EDA Project for Sports

Problem Statement:
You have been hired as a data analyst by a sports management company. They are interested in forming a new team for the upcoming IPL Season 2018 and want your expertise to suggest players that will maximize their chances of winning matches. Your task is to analyze the IPL dataset and recommend the top-performing players in various positions to include in the new team.

Dataset:
Use the "Indian Premier League (IPL)" 2017 dataset available here:
https://drive.google.com/drive/folders/1H_GPzdDGmkSkz3vg42Hi8nIRfmN4twyJ?usp=sharing
Or you can get more data from here:
https://www.kaggle.com/datasets/anandkumarsahu09/ipl-player-stats-20162022

It contains comprehensive data on IPL matches, teams, players, and performance metrics.

Tasks for Player Selection and Analysis:

1. Data Loading and Inspection:

- Load the IPL dataset into your programming environment.
- Print the first few rows to understand the structure and content of the data.
- Check the dimensions of the dataset.
- Identify the different variables/columns available in the dataset and their meanings.
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2. Data Cleaning and Preparation:

- Handle missing values appropriately (e.g., fill or drop missing values).
- Remove irrelevant columns that are not necessary for player analysis.
- Convert data types if required (e.g., converting string dates to datetime objects).

3. Player Performance Analysis:

- Identify key performance metrics that are relevant for each player position (e.g., batting average, strike rate, bowling economy rate, etc.).
- Compute player statistics and rankings based on these metrics.
- Analyze the top-performing players in each position and their historical performances in IPL.

4. Team Composition Strategy:

- Understand the team composition rules in IPL (e.g., a limited number of foreign players, a balance of batsmen, bowlers, and all-rounders).
- Based on the analysis of player performances, suggest the optimal number of players to include in each position (e.g., batsmen, bowlers, wicket-keepers, all-rounders).
- Consider the team's budget constraints and the availability of players in the auction.

5. Player Selection Recommendations:

- Provide a list of top-performing players for each position, considering their historical performances and the team's composition strategy.
- Include statistics and insights for each recommended player, highlighting their strengths and contributions to the team.
- Present the recommendations in a clear and organized manner, facilitating decision-making for the team management.

6. Validation and Sensitivity Analysis:

- Validate the player selection recommendations using statistical methods and by comparing with successful IPL teams from previous seasons.
- Perform sensitivity analysis to assess the impact of including different players in the team and how it affects the team's overall chances of winning.

Performing validation and sensitivity analysis in the context of player selection recommendations can help assess the reliability and robustness of the suggested team composition. Here's an overview of how to approach validation and sensitivity analysis:

A. Validation using Statistical Methods:

- Divide the historical IPL dataset into two parts: training data and validation data.
- Use the training data to perform the analysis and generate player selection recommendations.
- Apply statistical methods, such as cross-validation or bootstrapping, to evaluate the performance of the recommended team composition.

- Measure performance metrics like win percentage, run rate, or other relevant indicators to compare the recommended team's performance against other teams in the training data.

Comparison with Successful IPL Teams:

- Identify successful IPL teams from previous seasons based on their achievements (e.g., champions, finalists, consistent performers).
- Compare the recommended team composition with the player selection strategies of these successful teams.
- Analyze similarities or patterns in the selection of players across positions and assess if the recommended team aligns with successful team compositions.
- Consider the strengths and weaknesses of successful teams and evaluate if the recommended team addresses those factors.

Sensitivity Analysis:

- Perform sensitivity analysis to examine the impact of including different players in the team on the team's overall chances of winning.
- Select a subset of recommended players and vary their composition, keeping the team's constraints (e.g., budget, foreign player limit) in mind.
- Simulate the performance of the team with different player combinations using historical data or statistical models.
- Evaluate how changes in the team composition affect performance metrics (e.g., win percentage, average score, bowling economy rate).
- Identify key players whose presence significantly impacts team performance and explore scenarios where certain players are unavailable.

Interpretation and Conclusions:

- Analyze the results of the validation and sensitivity analysis.
- Assess the consistency of the player selection recommendations across different evaluation methods.
- Summarize the statistical performance measures, comparison with successful teams, and sensitivity analysis outcomes to draw conclusions about the recommended team's potential success in the IPL.
- Discuss the limitations of the analysis, such as assumptions made, data availability, or changes in team dynamics over time.

Remember that validation and sensitivity analysis provide additional insights and help mitigate potential biases in player selection recommendations. However, they are not definitive predictors of future performance, as IPL dynamics can change between seasons. It's essential to continuously update the analysis and consider real-time factors when finalizing the team composition.

Also please document your findings, provide explanations for the steps you took, and present your recommendations in a compelling manner. You may also consider additional analysis, such as analyzing player performance in different match conditions or against specific opponents, to further enhance your recommendations.

Good luck with your player selection analysis, and may the new team thrive in the IPL!