

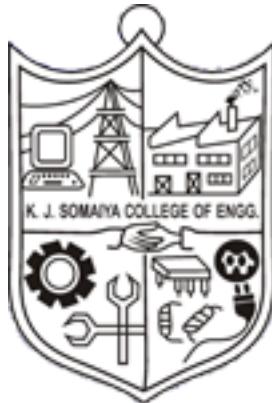
**University of Mumbai**  
**Football Match Prediction**  
Submitted in partial fulfillment of requirements  
for completion of  
**Mini-Project**  
by  
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**Guide**  
**Sangeeta Nagpure Ma'am**



## **Department of Information Technology**

**K. J. Somaiya College of Engineering, Mumbai-77**  
(Autonomous College Affiliated to University of Mumbai)

**Batch 2021**

## **K. J. Somaiya College of Engineering, Mumbai-77**

(Autonomous College Affiliated to University of Mumbai)

### **Certificate**

This is to certify that the report entitled **Soccer Prediction and Analysis** is bona fide record of Mini-Project work done by **Parva, Vishant, Abhishek, Rachit** in the Sem VI, year 2021 under the guidance of **Mrs. Sangeeta Nagpure**. Department of Information Technology in partial fulfillment of requirement for the completion of Mini-Project

**Mrs. Sangeeta Nagpure**

Guide

**Department of Information Technology**

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**TY Mini-Project -2021**

Date: 17/04/2021

Place: Mumbai-77

## **K. J. Somaiya College of Engineering, Mumbai-77**

(Autonomous College Affiliated to University of Mumbai)

### **Certificate of Approval of Examiners**

We certify that this report entitled **Soccer Prediction and Analysis** is bona fide record of Mini-Project work done by **Parva, Vishant, Abhishek, Rachit**.

This project is approved for the award of credits for completing Mini-Project course

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Internal Examiner

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External Examiner

Date: 17/04/2021

Place: Mumbai-77

**K. J. Somaiya College of Engineering, Mumbai-77**

**Department of Information Technology**

**TY Mini-Project -2021**

(Autonomous College Affiliated to University of Mumbai)

### **DECLARATION**

We declare that this written report submission represents the work done based on our and / or others' ideas with adequately cited and referenced the original source. We also declare that we have adhered to all principles of intellectual property, academic honesty and integrity as we have not misinterpreted or fabricated or falsified any idea/data/fact/source/original work/ matter in our submission.

We understand that any violation of the above will be cause for disciplinary action by the college and may evoke the penal action from the sources which have not been properly cited or from whom proper permission is not sought.

|   |   |
|---|---|
| <b>Parva Vipul Barbhaya</b><br><hr/> <b>Signature of the Student</b><br><br><b>1814004</b><br><hr/> <b>Roll No.</b> | <b>Rachit Hemal Mehta</b><br><hr/> <b>Signature of the Student</b><br><br><b>1814037</b><br><hr/> <b>Roll No.</b>     |
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**Date:**

**Place: Mumbai-77**

**Department of Information Technology**

**TY Mini-Project -2021**

*Dedicated to*

.....

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# CHAPTER 1

## Introduction

### 1.1 Problem Definition

As one of the most popular sports on the planet, football has always been followed very closely by a large number of people. In recent years, new types of data have been collected for many games in various countries, such as play-by-play data including information on each shot or pass made in a match. In addition to this, the performance of each player is also closely monitored. Each player is judged on the basis of a number of attributes. These factors play a major role in understanding the overall ability and potential of the player. The strengths and weaknesses of all the players can be analyzed with the help of a Machine Learning framework. This thorough study gives the team management a better insight and allows them to explore different ways through which they can improve the performance of the players. Many techniques to predict the outcome of professional football matches have traditionally used the number of goals scored by each team as a base measure for evaluating a team's performance and estimating future results. The number of goals scored during a match possesses an important random element which leads to large inconsistencies in many games between a team's performance and number of goals scored or conceded. Therefore, the main objective of our project is to explore different Machine Learning techniques to predict the score and outcome of football matches, using in-game match events and various attributes along with the number of goals scored by each team. We aim to explore different model design hypotheses and assess our model's performance against benchmark techniques. We plan to train and test various machine learning models like SVM, Random Forest, Linear Regression, etc. and compute the accuracy for each one of them. On the basis of accuracy achieved, models will be selected for prediction. We have considered two areas of research that are especially important considering the objective of our project. Firstly, we find out how various attributes related to different teams can influence the prediction process. Secondly, we develop efficient models that predict the number of goals and eventually the final results.

Another feature that we have included in our project is Player Analysis. We analyze players on the basis of various factors and plot the respective graphs. All in all, it is a comprehensive guide for the user.

## **1.2 Motivation:**

A particularly important element of Machine Learning in football is the ability to evaluate a team's performance in games and use that information to make an attempt in predicting the result of future games based on the available data. Outcomes from sports matches can be difficult to predict, with surprises often popping up. Football in particular is an interesting example as matches have fixed length as opposed to racket sports such as tennis, where the game is played until a player wins. It also possesses a single type of scoring event: goals as opposed to a sport like rugby where different events score a different number of points that can happen an infinite amount of times during a match, and which are all worth 1 point. The possible outcomes for a team taking part in a football match are win, loss or draw. It can therefore seem quite straightforward to predict the outcome of a game. Traditional predictive methods have simply used match results to evaluate team performance and build statistical models to predict the results of future games. However, due to the low-scoring nature of games which is less than 3 goals per game on average in the English Premier League in the past 15 years, there is a random element linked to the number of goals scored during a match. For instance, a team with many scoring opportunities could be unlucky and convert none of their opportunities into goals, whereas a team with a single scoring opportunity could score a goal. This makes match results an imperfect measure of a team's performance and therefore an incomplete metric on which to predict future results. It is very important to assess and use various attributes along with the number of goals scored by the teams to make a near perfect prediction. A comprehensive player analysis in addition to determine player performance.

## **1.3 Scope of Project**

The project, ProSoccerPredictor is a Football Match Prediction and Player Analysis System which is designed to predict outcomes for matches between different teams and to also get a complete performance analysis on different players.

## **Deliverables**

1. The ability for users to Register and Log In.
2. The ability to predict match outcome.
3. The ability to predict goals scored.
4. Plotting various graphs for analysis.
5. Finding out individual player statistics using search option.
6. Analyzing players on various factors.
7. The ability for users to Log Out.

## **1.4 Functional and Non-Functional Requirements**

### **Functional Requirements:**

| <b>Sr.No.</b> | <b>Short Description</b> | <b>Description in Detail</b>   |
|---------------|--------------------------|--|
| 1.            | User Registration        | <p>If a person/visitor wants to use our website's services such as Soccer team prediction, Player Analysis, Player Stats, registration of the user is must. User can avail all the utilities of our website after being logged in.</p> <p>The user will have to enter his/her details such as first name, email id, password. The password will be hashed and then stored in the database.</p> |

|    |                          |   |
|----|--------------------------|---|
| 2. | Login and Authentication | A user will be able to login to the website by entering his/her user name and password. If the user will enter wrong credentials, then appropriate message will be shown to the user. After a user submits his credentials at the login page the credentials will be collected and validated against user data which is stored on the database. If user name is found in the database, the user will be allowed access to the portal. The authentication module will not allow disabled, deleted users and expired users to log on to the portal. s |
| 3. | Goals scored             | Goals scored by the all the teams of premier league and its wins/loses are taken into consideration and these factors will predict the winner.  |
| 4. | Match outcome            | Match Outcome is based on the performance of the respective team in the previous entire year's Premier League Football data.  |
| 5. | Player Analysis          | Players Analysis consists of graphical analysis of players based on various factors such as Country, Club, Wage, Age, Height, Weight, Preferred Foot, Overall Potential, Position, Skill Moves, Skill Score of players in various positions, etc.   |
| 6. | Player Statistics        | Player statistics displays the most fundamental and essential details of user chosen player such as players name, age, country, team, height, weight, etc.  |

### **Non-Functional Requirements:**

| <b><i>Sr.No.</i></b> | <b><i>Short Description</i></b> | <b><i>Description in Detail</i></b>  |
|----------------------|---------------------------------|--|
| 1.                   | Performance                     | <p>The system must not lag, because the users using it don't have down-time to wait for it to complete an action.</p> <p>The system must complete updating the databases, adding the details successfully every time the user requests such a process.</p> <p>All the functions of the system must be available to the user every time the system is turned on.</p> <p>If for any reason some operation cannot be performed or has failed to execute, then user must be alerted with appropriate messages.</p> |
| 2.                   | Security                        | <p>The database of a website should not store any password in plain text. A hashed value has to be stored.</p> <p>The details of each person should be kept secured in the database so that no third party can access the user details.</p>  |
| 3.                   | Reliability                     | <p>As the system provides the right tools for discussion forum, problem solving must be made sure that the system is reliable in its operations and for securing the sensitive details.</p>  |

|    |            |   |
|----|------------|---|
| 4. | Usability: | <p>The system must be easy to use quickly accessible by users.</p> <p>The system must be intuitive and simple in the way it displays all relevant data.</p> <p>The features of the system must be easily navigable by the users with buttons that are easy to understand.</p> |
|----|------------|---|

## 1.4 Organization of the Report

We have elaborated all the essential pieces of our system, its scope, functional and non-functional requirements and motivation behind creating this system. In the follow up part we have discussed the background details regarding the program, things that were going on continuously throughout the course of our project. We discuss about the technologies, programming languages that we have used to create the Web Application. Nonetheless we also discuss about the methodology to our approach, algorithms that we have used to make the Web Application more robust. We have presented the implementation of various web pages and even displayed few test cases regarding the same. We later on discuss about our results and conclude with our learning and describe the scope for future work. We also added few references and acknowledged our Professor without which the project would have not been possible.

## CHAPTER 2

### Background Work

We landed the idea for football match prediction from the apps that use machine learning models to predict match outcome and let you bet on teams for different matches. Also there are not many websites that predict match outcomes and do analysis based on attributes. As football fans we thought it would be best to predict football match outcomes as the sport is one of the most widely watched sport on the planet. We almost immediately came up with the name of the project. All of us agreed to proceed with the idea. We started researching on this topic, finding out which type of ML models are used to predict match outcomes and goals scored in a match. Some of us already knew how these models work and how to use them to predict results. After finalizing on topic we found out dataset from Kaggle which provides free access to millions of machine learning datasets. The dataset is of English Premier League that has data for last 7 seasons.

As per the integration part of these models we had a choice between Flask and Django. Django was a better choice for as we had worked with Django before. Django framework uses python as the base coding language and consists of multiple packages that allow us to integrate these models with the framework. The main advantage of using Django is the framework is specifically used for performing these kinds of tasks and has inbuilt packages that make our job as a coder easier. We started surfing web for Django and its functions as “how does it work”, “how would we implement our idea into reality”. We also thought of displaying player statistics. We thought it would be best if the user inputs the team names and the player name so we can render the respective results on the page. We came up with the basic layout of website and discussing all the functionalities we were going to add and how would the interface look like.

We have used keras machine learning library in python which has inbuilt models and scikit-learn library for pre-processing of data. As for the coding environment we have used Jupyter Notebook. Using this knowledge and referring to a few papers we found that classification models are used to predict the match outcomes by training the model on a large dataset containing the data of previous matches played by the team in the league.

We started training various models such as SVM, KNN, XGBoost and some more; found out the accuracy for each one of them. The model which gave us highest accuracy is used in the website for prediction. The goals scored by teams is predicted using Multiple Linear Regression model that trains on multiple attributes and predicts a result. For the analysis of players stats matplotlib library in python is used that is used to display different types of graphs which can be easily rendered through Django framework.

The most imperative step for completing the project successfully was the integration of models with the framework, for that we referred to various websites and videos on how to go about doing it. We figured it out eventually. As we made progress we stumbled upon different problems of implementing such a project but eventually learned to handle such anomalies or technical difficulties.

## CHAPTER 3

### Implementation

#### 3.1 Technologies Used

1. **Django** - Django is a high-level Python Web framework that encourages rapid development and clean, pragmatic design. Built by experienced developers, it takes care of much of the hassle of Web development, so you can focus on writing your app without needing to reinvent the wheel. It is free and open source.
2. **HTML** - The HyperText Markup Language, or HTML is the standard markup language for documents designed to be displayed in a web browser.
3. **CSS** - Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a markup language such as HTML.
4. **Bootstrap** - Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains CSS- and JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components.
5. **SQLite** - SQLite is a C-language library that implements a small, fast, self-contained, high-reliability, full-featured, SQL database engine. SQLite is the most used database engine in the world.
6. **Jupyter Notebook** - Project Jupyter is a non-profit, open-source project, born out of the IPython Project in 2014 as it evolved to support interactive data science and scientific computing across all programming languages. Jupyter will always be 100% open-source software, free for all to use and released under the liberal terms of the modified BSD license. Jupyter is developed in the open on GitHub, through the consensus of the Jupyter community.

## 3.2 Algorithm/ Methodology

### Methodology

**1. Match prediction** - In match prediction, we predict Win/Draw/Lose for the two teams which are playing the football match. For the prediction we use classification algorithms of machine learning. We implemented various classification algorithms on the dataset such as SVM, Logistic Regression, KNN, XG Boost and Random Forest Classification. We use attributes such as \_\_ for predicting the match outcome. We calculated the accuracy for all the models and chose the model which has the highest accuracy. i.e SVM

Support Vector machine (SVM)- Support Vector Machine is a supervised machine learning algorithm which can be used for both classification or regression challenges. However, it is mostly used in classification problems. In the SVM algorithm, we plot each data item as a point in n-dimensional space (where n is number of features) with the value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper-plane that differentiates the two classes.

