NBA Prediction Modeling

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Project Goal

Create a model that can predict the outcome of NBA games with 68% accuracy.

Stakeholder

Stat-Ball.com, a sports news and entertainment website.

Business Use Case

The site plans to have fantasy drafts and competitions for predicting NBA game winners, so they want an in-house model for users to compete against.

Project Tasks

Data Collection

- Web-scrape available statistics
- Create database to store the datasets

Data Processing

- Determine data aggregation method
- Prepare data for modeling pipeline

Modeling and Testing

- Select appropriate modeling methods
- Test models and analyze results

Data Collection

Scope: Boxscore data from the past 10 regular seasons

Source: Basketball-Reference.com

Method: Web-scraper

Data Storage

SQLite Database:

- 3 tables: Game Info, Player Stats, Team Stats
- 11,979 NBA games
- 341,669 observations
- 46 features
- Kaggle link

Data Processing

Responsiveness

- Robust vs. Relevant

- 10, 20, and 30 game averages

-Seasonal carryover

Aggregation Method

Team Aggregation:

- Efficient

Player Aggregation:

- Can react to roster changes

Feature Selection

- Four Factor data

- Full dataset

- Principal Component Analysis

Model Selection

- Logistic Regression (LR)
- K-Nearest Neighbors (KNN)
- Random Forest (RF)
- Gaussian Naive-Bayes (GNB)
- Support Vector (SVC)

- Neural Network (NN)

