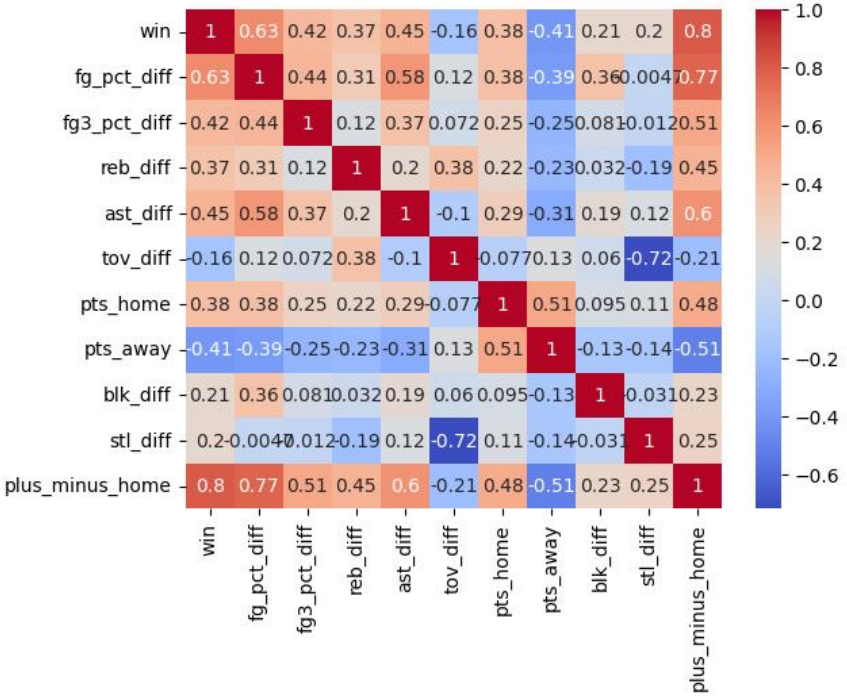
Key Insights from Metric Analysis

- **Field Goal Impact**: Small changes in FG% can significantly influence game outcomes, as seen with values like -0.107 and 0.098.
- **3-Point Variability**: The wide range (-0.453 to 0.186) suggests that 3-point shooting can either be a game-changer or a major vulnerability.
- **Rebounding Dominance**: A large rebound differential (e.g., -21.0 vs. 12.0) often correlates with the team's ability to control possessions.
- **Assist Patterns**: Positive assist differentials typically align with better ball movement and team play.

Correlation Heat Map

-Teams with a higher field goal percentage differential, more rebounds, assists, and steals tend to win more games.

-Home-court advantage also plays a significant role in determining wins.

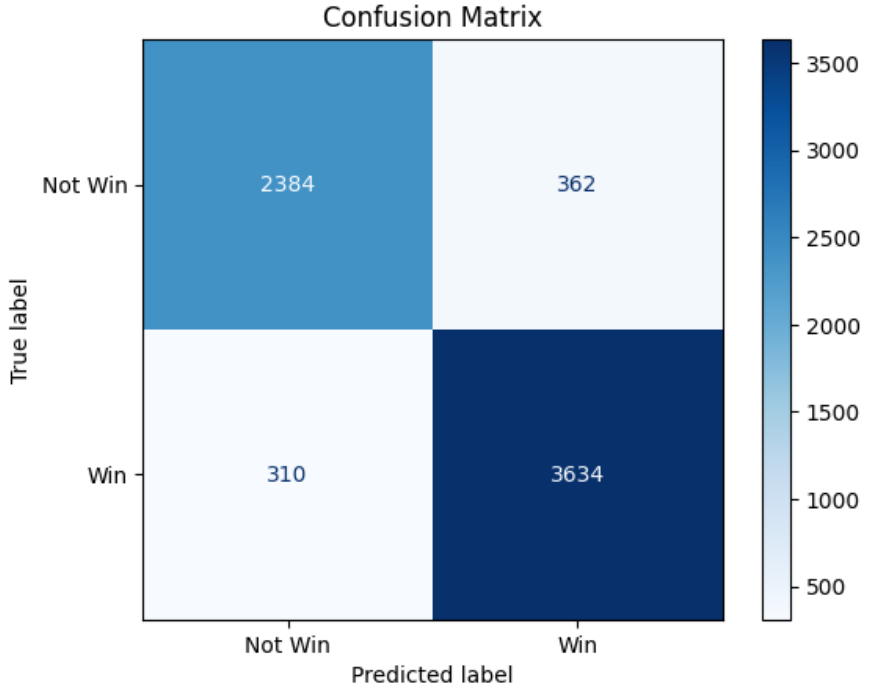


Logistic Regression

-The model has a high accuracy, precision, recall, and F1-score, indicating good overall performance.

-The model is better at predicting wins (high recall) than avoiding false positives (precision).

-Further analysis could focus on reducing false positives or false negatives based on specific business requirements.



Classification Report

	precision	recall	f1-score	support
0	0.88	0.87	0.88	2746
1	0.91	0.92	0.92	3944
accuracy			0.90	6690
macro avg	0.90	0.89	0.90	6690
weighted avg	0.90	0.90	0.90	6690

```
Random Forest Accuracy: 0.8923766816143498
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THANK YOU

REFERENCES

- Kaggle : https://www.kaggle.com/datasets/wyattowalsh/basketball
- Git Hub : https://github.com/Meenakshipooranik/NBA-Data-Analysis/blob/main/nba.ipynb