**2. Goals prediction** - We predict the goals scored by each team at the end of the match that is the final score. For this prediction we use regression algorithms of machine learning. We implemented the Multiple linear regression to predict the goals scored by the home team and away team. We use attributes such as \_\_ for predicting the goals scored.

Multiple Linear Regression- Multiple linear regression, also known simply as multiple regression, is a statistical technique that uses several explanatory variables to predict the outcome of a response variable. The goal of multiple linear regression is to model the linear relationship between independent variables and dependent variable. In essence, multiple regression is the extension of linear regression because it involves more than one independent variable.

**3. Player Analysis** - We used python libraries matplotlib and seaborn in order to plot the player data for data visualization. Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python. Seaborn is a Python data visualization library based on matplotlib. It provides a high-level interface for drawing attractive and informative statistical graphics.

**4. Player Statistics** - User inputs the player's name in the search bar to view player statistics. We search the entire dataset by the player's name entered and store the respective statistics of the player and display them to the user.

The Models created are dumped on the framework using joblib library that stores the classifier and regression model in to a sav file which can then be used for prediction. The sav file is then imported in Django and then is used to predict the output based on user input.

```
filename= 'finalized_model.sav'
joblib.dump(classifier,filename)
```

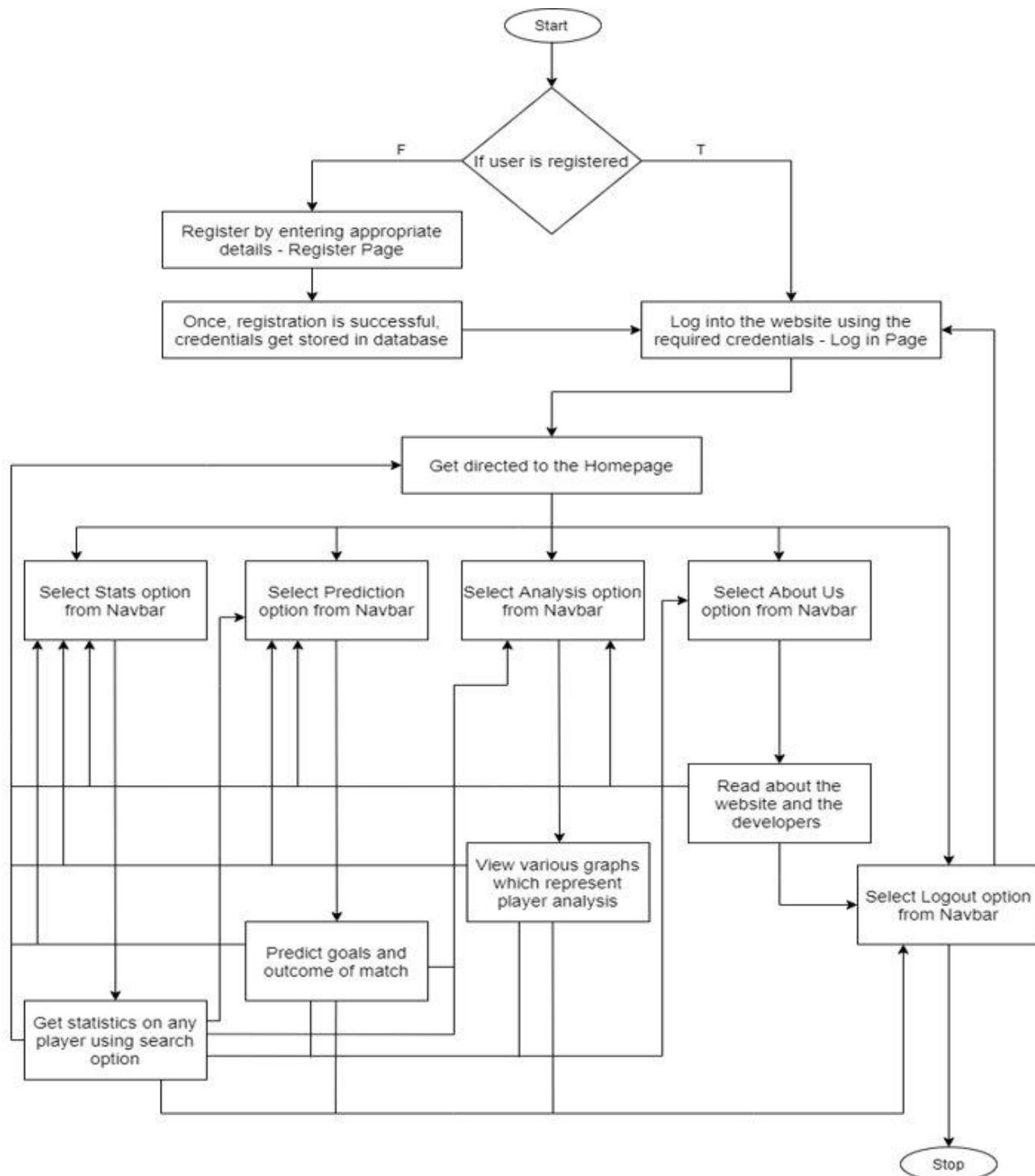
|   | Unnamed: 0 | FTR | HTP | ATP | HM1 | HM2 | HM3 | AM1 | AM2 | AM3 | HTGD | ATGD | DiffFormPts | Win |
|---|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-------------|-----|
| 0 | 0          | H   | 0.0 | 0.0 | M   | M   | M   | M   | M   | M   | 0.0  | 0.0  | 0.0         | 0   |
| 1 | 1          | H   | 0.0 | 0.0 | M   | M   | M   | M   | M   | M   | 0.0  | 0.0  | 0.0         | 0   |
| 2 | 2          | NH  | 0.0 | 0.0 | M   | M   | M   | M   | M   | M   | 0.0  | 0.0  | 0.0         | 1   |
| 3 | 3          | NH  | 0.0 | 0.0 | M   | M   | M   | M   | M   | M   | 0.0  | 0.0  | 0.0         | 2   |
| 4 | 4          | H   | 0.0 | 0.0 | M   | M   | M   | M   | M   | M   | 0.0  | 0.0  | 0.0         | 0   |

|      | HTP       | ATP       | HM1_D | HM1_L | HM1_M | HM1_W | HM2_D | HM2_L | HM2_M | HM2_W | ... | AM2_D | AM2_L | AM2_M | AM2_W | AM3_D | AM3_L |
|------|-----------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-------|-------|-------|-------|-------|-------|
| 0    | -2.280523 | -2.345017 | 0     | 0     | 1     | 0     | 0     | 0     | 1     | 0     | ... | 0     | 0     | 1     | 0     | 0     | 0     |
| 1    | -2.280523 | -2.345017 | 0     | 0     | 1     | 0     | 0     | 0     | 1     | 0     | ... | 0     | 0     | 1     | 0     | 0     | 0     |
| 2    | -2.280523 | -2.345017 | 0     | 0     | 1     | 0     | 0     | 0     | 1     | 0     | ... | 0     | 0     | 1     | 0     | 0     | 0     |
| 3    | -2.280523 | -2.345017 | 0     | 0     | 1     | 0     | 0     | 0     | 1     | 0     | ... | 0     | 0     | 1     | 0     | 0     | 0     |
| 4    | -2.280523 | -2.345017 | 0     | 0     | 1     | 0     | 0     | 0     | 1     | 0     | ... | 0     | 0     | 1     | 0     | 0     | 0     |
| ...  | ...       | ...       | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ... | ...   | ...   | ...   | ...   | ...   | ...   |
| 6835 | -0.245340 | 1.176242  | 0     | 1     | 0     | 0     | 0     | 1     | 0     | 0     | ... | 0     | 0     | 0     | 1     | 0     | 0     |
| 6836 | -0.493533 | 2.534442  | 0     | 0     | 0     | 1     | 1     | 0     | 0     | 0     | ... | 1     | 0     | 0     | 0     | 0     | 0     |
| 6837 | -0.642449 | -0.835906 | 0     | 1     | 0     | 0     | 0     | 1     | 0     | 0     | ... | 1     | 0     | 0     | 0     | 1     | 0     |
| 6838 | 1.392734  | 0.019257  | 0     | 0     | 0     | 1     | 0     | 1     | 0     | 0     | ... | 0     | 1     | 0     | 0     | 0     | 1     |
| 6839 | -0.344617 | 0.119864  | 1     | 0     | 0     | 0     | 0     | 0     | 0     | 1     | ... | 0     | 0     | 0     | 1     | 0     | 0     |

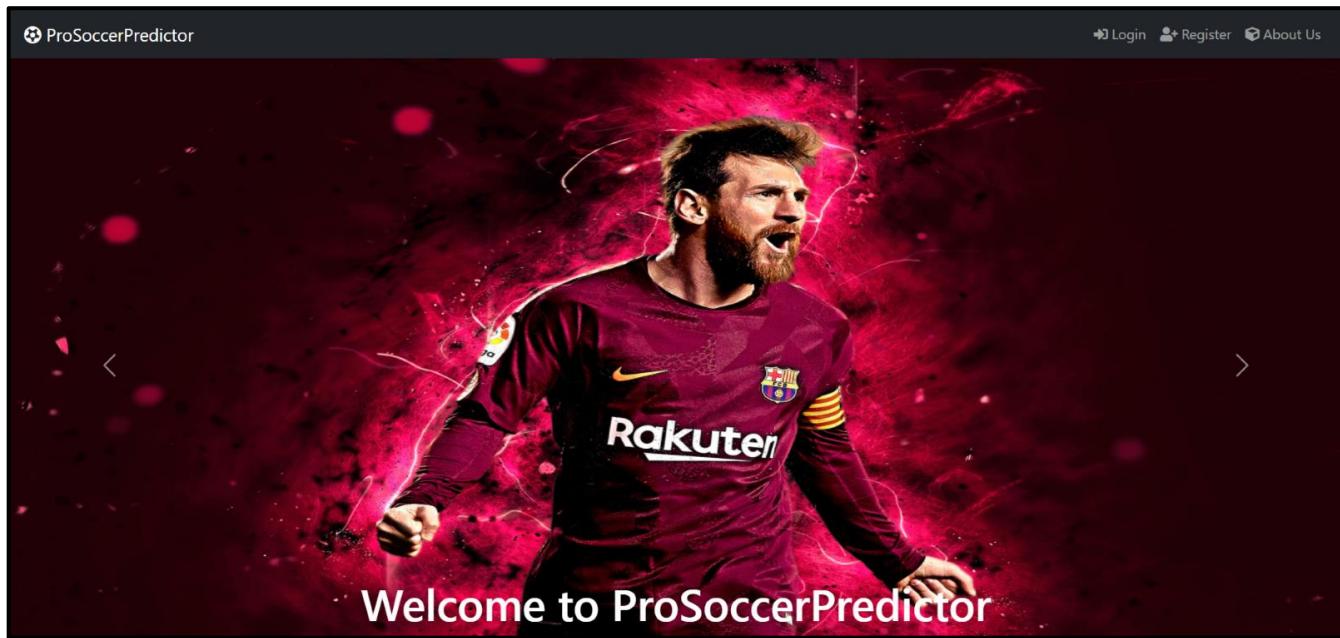
| AM3_M | AM3_W | HTGD      | ATGD      |
|-------|-------|-----------|-----------|
| 1     | 0     | 0.013972  | -0.020983 |
| 1     | 0     | 0.013972  | -0.020983 |
| 1     | 0     | 0.013972  | -0.020983 |
| 1     | 0     | 0.013972  | -0.020983 |
| 1     | 0     | 0.013972  | -0.020983 |
| ...   | ...   | ...       | ...       |
| 0     | 1     | -0.403413 | 1.004475  |
| 0     | 1     | -0.669021 | 2.941452  |
| 0     | 0     | -1.010517 | -1.312301 |
| 0     | 0     | 1.417901  | -0.134923 |
| 0     | 1     | -0.820797 | -0.476742 |

### 3.3 Implementation

#### Workflow



## Home Page

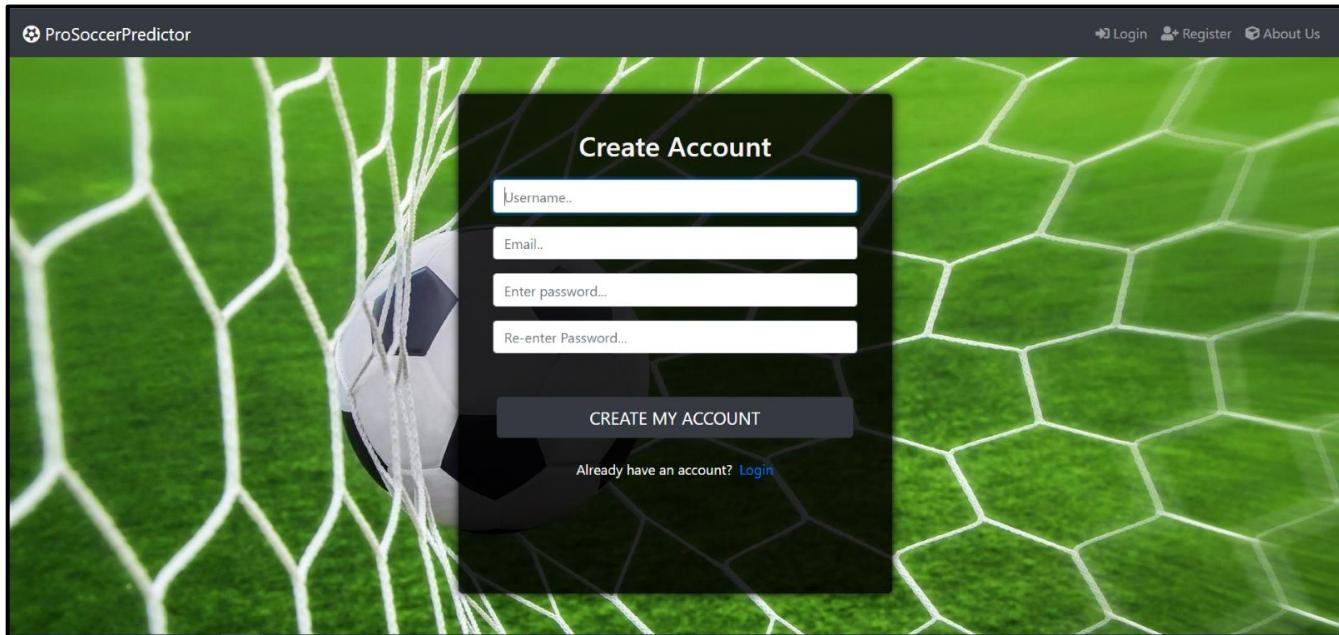


## About Us

The 'About Us' page features a large image of a soccer player in mid-kick on a green field under a cloudy sky. To the right, there is a 'ABOUT US' section with a brief description of the website's purpose and a team hierarchy diagram. The description highlights the popularity of football and the collection of new data for analysis. The hierarchy diagram shows a team structure with 'PARVA B' at the top, followed by 'RACHIT M', 'VISHANT M', and 'ABHISHEK P' at the bottom, with a small 'Globe' icon at the very bottom.