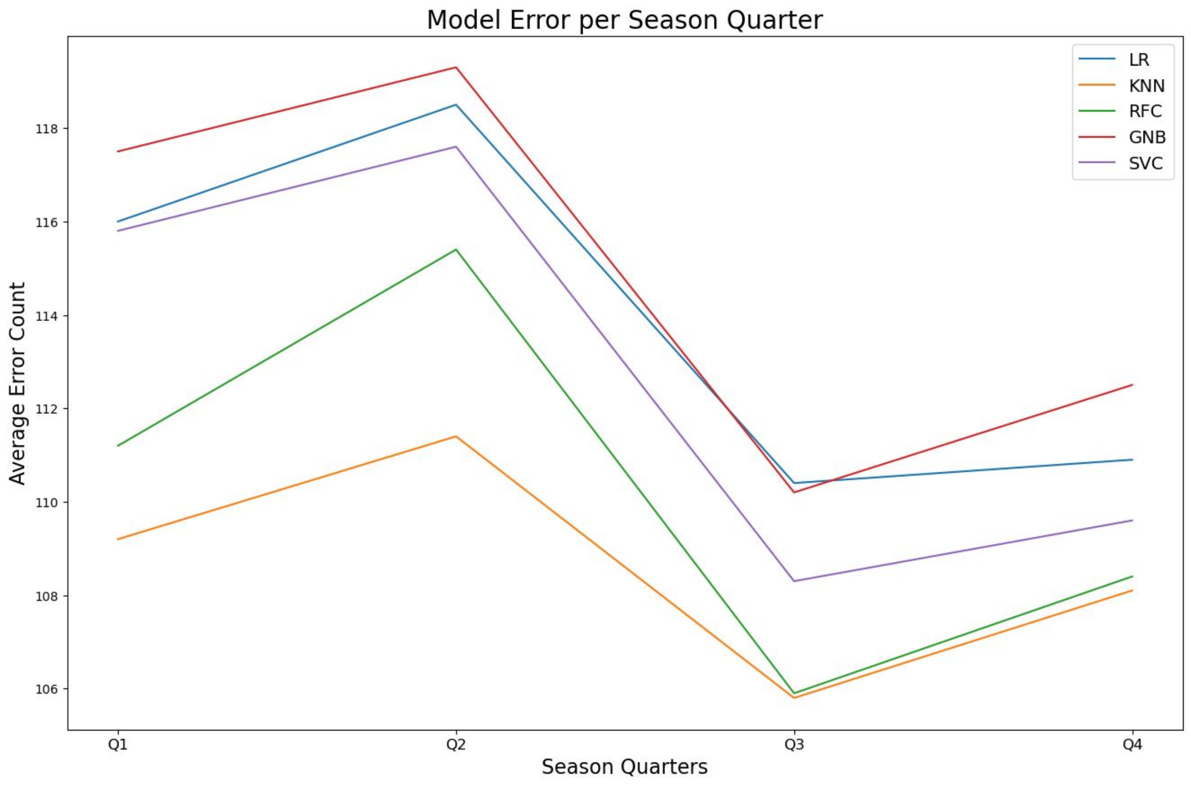
- Elo Rating System

Model Comparison

- Baseline Model:
  - Accuracy: 57.2%

- Models behaved similarly:
  - Accuracy: 59-62%
  - Error Distribution

- Higher error in the first half of a season



Elo Rating System

Data Requirements:

- Team Elo ratings
- Away/Home Team
- Game Outcome

Assumptions:

- Head-to-head
- Winner: gains rating
  Loser: loses rating
- Zero-sum

Additional Adjustments:

- Margin of Victory
- Seasonal Reset

Performance:

- 65.3% accuracy

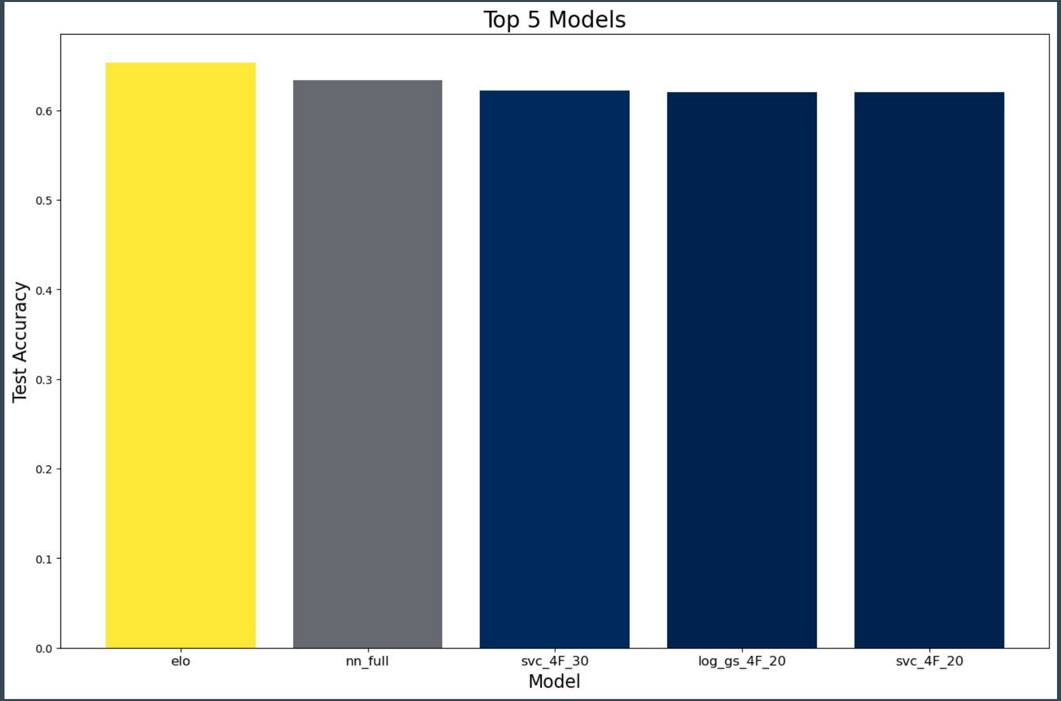
Results

Top Performing Models:

●	Elo System	65.3% accuracy
●	Neural Network	62.6% accuracy
●	SVC	62.2% accuracy

Top Performing Data:

- 20-game Four Factor dataset



Recommendation:

Elo Rating System

- Highest accuracy model (65.3%)
- Lowest data requirements
- Outperforms ML models

Next Steps:

Data Collection

- Additional seasons
- Playoff data

Player Aggregation

- Responsive to roster changes
- Opportunity to create player-based metrics

Additional Adjustments

- Improved feature engineering/selection
- Ensemble model the incorporates Elo

Questions?

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LinkedIn

GitHub