Game of Quidditch

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ABSTRACT

- Quidditch Player Myself for RPI Quidditch Team
  - 1.5 Years
- Project analyzes player statistics from the Major League Quidditch (MLQ) 2022 season to explore how individual performance of players impacts their team rankings.
- By applying data analysis techniques -
  - Study uncovers patterns that reveals strategies
  - Highlight the importance of player contributions in determining team success.

Problem Area

What I Explored:

- Analyzed how individual player statistics (e.g., goals, assists, turnovers, total contributions) impact team rankings in MLQ 2022 season.

Why Data Matters:

- Quidditch combines athleticism, teamwork, and strategy, but lacks the analytical focus seen in sports like basketball and soccer.
- Insights can help teams optimize strategies and enhance overall performance.
- **Goal** ~ Report findings to RPI Quidditch team

HYPOTHESIS:

"Higher individual contributions lead to better team rankings."

THE DATA

Data Sources:

- **MLQuidditch.com**
  - CSV Format ~ Ideal
- A reliable platform for Major League Quidditch (MLQ) 2022 season statistics.

Data is Applicable:

- Relevant for testing the hypothesis:
  - *Higher individual Total Contributions correlate with better team rankings.*
- Metrics provide a clear connection between individual efforts & team success.

Datasets Used:

Individual Player Statistics (2022):

- **Metrics**: Goals, assists, turnovers, stops, shifts, bludger control, etc.
- **Key Focus**: *Total Contribution* - Crucial for testing hypothesis .

Team Standings (2022):

- **Metrics**: Wins/losses, Quaffle Points For/Against per Game, Quaffle Point, snitch catches.
- **Key Focus**: *Team rank* ~ performance metrics.

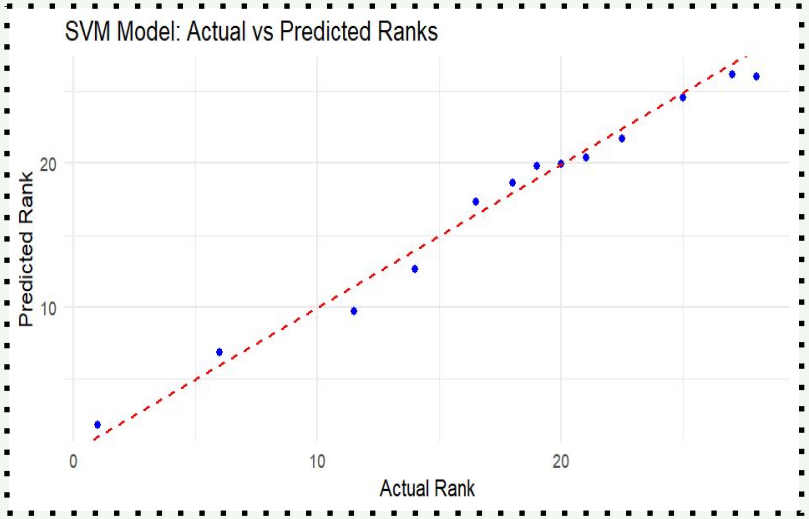
Analysis 1 ~ *Techniques Used and Results*

Model 1 ~ Support Vector Machines (SVM):

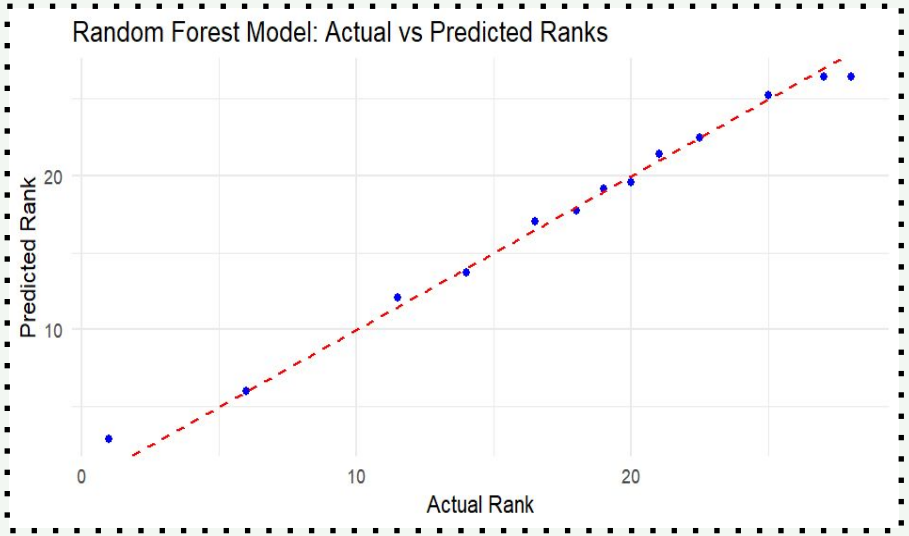
- **Results**: Average error of 0.99
- Showing some alignment between individual contributions & team performance but with room for improvement

- **Description**: Scatter plot comparing actual & predicted ranks
  - Showed most points were close to the perfect match line, meaning the predictions were pretty accurate

- **Why**: Helps separate and categorize data effectively, which was useful for identifying how player contributions influence rankings