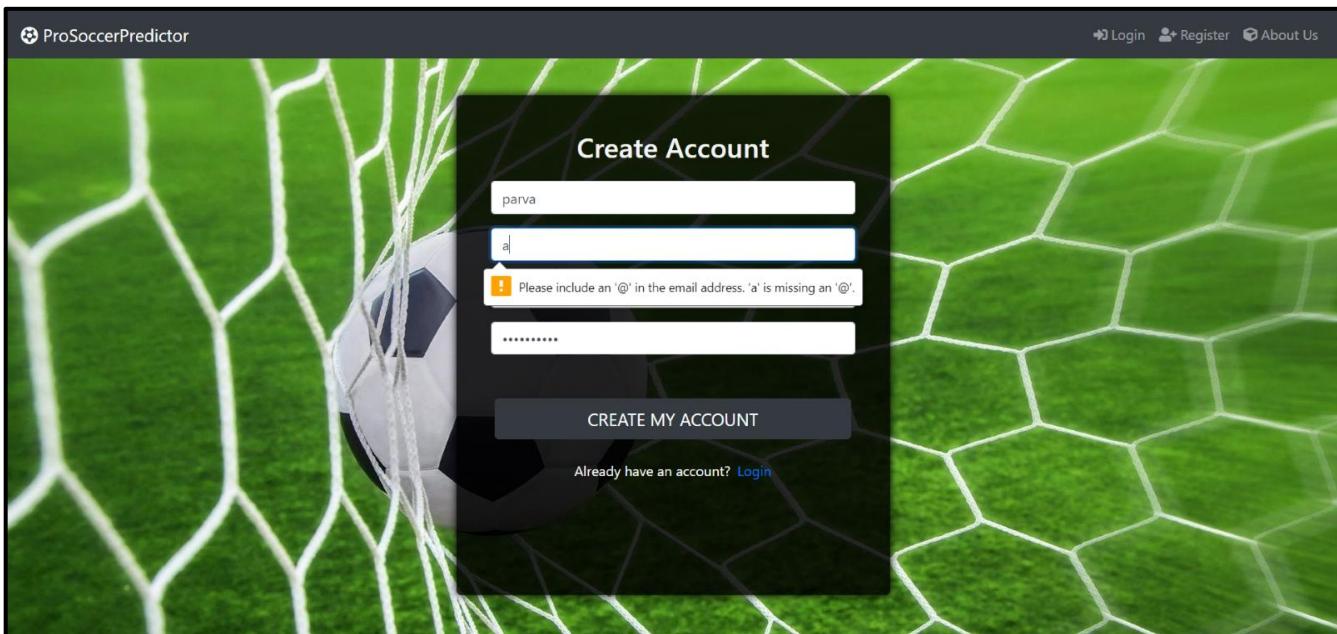
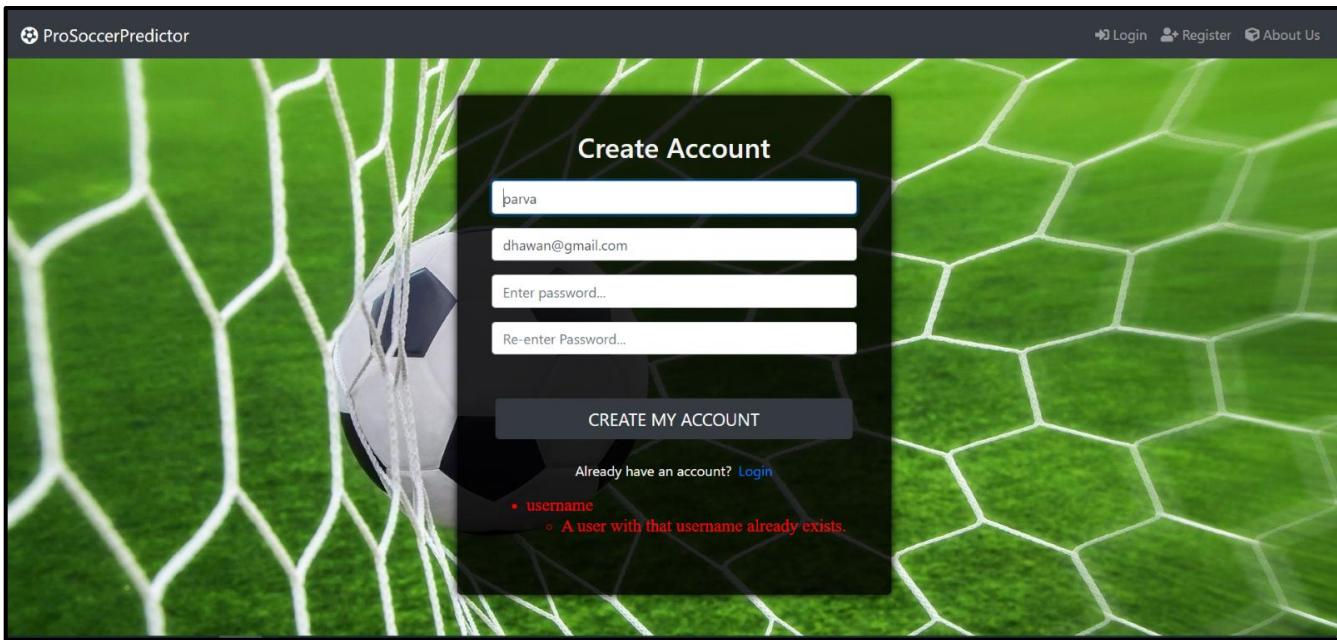
## Registration

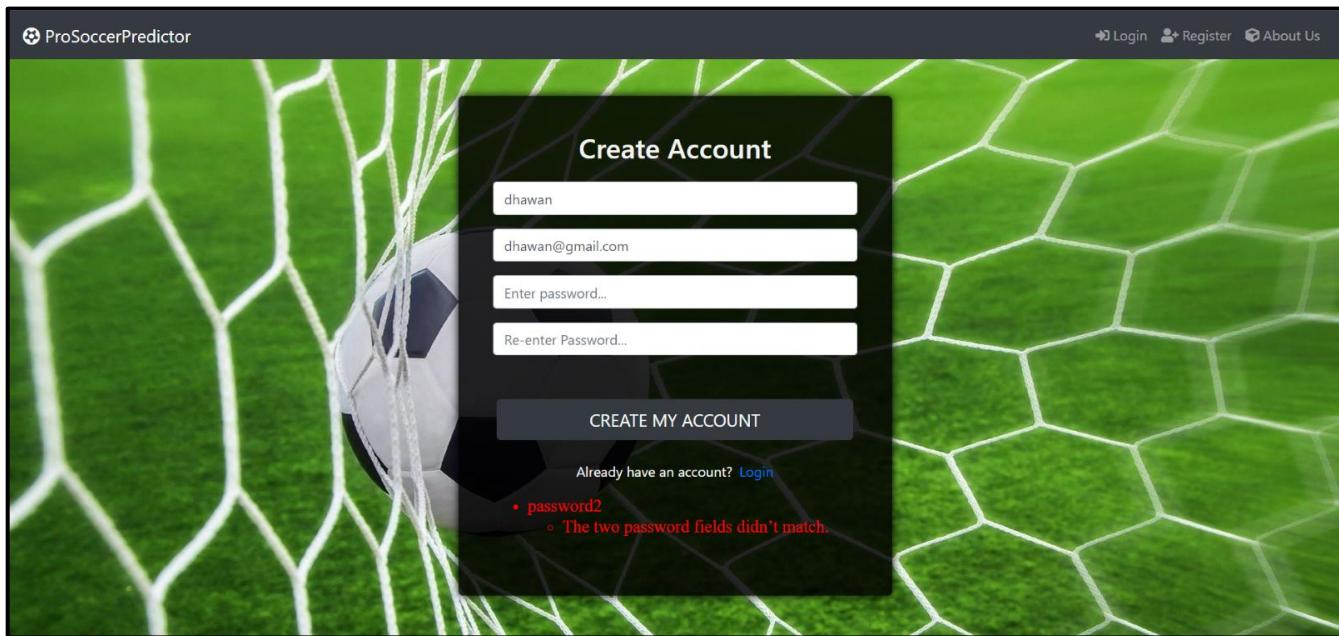
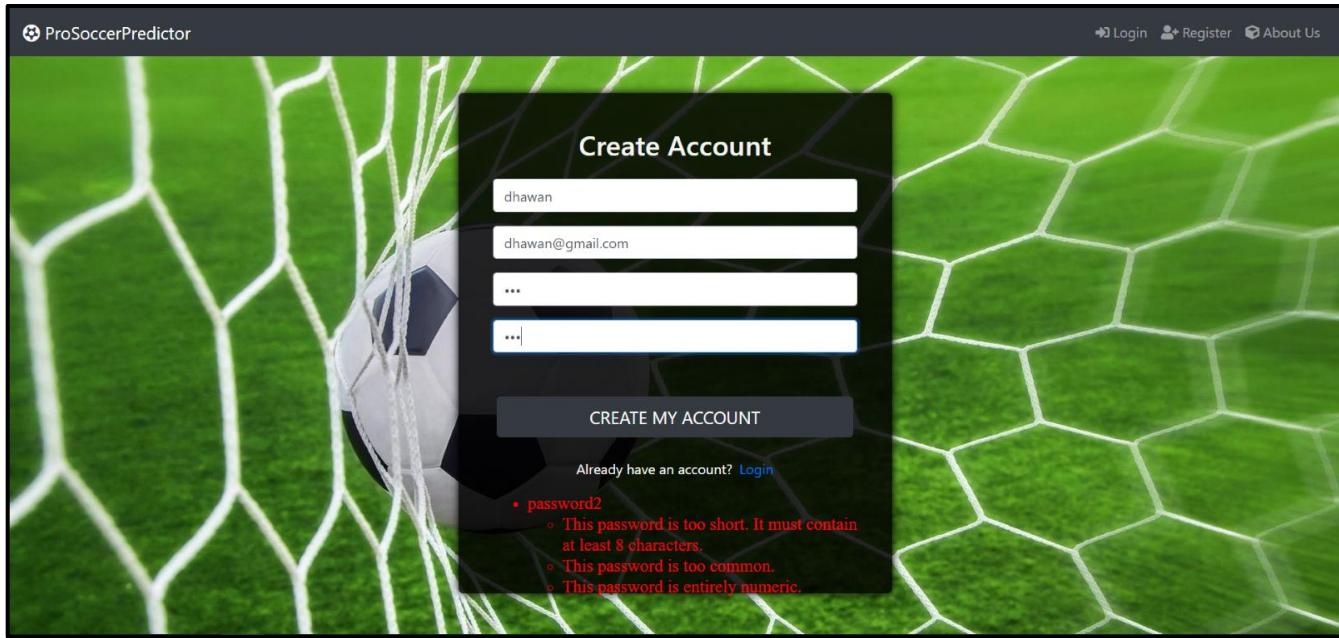
User must register to access the features of the website. User has to enter his email id, username and password.



Inbuilt Django validations are implemented for signup form. The user has to enter a unique username which has not been taken by any user.

The user should also enter a valid email id. The user also has to enter a strong password and the same one in confirmation.



