

FIFA PLAYER PERFORMANCE ANALYSIS AND GOAL PREDICTION SYSTEM



Prudhvi Krishna Gangavarapu

Information Technology
University of New Hampshire, Manchester

Goal

- ◆ Simplify complex football statistics, specifically focusing on goals, to make them more understandable for fans.
- ◆ Utilize a dataset from football events available on Kaggle to analyze and understand goal-scoring patterns.
- ◆ Develop a machine learning model to predict goal outcomes based on various factors.
- ◆ Create a user interface (UI) to showcase visualizations of goal-related statistics and provide a platform for users to input their own values and test goal-scoring scenarios.
- ◆ Deploy the project as a website to make it accessible to football fans and enthusiasts.

Objectives

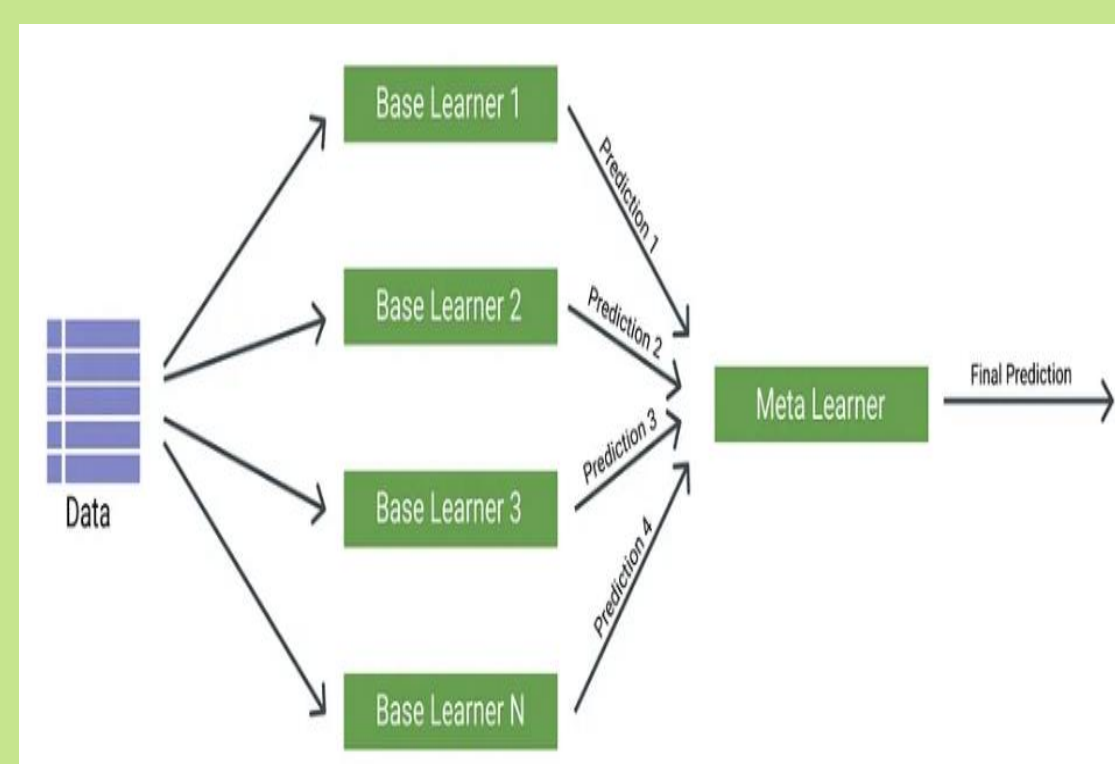
Comprehensive Data Analysis: Utilize exploratory data analysis techniques to gain insights into football events data, identifying patterns, trends, and factors influencing game outcomes.

Accurate Goal Prediction: Develop machine learning models capable of accurately predicting goal outcomes based on various features from the dataset, such as time, side, assist method, location, fast break, body part, and situation.