Analysis 2 ~ *Techniques Used and Results*



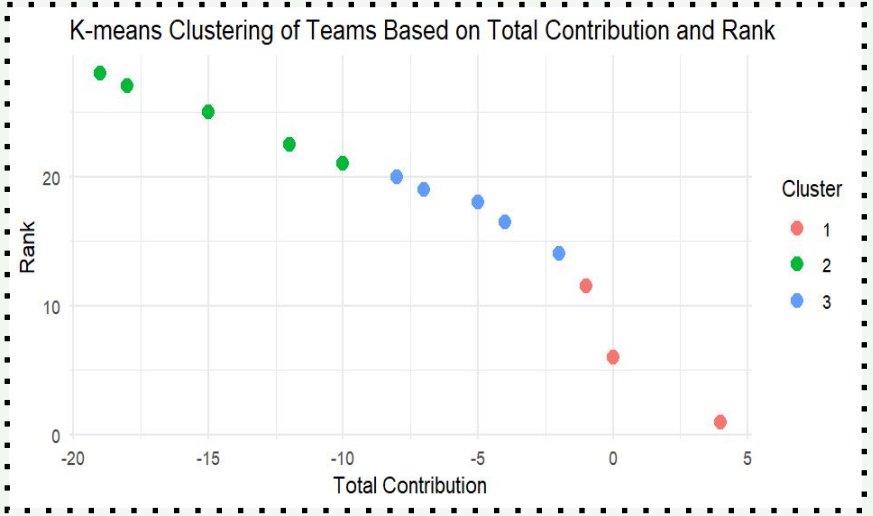
Model 2 ~ Random Forest Regression:

- **Results:** Achieved 97.71% variance - indicating that *TotalContribution* is a key predictor of Rank
- **Description:** Model effectively predicted team rankings, confirming a strong correlation between individual contributions and team performance.
- **Why:** Used for its ability to handle complex, non-linear relationships among variables and multiple interactions.

Analysis 3 ~ *Techniques Used and Results*

Model 3 ~ K-means Clustering:

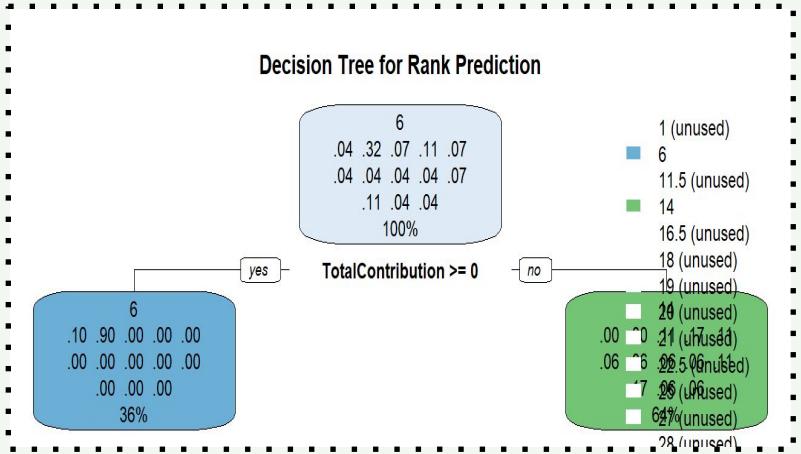
- **Results:** Divided the data into 3 clusters
  - Higher contributions (better rankings)
  - Moderate contributions (intermediate rankings)
  - Lower contributions (poorer rankings)



- **Description:** Model supported the hypothesis that greater contributions correlate with better team rankings.

- **Why:** Used to categorize player contributions and understand their impact on team performance.

Analysis 4 ~ *Techniques Used and Results*



Model 4 ~ Decision Tree:

- **Results**: Higher contributions led to better team rankings.
  - **TotalContribution ≥ -0.5** are classified as higher, Rank = 6
  - **Lower contributions (< -0.5)** are more likely to worse ranks, Rank = 14
- **Description**: Clear trend where higher contributions align with better performance.
- **Why**: Used to break down data and identify patterns in player contributions and team performance.

WRAP UP ~ *Outcomes & Conclusions*

Key Results:

- **Random Forest**: Most effective - 97.71% variance in rankings.
- **K-means Clustering**: Defined performance relationship, validating the hypothesis.

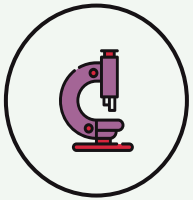
Conclusions:

- Confirmed the hypothesis that individual performance drives team success!

NEXT STEPS

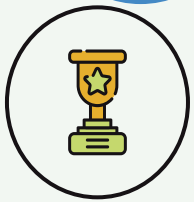
1

Share findings with the RPI Quidditch team to guide strategy improvements.



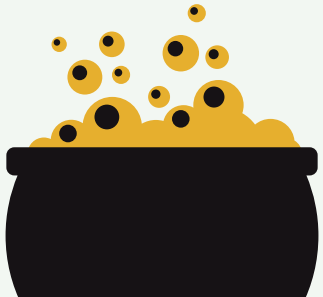
2

Expand the dataset to include future seasons for more robust analysis.



3

Add more metrics (e.g., goals, assists, turnovers) to refine model accuracy.



THANK YOU!

Questions?