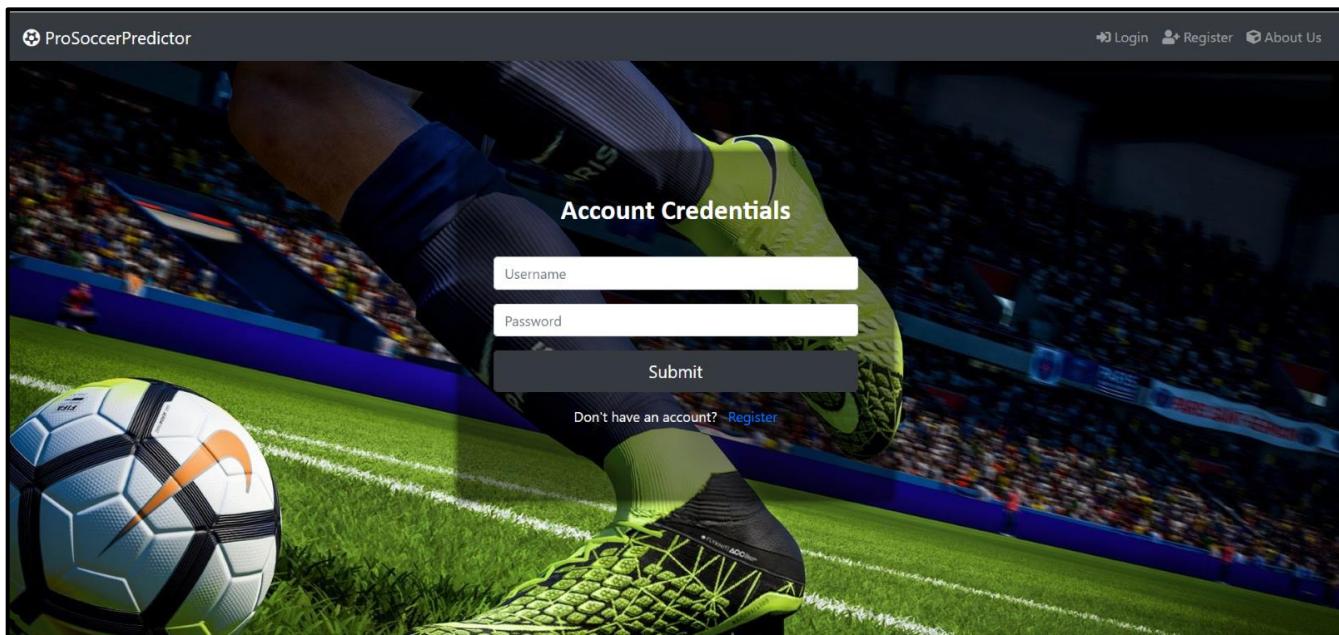


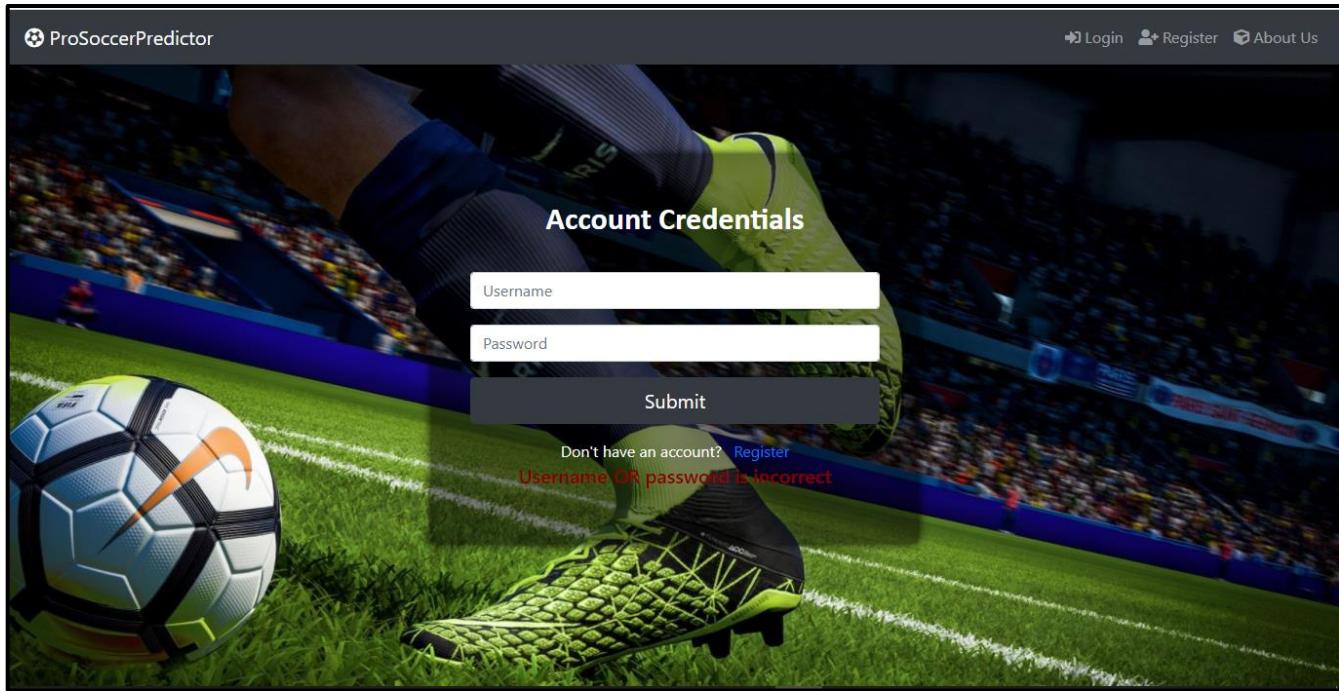
The user information will be saved in the SQLite database.

| USERNAME  | EMAIL ADDRESS           | FIRST NAME | LAST NAME | STAFF STATUS |
|-----------|-------------------------|------------|-----------|--------------|
| rohan     | rohan@gmail.co          |            |           | red          |
| abhishek  | abhi21.potdar@gmail.com |            |           | green        |
| dhawan    | dhawan@gmail.com        |            |           | red          |
| parva     | parva@gmail.com         |            |           | red          |
| rachit.hm | rachit.hm@somaiya.edu   |            |           | red          |
| ronaldo   | ronaldo@gmail.com       |            |           | red          |
| vishant   | vishant.m@somaiya.edu   |            |           | red          |

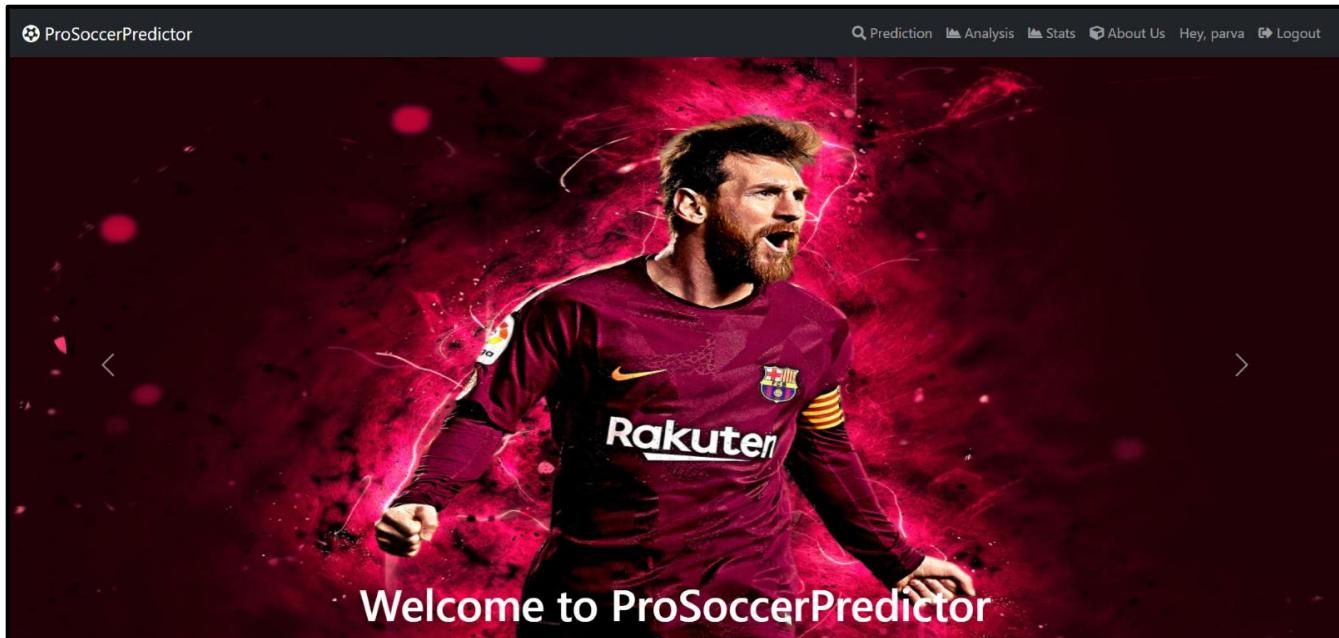
## Login

User is redirected to login page after registration. User has to enter valid username and password. Inbuilt Django validations are also implemented in this sign-in form.

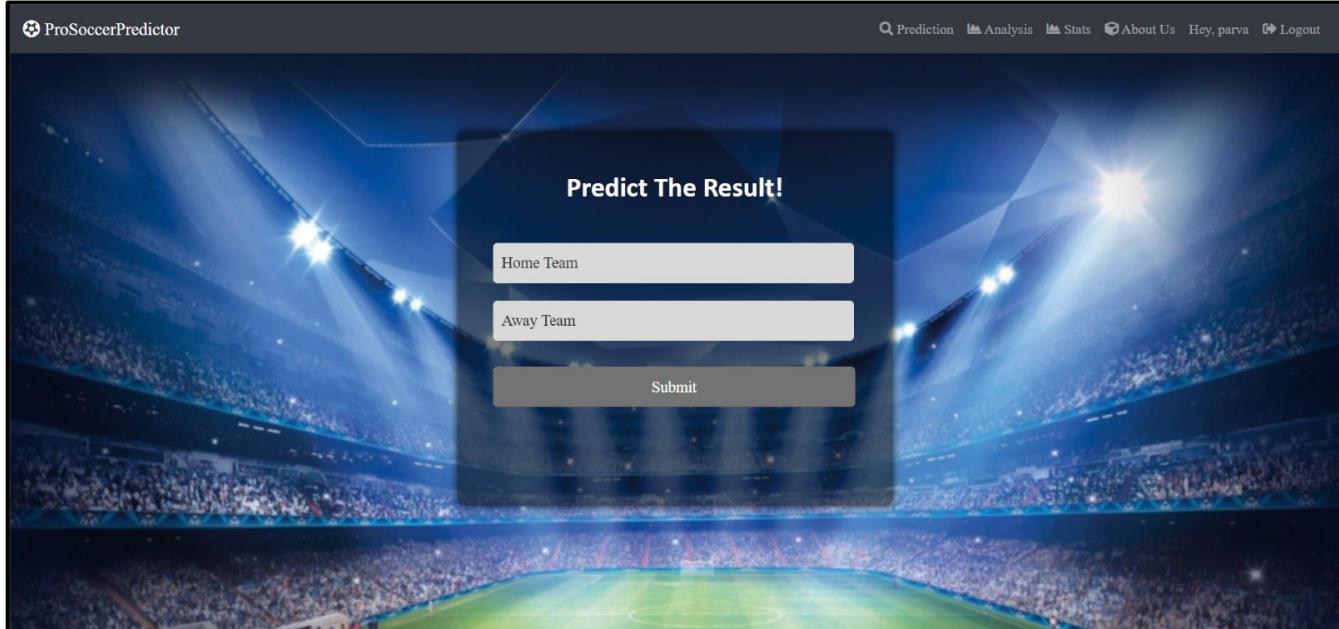




After successful sign-in the user is redirected to the home page and the user can access the features of the website such as prediction, analysis and statistics.



User must input the two teams for which he wants to predict the result of the match. Autocomplete feature has been implemented while accepting the two teams. After selecting both the teams click on submit button to predict the result.

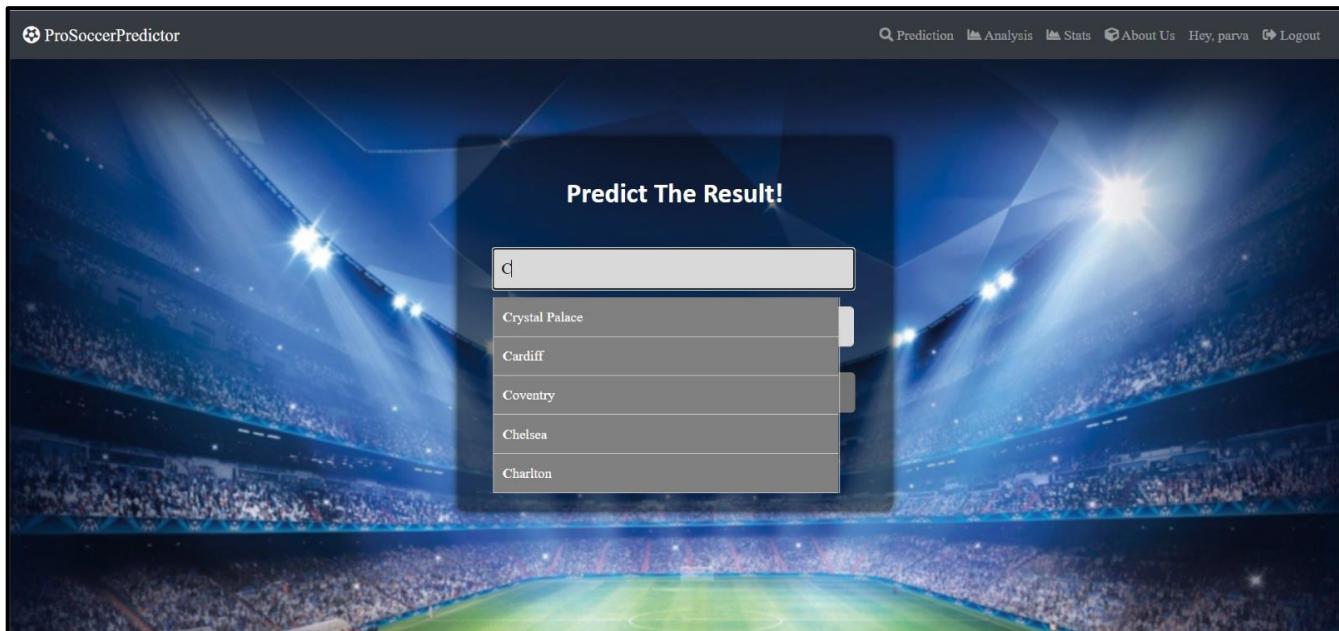


Predict The Result!