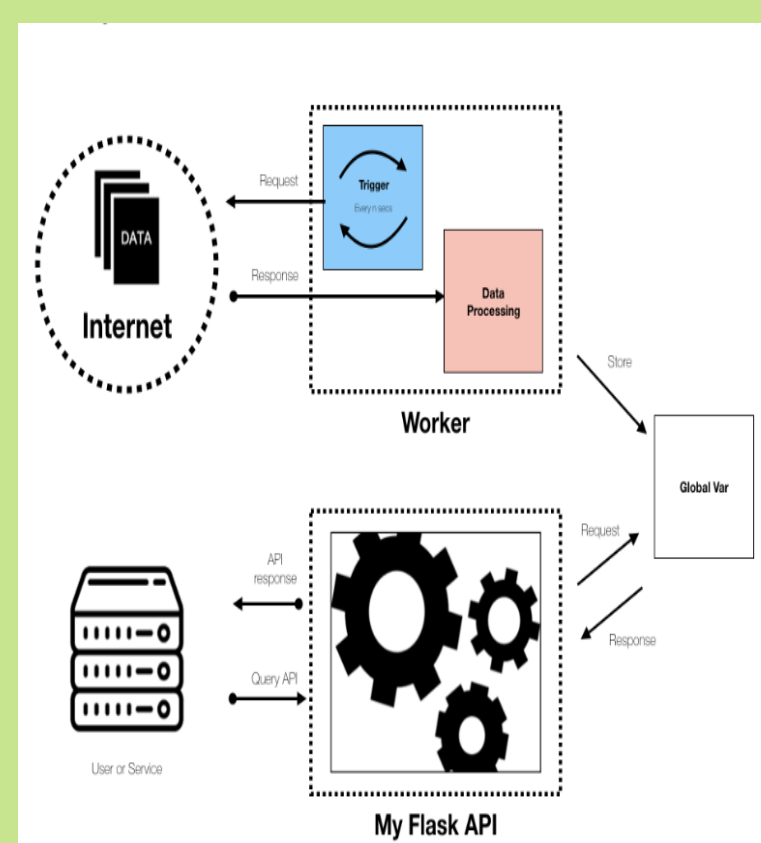
Interactive Web Platform: Integrate the findings and models into a user-friendly web application, allowing football enthusiasts to explore and analyze football event data interactively, gaining insights into goal-scoring dynamics and facilitating strategic decision-making in professional football.



Steps involved in Data Analysis and Prediction project.



Overview of a single level Stacking model - Schematic of a stacking classifier framework.



Working of Flask framework.

Approach

Exploratory Data Analysis (EDA)

- ◆ Utilize EDA techniques to explore and visualize the Football Events dataset.
- ◆ Generate summary statistics and visualizations to identify patterns and trends in football events data.
- ◆ Identify significant factors influencing game outcomes through thorough analysis.

Machine Learning Model Development

- ◆ Develop machine learning models to predict goal outcomes using relevant features from the dataset.
- ◆ Experiment with various classification algorithms and select the model with the highest accuracy for goal prediction.
- ◆ Evaluate model performance using appropriate metrics and fine-tune parameters for optimization.

Integration into Web Application

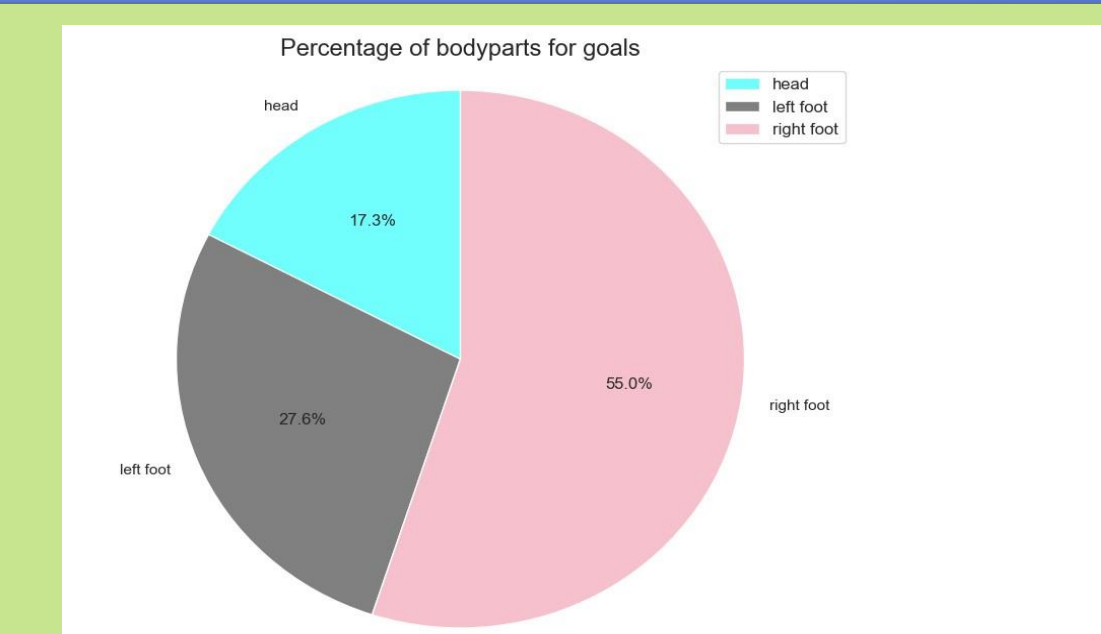
- ◆ Integrate the developed machine learning models and EDA findings into a web application using Flask.
- ◆ Design an interactive user interface to allow users to explore and analyze football event data.
- ◆ Provide insights into goal-scoring dynamics and support strategic decision-making in professional football.

