Predicting Playoff Potential

Key Factors Behind NBA Playoff Teams

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Problem & Stakeholder

Problem

NBA teams need to identify key performance metrics that most strongly influence playoff qualification

Stakeholders

- Coaches
- Analysts
- Fans
- Front Office (GM's, Owners, Etc.)
- Gamblers?

Need

Data-driven insights to optimize team construction and in-season strategy for maximizing playoff chances

Envisioned Solution - a predictive model that can:

A

Identifies the **most influential factors** for playoff qualification

For eg:

- Field Goal %
- Defensive Rating
- Turnover %
- Net Rating

B

Provides **actionable insights** for team management.

For eg:

Focus areas:
- Shooting efficiency

Areas of Improvement:
- Turnover management

C

Uses historical NBA data to **predict playoff chances**

- - Around 44 years of past data. (1980 - 2024)

D

Focuses on **key performance metrics** that teams can actively influence

- Shot selection: Three-point attempt rate (3PAR: 5.74)

Data

1,254 team-seasons of NBA data

78 original features including:

- Per-game statistics
- Advanced metrics
- Team performance indicators

Source: Basketball-Reference Site

https://www.basketball-reference.com

BASKETBALL REFERENCE

Initial Results

Approach

Approach 1:

- Dimensionality Reduction with PCA
- Feature Importance
- Regression Modeling with Important Features
- Model Refinement and Analysis
- **R^2: 0.671**

Approach 2:

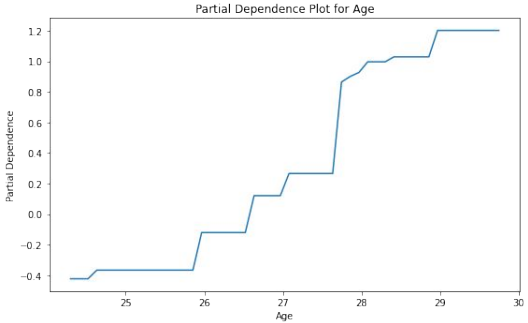
- Multiple Modeling:
  - Logistic, Gradient Boosting, Random Forest
- Feature Importance
- Partial Dependency Plots

Model	ROC-AUC	Accuracy
Logit	0.54	0.58
Random Forest	0.85	0.85
Gradient Boosting	0.87	0.87

Key Features

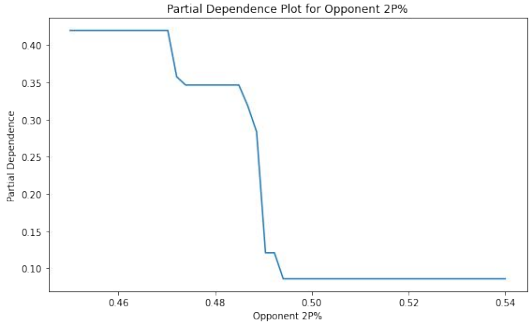
PCA Reduction

- Field Goal %
- Turnover %
- Effective Field Goal %
- Defensive Rating
- Turnovers
- Opponent Free Throws



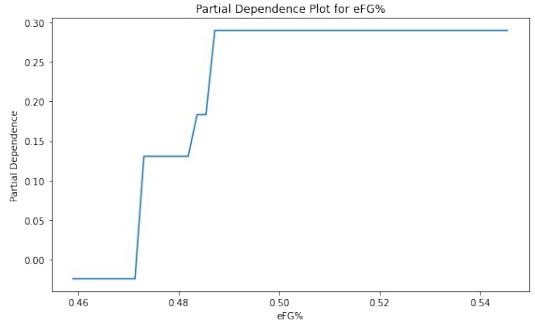
Random Forests

- Age
- Strength of Schedule
- Effective Field Goal %
- Opponent Field Goal %
- Opponent 2P %
- Field Goal %



Gradient Boosting

- Strength of Schedule
- Age
- Field Goal %
- True Shooting %
- Effective Field Goal %
- Opponent Field Goal %



Challenges

- **Unpredictable Nature of Basketball**:
  - "Cinderella" teams defying statistical predictions
  - Injuries affecting team performance mid-season
- **Model Limitations**:
  - Cannot fully capture team dynamics
  - Historical data may not capture future unexpected outcomes
- Must balance model accuracy with sport's inherent variability
- Feature selection methodology could be more robust

Plan & Goals

- Improved data preprocessing
- Sophisticated feature selection
- Hyper Parameter Tuning