Home Team

Away Team

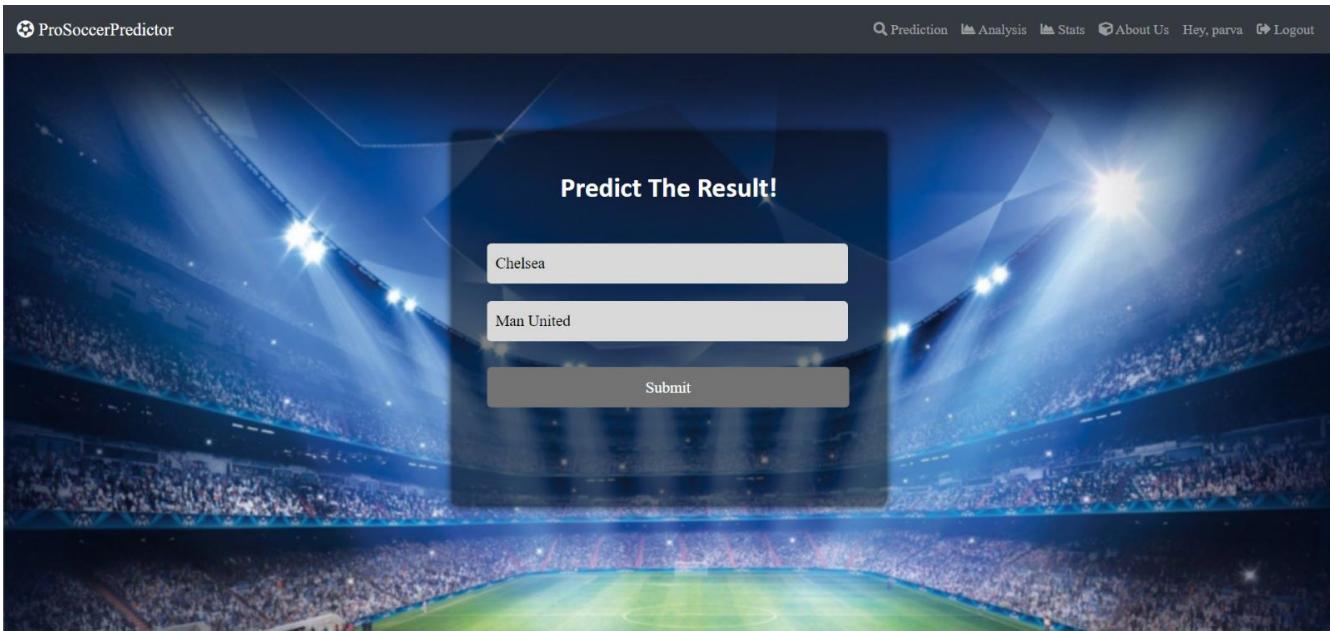
Submit



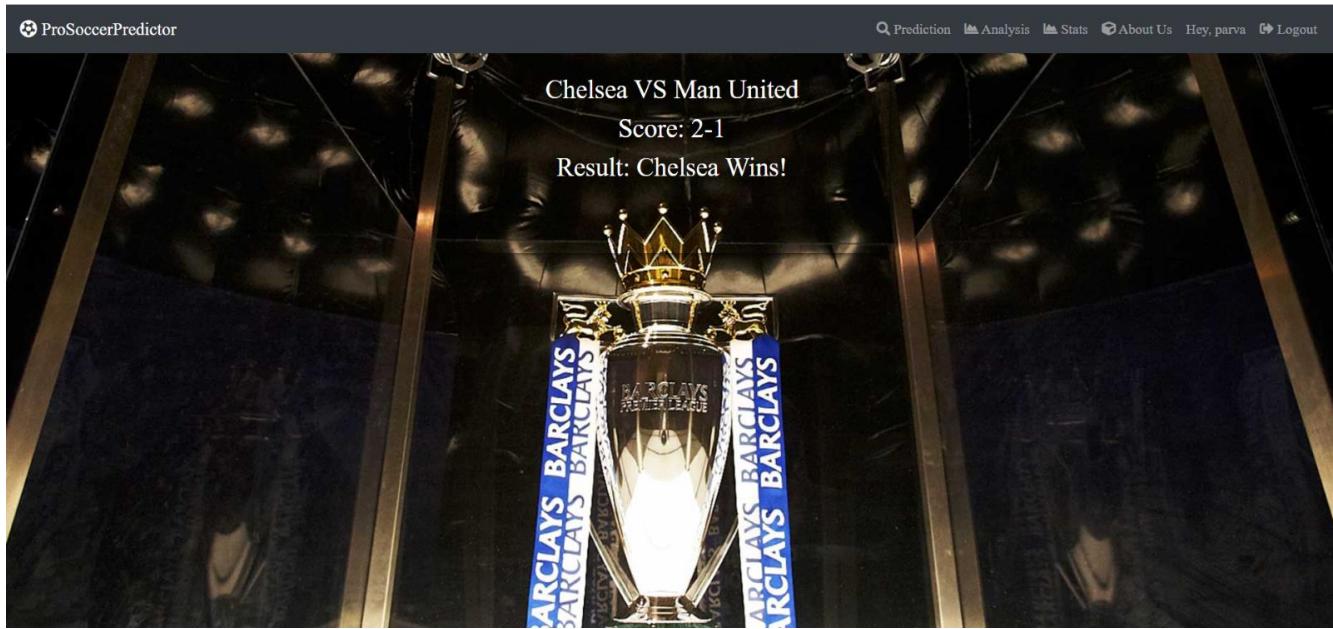
Predict The Result!

c

- Crystal Palace
- Cardiff
- Coventry
- Chelsea
- Charlton



User can see the goals scored by each team after full time which is predicted by regression model. Match outcome is also displayed which is predicted by classification model.



ProSoccerPredictor

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Analysing players on the basis of preferred foot (Right or Left) ^

Analysis based on different player positions ^

Analysis based on Work rate of the players ^

Analysis based on skill moves of Players ^

Analysis based on body weight of the players ^

Analysis based on potential scores of the players ^

Analysing ball control and dribbling attributes of left-footed and right-footed footballers ^

Analysing players on the basis of Height ^

Best players according to their respective positions ^

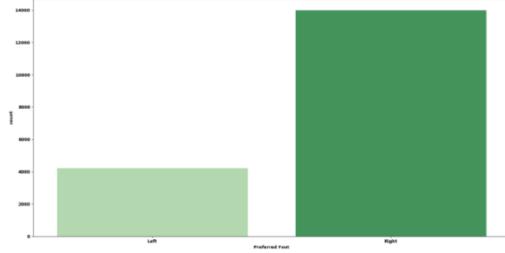
Analysis based on overall scores of the players ^

Analysing players on the basis of Age ^

Top 10 right-footed players ^

Analysing players on the basis of preferred foot (Right or Left) ^

**Analysing players on the basis of preferred foot**



| Preferred Foot | Count   |
|----------------|---------|
| Left           | ~3,500  |
| Right          | ~13,500 |

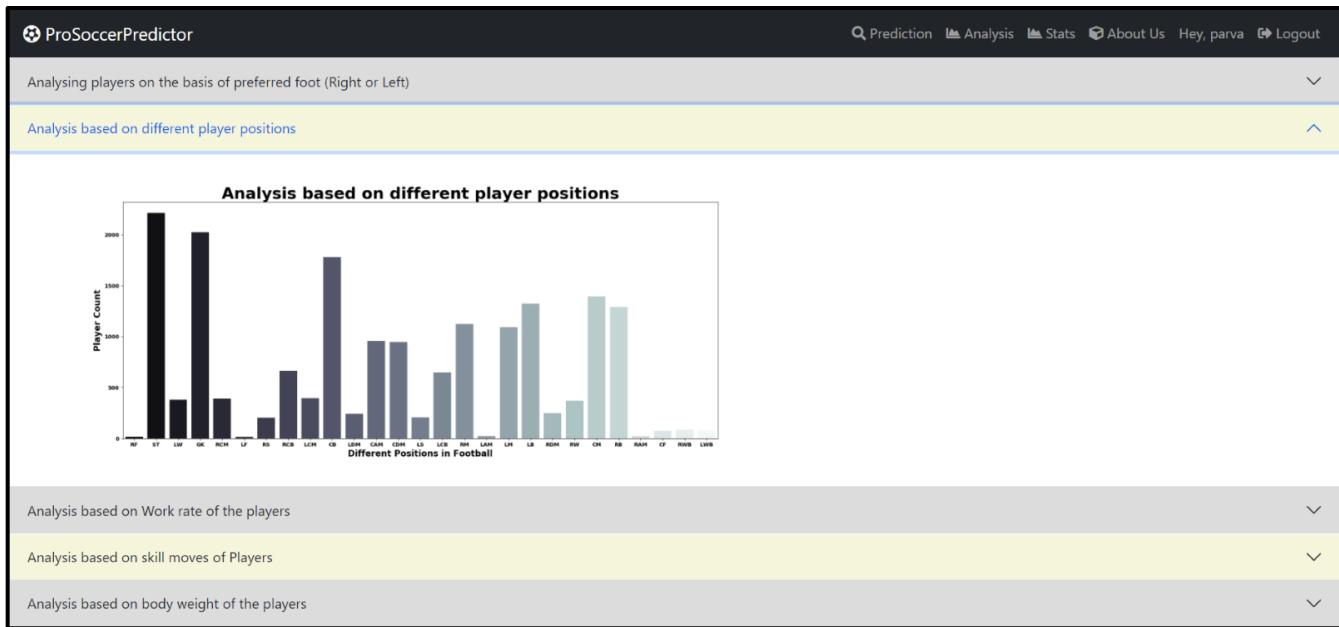
Analysis based on different player positions ^

Analysis based on Work rate of the players ^

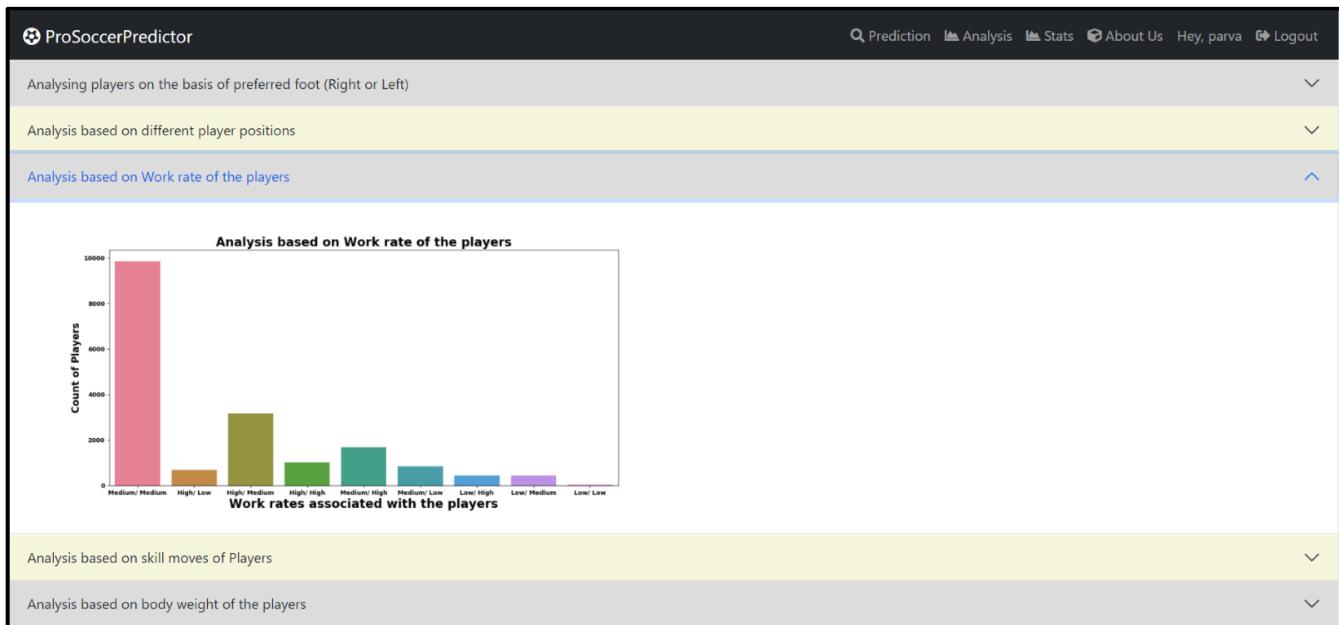
Analysis based on skill moves of Players ^

Analysis based on body weight of the players ^

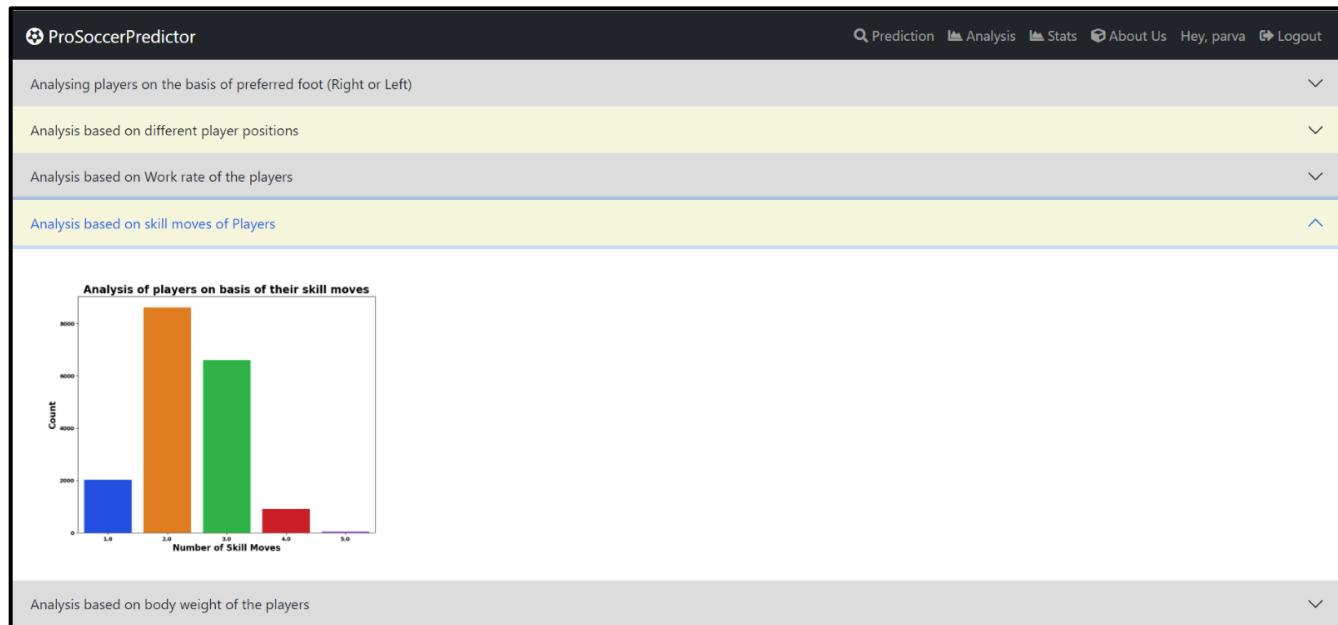
The graph above represents the analysis of players on the basis of preferred foot, either right or left. From this graph, we can conclude that right footed players are a majority. They are more in number as compared to the left footed players.