Model Evaluation and Optimization

- ◆ Assess the performance of machine learning models using cross-validation and validation datasets.
- ◆ Optimize models for accuracy and efficiency through techniques such as feature selection and hyperparameter tuning.

Results

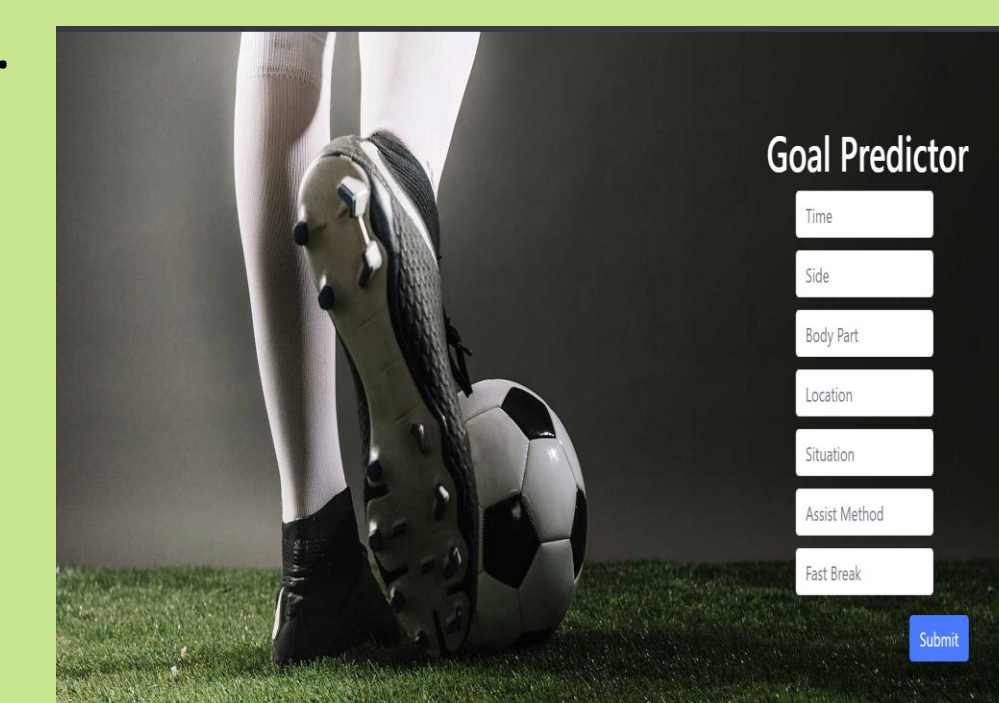
- ◆ Visualizations such as top scorers, most effective players, and offensive teams offer a comprehensive overview of goal-scoring trends, emphasizing the contributions of both individual players and teams to overall performance..
- ◆ Trained machine learning models, including Gradient Boosting Classifier, Logistic Regression, and Soft Voting Classifier, demonstrate promising performance in predicting goal outcomes during football matches. With an accuracy of 91.7%, these models effectively capture underlying patterns and make precise predictions based on selected features



Exploring goal-scoring dynamics in football by analyzing the percentage distribution of body parts per goal.

The Gradient Boosting Classifier, Logistic Regression, and Soft Voting Classifier, exhibited promising accuracy and classification results.

Accuracy: 0.91779801307106194				
Classification Report:				
	precision	recall	f1-score	support
0	0.99	0.93	0.96	183236
1	0.18	0.61	0.28	4966
accuracy			0.92	188202
macro avg	0.59	0.77	0.62	188202
weighted avg	0.97	0.92	0.94	188202



A Flask application empowering users to input custom parameters such as time, side, body part, situation, assist method, and fast break, to receive real-time predictions on goal likelihood. This interactive tool enhances strategic decision-making in football by offering instant insights tailored to specific match scenarios.

Conclusion

- ◆ Through comprehensive data analysis and machine learning modeling, this project achieved a deep understanding of goal-scoring dynamics in football, unveiling significant trends and patterns.
- ◆ With an impressive accuracy of 91.7%, the trained machine learning models demonstrate their effectiveness in predicting goal outcomes during football matches, highlighting their potential for enhancing strategic decision-making in professional football.

Football Analytics Insights: Exploring Goal Dynamics Using Python and Jupyter Notebook with NumPy, Pandas, Matplotlib, and Seaborn