The graph above represents the analysis of players on the basis of different player positions such as ST, LCM, RCM, LB, RB, CB, GK, etc. From this graph, the user gets a complete distribution through which he gets a thorough analysis of count of players in each position.



The graph above represents the analysis of players on the basis of work rate. Each player is assigned work rate according to their attacking and defensive capabilities – High, Medium, Low. In this graph, each block consists of two attributes such as (Medium, Medium), (High, Low), (High, High), (High, Medium), etc. where the first attribute defines attacking work rate and the second attribute defines defensive work rate. The graph displays the count of players according to respective category.



The graph above represents the analysis of players on the basis of skill moves. The user can get the count of players and also the number of skills possessed by the players.

ProSoccerPredictor

Prediction Analysis Stats About Us Hey, parva Logout

Analysing players on the basis of preferred foot (Right or Left)

Analysis based on different player positions

Analysis based on Work rate of the players

Analysis based on skill moves of Players

Analysis based on body weight of the players

Analysis based on body weight of the players

Analysis based on potential scores of the players

The graph above displays the analysis of players on the basis of their Body Weight. From this graph, we can conclude that maximum players have weight between 150 and 180 lbs.

Analysis based on potential scores of the players

Histogram for Potential Scores of Players

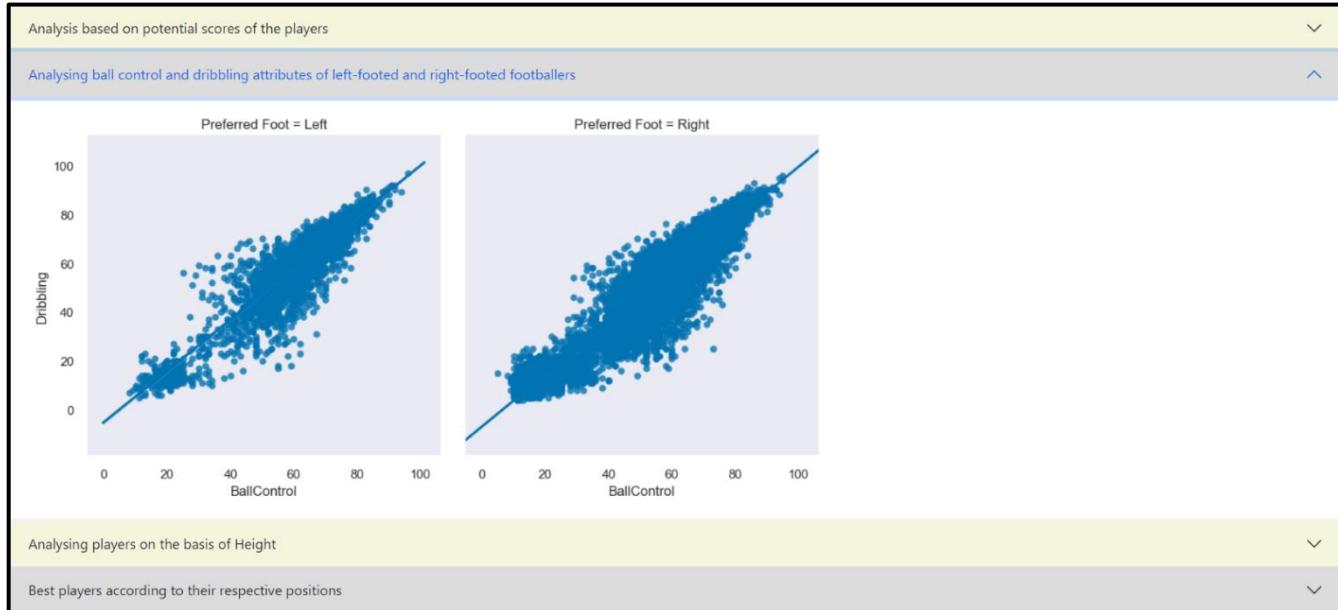
Analysing ball control and dribbling attributes of left-footed and right-footed footballers

Analysing players on the basis of Height

Best players according to their respective positions

Analysis based on overall scores of the players

The graph above displays the analysis of players on the basis of their Potential scores. From this graph, we can conclude that maximum players have overall score around 70 and very few players have overall score above 90.



The graph above displays the analysis of players on the basis of ball control and dribbling attributes of left-footed and right-footed footballers.



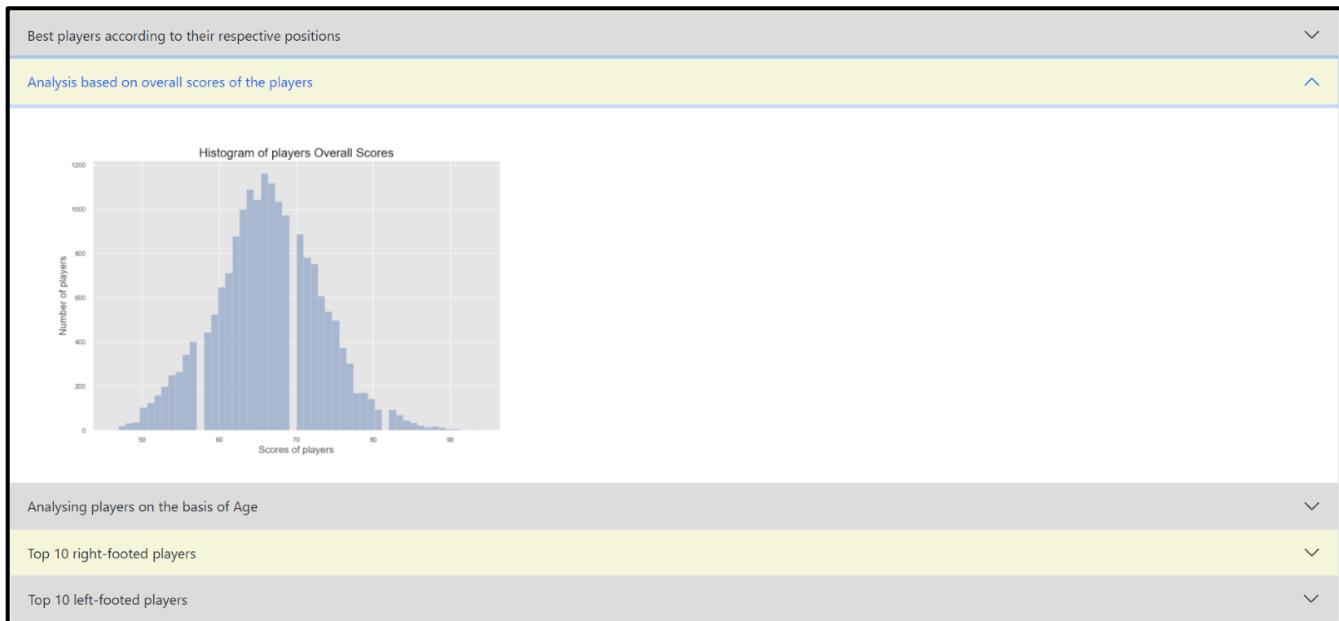
The graph above displays the analysis of players on the basis of their heights. From this graph, we can conclude that maximum players have height between 5'10" and 5'11".

| Best players according to their respective positions |      |                   |         |      |                          |           |
|--|------|-------------------|---------|------|--------------------------|-----------|
| Position   | Name | Age               | Overall | Club | Nationality              |           |
| 17   | CAM  | A. Griezmann      | 27      | 89   | Atletico Madrid          | France    |
| 12   | CB   | D. Godin          | 32      | 90   | Atletico Madrid          | Uruguay   |
| 20   | CDM  | Sergio Busquets   | 29      | 89   | FC Barcelona             | Spain     |
| 21   | CF   | Luis Alberto      | 25      | 82   | Lazio                    | Spain     |
| 67   | CM   | Thiago            | 27      | 86   | FC Bayern München        | Spain     |
| 3  | GK   | De Gea            | 27      | 91   | Manchester United        | Spain     |
| 28   | LAM  | J. Rodriguez      | 26      | 88   | FC Bayern München        | Colombia  |
| 35   | LB   | Marcelo           | 30      | 88   | Real Madrid              | Brazil    |
| 24   | LCB  | G. Chelini        | 33      | 89   | Juventus                 | Italy     |
| 11   | LCM  | T. Kroos          | 28      | 90   | Real Madrid              | Germany   |
| 14   | LDM  | N. Kanté          | 27      | 89   | Chelsea                  | France    |
| 5  | LF   | E. Hazard         | 27      | 91   | Chelsea                  | Belgium   |
| 33   | LM   | P. Aubameyang     | 29      | 88   | Arsenal                  | Gabon     |
| 21   | LS   | E. Cavani         | 31      | 89   | Paris Saint-Germain      | Uruguay   |
| 2  | LW   | Neymar Jr         | 26      | 92   | Paris Saint-Germain      | Brazil    |
| 474  | LWB  | N. Schürrle       | 25      | 80   | TSG 1899 Hoffenheim      | Germany   |
| 129  | RAM  | J. Cuadrado       | 30      | 84   | Juventus                 | Colombia  |
| 69   | RB   | A. Piqué          | 29      | 86   | Chelsea                  | Spain     |
| 8  | RCB  | Sergio Ramos      | 32      | 91   | Real Madrid              | Spain     |
| 4  | RCM  | K. De Bruyne      | 27      | 91   | Manchester City          | Belgium   |
| 45   | RDM  | P. Pogba          | 26      | 87   | Manchester United        | France    |
| 0  | RF   | L. Messi          | 31      | 94   | FC Barcelona             | Argentina |
| 25   | RW   | K. Mbappé         | 19      | 88   | Paris Saint-Germain      | France    |
| 7  | RS   | L. Suárez         | 31      | 91   | FC Barcelona             | Uruguay   |
| 56   | RW   | Bernardo Silva    | 23      | 86   | Manchester City          | Portugal  |
| 450  | RWB  | M. Ginter         | 24      | 80   | Borussia Mönchengladbach | Germany   |
| 1  | ST   | Cristiano Ronaldo | 33      | 94   | Juventus                 | Portugal  |

Analysis based on overall scores of the players

Analysing players on the basis of Age

The table above displays the Best Players according to their positions.



The graph above displays the analysis of players on the basis of overall scores of players. From this graph, we can conclude that maximum players have overall score around 66 and very few players have overall score above 90.



The graph above displays the analysis of players on the basis of their age. From this graph, we can conclude that maximum players are between age 20 and 27

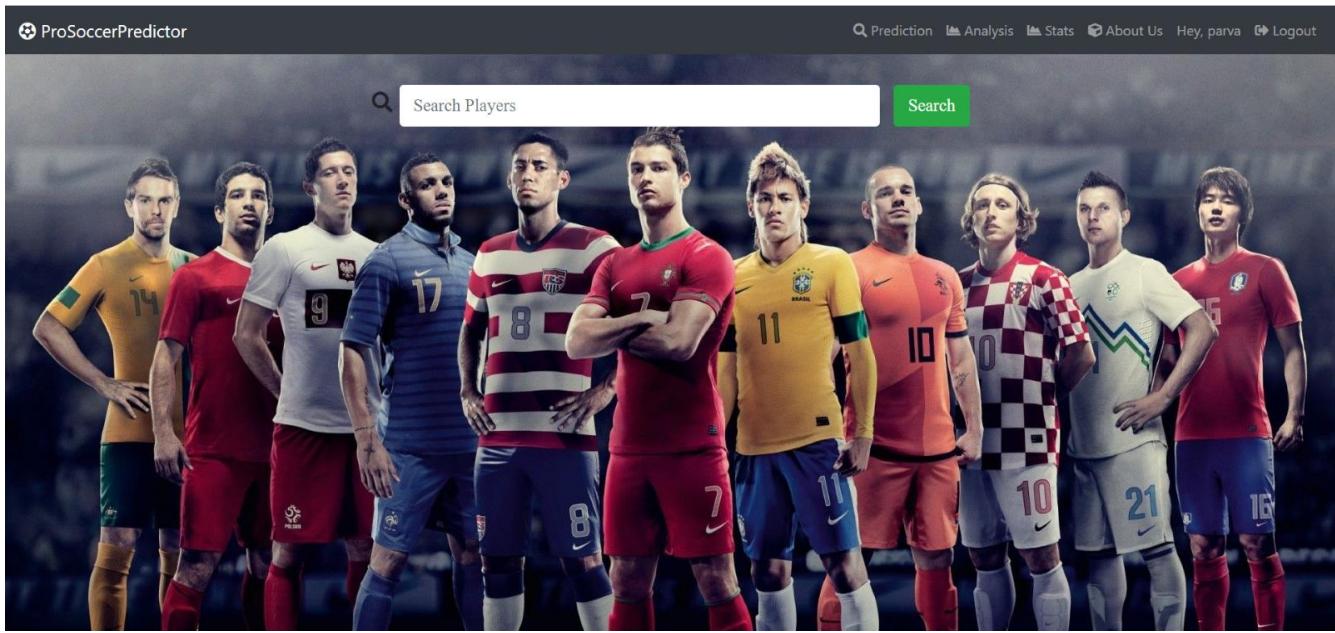
| Analysis based on potential scores of the players  | ▼                 |     |                     |             |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
|--|-------------------|-----|---------------------|-------------|------|-------------|---|-------------------|----|----------|----------|---|-----------|----|---------------------|--------|---|-----------|----|-------------------|-------|---|--------------|----|-----------------|---------|---|-----------|----|---------|---------|---|-----------|----|-------------|---------|---|-----------|----|--------------|---------|---|--------------|----|-------------|-------|---|-----------|----|-----------------|----------|----|----------------|----|-------------------|--------|
| Analysing ball control and dribbling attributes of left-footed and right-footed footballers  | ▼                 |     |                     |             |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| Analysing players on the basis of Height   | ▼                 |     |                     |             |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| Best players according to their respective positions   | ▼                 |     |                     |             |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| Analysis based on overall scores of the players  | ▼                 |     |                     |             |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| Analysing players on the basis of Age  | ▼                 |     |                     |             |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| <a href="#">Top 10 right-footed players</a>  | ^                 |     |                     |             |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| <table border="1"> <thead> <tr><th></th><th>Name</th><th>Age</th><th>Club</th><th>Nationality</th></tr> </thead> <tbody> <tr><td>1</td><td>Cristiano Ronaldo</td><td>33</td><td>Juventus</td><td>Portugal</td></tr> <tr><td>2</td><td>Neymar Jr</td><td>26</td><td>Paris Saint-Germain</td><td>Brazil</td></tr> <tr><td>3</td><td>D. De Gea</td><td>27</td><td>Manchester United</td><td>Spain</td></tr> <tr><td>4</td><td>K. De Bruyne</td><td>27</td><td>Manchester City</td><td>Belgium</td></tr> <tr><td>5</td><td>E. Hazard</td><td>27</td><td>Chelsea</td><td>Belgium</td></tr> <tr><td>6</td><td>L. Modrić</td><td>32</td><td>Real Madrid</td><td>Croatia</td></tr> <tr><td>7</td><td>L. Suárez</td><td>31</td><td>FC Barcelona</td><td>Uruguay</td></tr> <tr><td>8</td><td>Sergio Ramos</td><td>33</td><td>Real Madrid</td><td>Spain</td></tr> <tr><td>9</td><td>J. Obliak</td><td>26</td><td>Atlético Madrid</td><td>Slovenia</td></tr> <tr><td>10</td><td>R. Lewandowski</td><td>29</td><td>FC Bayern München</td><td>Poland</td></tr> </tbody> </table> |                   |     | Name                | Age         | Club | Nationality | 1 | Cristiano Ronaldo | 33 | Juventus | Portugal | 2 | Neymar Jr | 26 | Paris Saint-Germain | Brazil | 3 | D. De Gea | 27 | Manchester United | Spain | 4 | K. De Bruyne | 27 | Manchester City | Belgium | 5 | E. Hazard | 27 | Chelsea | Belgium | 6 | L. Modrić | 32 | Real Madrid | Croatia | 7 | L. Suárez | 31 | FC Barcelona | Uruguay | 8 | Sergio Ramos | 33 | Real Madrid | Spain | 9 | J. Obliak | 26 | Atlético Madrid | Slovenia | 10 | R. Lewandowski | 29 | FC Bayern München | Poland |
|  | Name              | Age | Club                | Nationality |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| 1  | Cristiano Ronaldo | 33  | Juventus            | Portugal    |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| 2  | Neymar Jr         | 26  | Paris Saint-Germain | Brazil      |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| 3  | D. De Gea         | 27  | Manchester United   | Spain       |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| 4  | K. De Bruyne      | 27  | Manchester City     | Belgium     |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| 5  | E. Hazard         | 27  | Chelsea             | Belgium     |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| 6  | L. Modrić         | 32  | Real Madrid         | Croatia     |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| 7  | L. Suárez         | 31  | FC Barcelona        | Uruguay     |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| 8  | Sergio Ramos      | 33  | Real Madrid         | Spain       |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| 9  | J. Obliak         | 26  | Atlético Madrid     | Slovenia    |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| 10   | R. Lewandowski    | 29  | FC Bayern München   | Poland      |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |
| Top 10 left-footed players   | ▼                 |     |                     |             |      |             |   |                   |    |          |          |   |           |    |                     |        |   |           |    |                   |       |   |              |    |                 |         |   |           |    |         |         |   |           |    |             |         |   |           |    |              |         |   |              |    |             |       |   |           |    |                 |          |    |                |    |                   |        |

The Table above displays the Top 10 Right-footed Players

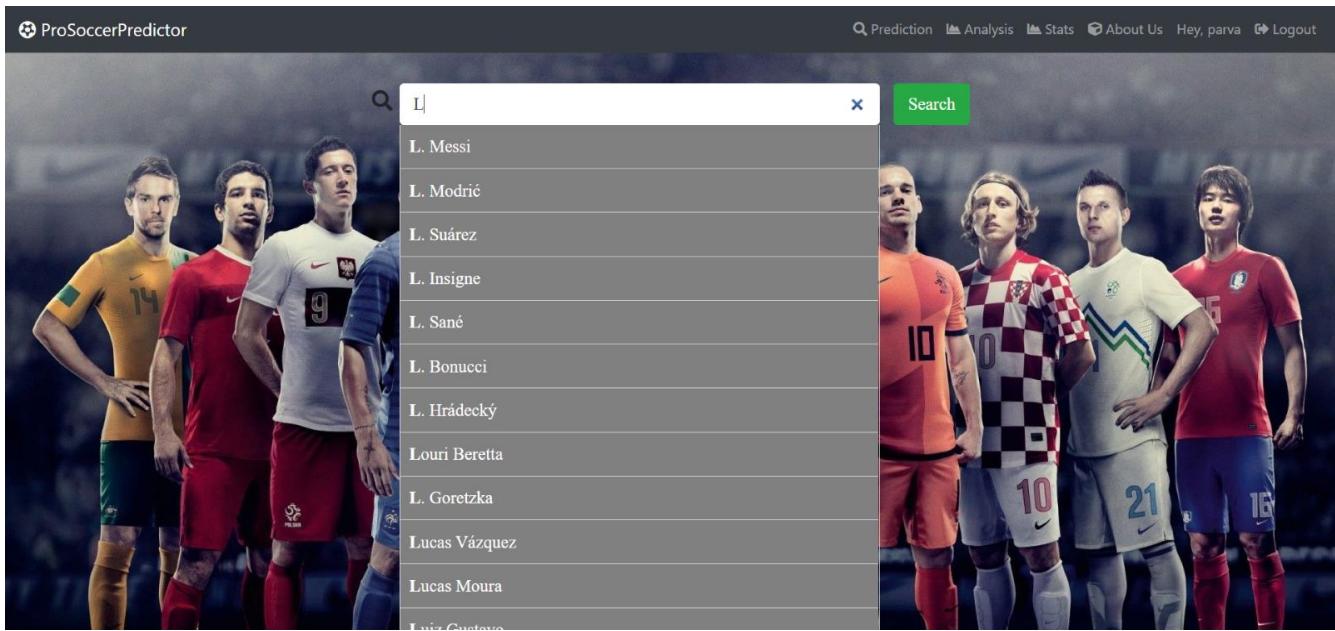
| Analysis based on potential scores of the players  | ▼            |     |                   |             |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
|--|--------------|-----|-------------------|-------------|------|-------------|---|----------|----|--------------|-----------|----|----------|----|-----------------|-------|----|-----------|----|----------|-----------|----|--------------|----|-----------------|--------|----|-------------|----|-------------|---------|----|--------------|----|----------|-------|----|----------|----|-----------|-------|----|--------------|----|-------------------|----------|----|------------|----|-------------|--------|----|---------|----|-------------|-------|
| Analysing ball control and dribbling attributes of left-footed and right-footed footballers  | ▼            |     |                   |             |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| Analysing players on the basis of Height   | ▼            |     |                   |             |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| Best players according to their respective positions   | ▼            |     |                   |             |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| Analysis based on overall scores of the players  | ▼            |     |                   |             |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| Analysing players on the basis of Age  | ▼            |     |                   |             |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| <a href="#">Top 10 right-footed players</a>  | ^            |     |                   |             |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| <a href="#">Top 10 left-footed players</a>   | ^            |     |                   |             |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| <table border="1"> <thead> <tr><th></th><th>Name</th><th>Age</th><th>Club</th><th>Nationality</th></tr> </thead> <tbody> <tr><td>0</td><td>L. Messi</td><td>31</td><td>FC Barcelona</td><td>Argentina</td></tr> <tr><td>13</td><td>D. Silva</td><td>32</td><td>Manchester City</td><td>Spain</td></tr> <tr><td>15</td><td>P. Dybala</td><td>24</td><td>Juventus</td><td>Argentina</td></tr> <tr><td>17</td><td>A. Griezmann</td><td>27</td><td>Atlético Madrid</td><td>France</td></tr> <tr><td>19</td><td>T. Courtois</td><td>26</td><td>Real Madrid</td><td>Belgium</td></tr> <tr><td>24</td><td>G. Chiellini</td><td>33</td><td>Juventus</td><td>Italy</td></tr> <tr><td>26</td><td>M. Salah</td><td>26</td><td>Liverpool</td><td>Egypt</td></tr> <tr><td>28</td><td>J. Rodriguez</td><td>26</td><td>FC Bayern München</td><td>Colombia</td></tr> <tr><td>36</td><td>M. Marcelo</td><td>30</td><td>Real Madrid</td><td>Brazil</td></tr> <tr><td>36</td><td>G. Bale</td><td>28</td><td>Real Madrid</td><td>Wales</td></tr> </tbody> </table> |              |     | Name              | Age         | Club | Nationality | 0 | L. Messi | 31 | FC Barcelona | Argentina | 13 | D. Silva | 32 | Manchester City | Spain | 15 | P. Dybala | 24 | Juventus | Argentina | 17 | A. Griezmann | 27 | Atlético Madrid | France | 19 | T. Courtois | 26 | Real Madrid | Belgium | 24 | G. Chiellini | 33 | Juventus | Italy | 26 | M. Salah | 26 | Liverpool | Egypt | 28 | J. Rodriguez | 26 | FC Bayern München | Colombia | 36 | M. Marcelo | 30 | Real Madrid | Brazil | 36 | G. Bale | 28 | Real Madrid | Wales |
|  | Name         | Age | Club              | Nationality |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| 0  | L. Messi     | 31  | FC Barcelona      | Argentina   |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| 13   | D. Silva     | 32  | Manchester City   | Spain       |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| 15   | P. Dybala    | 24  | Juventus          | Argentina   |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| 17   | A. Griezmann | 27  | Atlético Madrid   | France      |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| 19   | T. Courtois  | 26  | Real Madrid       | Belgium     |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| 24   | G. Chiellini | 33  | Juventus          | Italy       |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| 26   | M. Salah     | 26  | Liverpool         | Egypt       |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| 28   | J. Rodriguez | 26  | FC Bayern München | Colombia    |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| 36   | M. Marcelo   | 30  | Real Madrid       | Brazil      |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |
| 36   | G. Bale      | 28  | Real Madrid       | Wales       |      |             |   |          |    |              |           |    |          |    |                 |       |    |           |    |          |           |    |              |    |                 |        |    |             |    |             |         |    |              |    |          |       |    |          |    |           |       |    |              |    |                   |          |    |            |    |             |        |    |         |    |             |       |

The Table above displays the Top 10 Left-footed Players

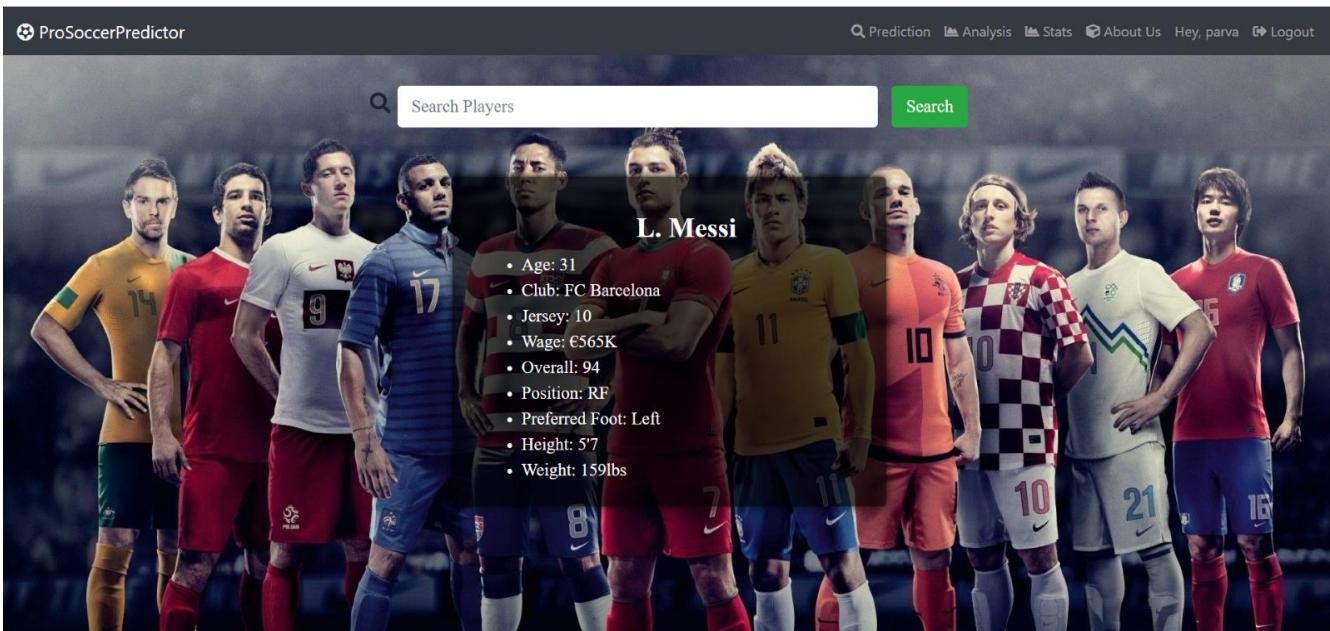
## Player Statistics



User can obtain the statistics of any given player in the dataset which has the data of almost 18000 players around the world. User must input the player's name for which he wants to obtain the statistics. Autocomplete feature has been implemented while accepting the player's name.



The statistics of the player's name searched will be displayed. Statistics such as age, club, wage, position, jersey number, height, weight are shown for the respective player.



The statistics of the player are displayed.

## Player Statistics Dataset

|    | A  | B                   | C   | D                     | E           | F           | G       | H         | I           | J           | K       | L     | M       | N         | O | P           | Q    | R          | S          | T    | U    | V    | W    |      |      |      |          |        |     |        |
|----|----|---------------------|-----|-----------------------|-------------|-------------|---------|-----------|-------------|-------------|---------|-------|---------|-----------|---|-------------|------|------------|------------|------|------|------|------|------|------|------|----------|--------|-----|--------|
| 1  | ID | Name                | Age | Photo                 | Nationality | Flag        | Overall | Potential | Club        | Club Logo   | Value   | Wage  | Special | Preferred | I | Internation | Weak | Foot       | Skill      | Move | Work | Rate | Body | Type | Real | Face | Position | Jersey | Nur | Joined |
| 2  | 0  | 158023 L. Messi     | 31  | https://cdi.Argentina | https://cdi | Argentina   | 94      | 94        | FC Barcelc  | https://cdi | €110.5M | €565K | 2202    | Left      | 5 | 4           | 4    | Medium/ I  | Messi      | Yes  | RF   | 10   |      |      |      |      |          |        |     |        |
| 3  | 1  | 20801 Cristiano F   | 33  | https://cdi           | Portugal    | https://cdi | 94      | 94        | Juventus    | https://cdi | €77M    | €405K | 2228    | Right     | 5 | 4           | 5    | High/ Low  | C. Ronaldc | Yes  | ST   | 7    |      |      |      |      |          |        |     |        |
| 4  | 2  | 190871 Neymar Jr    | 26  | https://cdi           | Brazil      | https://cdi | 92      | 93        | Paris Saint | https://cdi | €118.5M | €290K | 2143    | Right     | 5 | 5           | 5    | High/ Med  | Neymar     | Yes  | LW   | 10   |      |      |      |      |          |        |     |        |
| 5  | 3  | 193080 De Gea       | 27  | https://cdi           | Spain       | https://cdi | 91      | 93        | Manchest    | https://cdi | €72M    | €260K | 1471    | Right     | 4 | 3           | 1    | Medium/ I  | Lean       | Yes  | GK   | 1    |      |      |      |      |          |        |     |        |
| 6  | 4  | 192985 K. De Bruy   | 27  | https://cdi           | Belgium     | https://cdi | 91      | 92        | Manchest    | https://cdi | €102M   | €355K | 2281    | Right     | 4 | 5           | 4    | High/ High | Normal     | Yes  | RCM  | 7    |      |      |      |      |          |        |     |        |
| 7  | 5  | 183277 E. Hazard    | 27  | https://cdi           | Belgium     | https://cdi | 91      | 91        | Chelsea     | https://cdi | €93M    | €340K | 2142    | Right     | 4 | 4           | 4    | High/ Med  | Normal     | Yes  | LF   | 10   |      |      |      |      |          |        |     |        |
| 8  | 6  | 177003 L. Modric    | 32  | https://cdi           | Croatia     | https://cdi | 91      | 91        | Real Madr   | https://cdi | €67M    | €420K | 2280    | Right     | 4 | 4           | 4    | High/ High | Lean       | Yes  | RCM  | 10   |      |      |      |      |          |        |     |        |
| 9  | 7  | 176580 L. Suárez    | 31  | https://cdi           | Uruguay     | https://cdi | 91      | 91        | FC Barcelo  | https://cdi | €80M    | €455K | 2346    | Right     | 5 | 4           | 3    | High/ Med  | Normal     | Yes  | RS   | 9    |      |      |      |      |          |        |     |        |
| 10 | 8  | 155862 Sergio Ran   | 32  | https://cdi           | Spain       | https://cdi | 91      | 91        | Real Madr   | https://cdi | €51M    | €380K | 2201    | Right     | 4 | 3           | 3    | High/ Med  | Normal     | Yes  | RCB  | 15   |      |      |      |      |          |        |     |        |
| 11 | 9  | 200389 J. Obak      | 25  | https://cdi           | Slovenia    | https://cdi | 90      | 90        | Atlético M  | https://cdi | €68M    | €94K  | 1331    | Right     | 3 | 3           | 1    | Medium/ I  | Normal     | Yes  | GK   | 1    |      |      |      |      |          |        |     |        |
| 12 | 10 | 188545 R. Lewand    | 29  | https://cdi           | Poland      | https://cdi | 90      | 90        | FC Bayern   | https://cdi | €77M    | €205K | 2152    | Right     | 4 | 4           | 4    | High/ Med  | Normal     | Yes  | ST   | 9    |      |      |      |      |          |        |     |        |
| 13 | 11 | 182521 T. Kroos     | 28  | https://cdi           | Germany     | https://cdi | 90      | 90        | Real Madr   | https://cdi | €76.5M  | €355K | 2190    | Right     | 4 | 5           | 3    | Medium/ I  | Normal     | Yes  | LCM  | 8    |      |      |      |      |          |        |     |        |
| 14 | 12 | 182493 D. Godin     | 32  | https://cdi           | Uruguay     | https://cdi | 90      | 90        | Atlético M  | https://cdi | €44M    | €125K | 1946    | Right     | 3 | 3           | 2    | Medium/ I  | Lean       | Yes  | CB   | 10   |      |      |      |      |          |        |     |        |
| 15 | 13 | 168542 David Silva  | 32  | https://cdi           | Spain       | https://cdi | 90      | 90        | Manchest    | https://cdi | €60M    | €285K | 2115    | Left      | 4 | 2           | 4    | High/ Med  | Normal     | Yes  | LCM  | 21   |      |      |      |      |          |        |     |        |
| 16 | 14 | 215914 N. Kanté     | 27  | https://cdi           | France      | https://cdi | 89      | 90        | Chelsea     | https://cdi | €63M    | €225K | 2189    | Right     | 3 | 3           | 2    | Medium/ I  | Lean       | Yes  | LDM  | 13   |      |      |      |      |          |        |     |        |
| 17 | 15 | 211110 P. Dybala    | 24  | https://cdi           | Argentina   | https://cdi | 89      | 94        | Juventus    | https://cdi | €89M    | €205K | 2092    | Left      | 3 | 3           | 4    | High/ Med  | Normal     | Yes  | LF   | 21   |      |      |      |      |          |        |     |        |
| 18 | 16 | 202126 H. Kane      | 24  | https://cdi           | England     | https://cdi | 89      | 91        | Tottenham   | https://cdi | €83.5M  | €205K | 2165    | Right     | 3 | 4           | 3    | High/ High | Normal     | Yes  | ST   | 9    |      |      |      |      |          |        |     |        |
| 19 | 17 | 194765 A. Griezma   | 27  | https://cdi           | France      | https://cdi | 89      | 90        | Real Madr   | https://cdi | €78M    | €145K | 2246    | Left      | 4 | 3           | 4    | High/ High | Lean       | Yes  | CAM  | 7    |      |      |      |      |          |        |     |        |
| 20 | 18 | 192448 M. ter Steg  | 26  | https://cdi           | Germany     | https://cdi | 89      | 92        | FC Barcelo  | https://cdi | €58M    | €240K | 1328    | Right     | 3 | 4           | 1    | Medium/ I  | Normal     | Yes  | GK   | 22   |      |      |      |      |          |        |     |        |
| 21 | 19 | 192119 T. Courtois  | 26  | https://cdi           | Belgium     | https://cdi | 89      | 90        | Real Madr   | https://cdi | €53.5M  | €240K | 1311    | Left      | 4 | 2           | 1    | Medium/ I  | Courtois   | Yes  | GK   | 1    |      |      |      |      |          |        |     |        |
| 22 | 20 | 189511 Sergio Bus   | 29  | https://cdi           | Spain       | https://cdi | 89      | 89        | FC Barcelo  | https://cdi | €51.5M  | €315K | 2065    | Right     | 4 | 3           | 3    | Medium/ I  | Lean       | Yes  | CDM  | 5    |      |      |      |      |          |        |     |        |
| 23 | 21 | 179813 E. Covani    | 31  | https://cdi           | Uruguay     | https://cdi | 89      | 89        | Paris Saint | https://cdi | €60M    | €200K | 2161    | Right     | 4 | 4           | 3    | High/ High | Lean       | Yes  | LS   | 21   |      |      |      |      |          |        |     |        |
| 24 | 22 | 167495 M. Neuer     | 32  | https://cdi           | Germany     | https://cdi | 89      | 89        | FC Bayern   | https://cdi | €38M    | €130K | 1473    | Right     | 5 | 4           | 1    | Medium/ I  | Normal     | Yes  | GK   | 1    |      |      |      |      |          |        |     |        |
| 25 | 23 | 153079 S. Agüero    | 30  | https://cdi           | Argentina   | https://cdi | 89      | 89        | Manchest    | https://cdi | €64.5M  | €300K | 2107    | Right     | 4 | 4           | 4    | High/ Med  | Stocky     | Yes  | ST   | 10   |      |      |      |      |          |        |     |        |
| 26 | 24 | 138896 G. Chiellini | 33  | https://cdi           | Italy       | https://cdi | 89      | 89        | Juventus    | https://cdi | €27M    | €215K | 1841    | Left      | 4 | 3           | 2    | Medium/ I  | Normal     | Yes  | LCB  | 3    |      |      |      |      |          |        |     |        |
| 27 | 25 | 231747 K. Mbappé    | 19  | https://cdi           | France      | https://cdi | 88      | 95        | Paris Saint | https://cdi | €81M    | €100K | 2118    | Right     | 3 | 4           | 5    | High/ Med  | Lean       | Yes  | RM   | 10   |      |      |      |      |          |        |     |        |

## Match Outcome Prediction Dataset

|    | A        | B         | C           | D    | E    | F   | G    | H    | I    | J    | K        | L          | M   | N   | O   | P   | Q   | R   | S   | T   | U   | V   | W |
|----|----------|-----------|-------------|------|------|-----|------|------|------|------|----------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1  | Date     | HomeTeam  | AwayTeam    | FTHG | FTAG | FTR | HTGS | ATGS | HTGC | ATGC | HTP      | ATP        | HM1 | HM2 | HM3 | HM4 | HM5 | AM1 | AM2 | AM3 | AM4 | AM5 |   |
| 2  | 0 #####  | Charlton  | Man City    | 4    | 0 H  |     | 0    | 0    | 0    | 0    | 0        | 0          | 0 M | M   | M   | M   | M   | M   | M   | M   | M   | M   | M |
| 3  | 1 #####  | Chester   | West Ham    | 4    | 2 H  |     | 0    | 0    | 0    | 0    | 0        | 0          | 0 M | M   | M   | M   | M   | M   | M   | M   | M   | M   | M |
| 4  | 2 #####  | Coventry  | Middlesb    | 1    | 3 NH |     | 0    | 0    | 0    | 0    | 0        | 0          | 0 M | M   | M   | M   | M   | M   | M   | M   | M   | M   | M |
| 5  | 3 #####  | Derby     | Southamp'   | 2    | 2 NH |     | 0    | 0    | 0    | 0    | 0        | 0          | 0 M | M   | M   | M   | M   | M   | M   | M   | M   | M   | M |
| 6  | 4 #####  | Leeds     | Everton     | 2    | 0 H  |     | 0    | 0    | 0    | 0    | 0        | 0          | 0 M | M   | M   | M   | M   | M   | M   | M   | M   | M   | M |
| 7  | 5 #####  | Leicester | Aston Villa | 0    | 0 NH |     | 0    | 0    | 0    | 0    | 0        | 0          | 0 M | M   | M   | M   | M   | M   | M   | M   | M   | M   | M |
| 8  | 6 #####  | Liverpool | Bradford    | 1    | 0 H  |     | 0    | 0    | 0    | 0    | 0        | 0          | 0 M | M   | M   | M   | M   | M   | M   | M   | M   | M   | M |
| 9  | 7 #####  | Sunderl   | Arsenal     | 1    | 0 H  |     | 0    | 0    | 0    | 0    | 0        | 0          | 0 M | M   | M   | M   | M   | M   | M   | M   | M   | M   | M |
| 10 | 8 #####  | Tottenham | Ipwich      | 3    | 1 H  |     | 0    | 0    | 0    | 0    | 0        | 0          | 0 M | M   | M   | M   | M   | M   | M   | M   | M   | M   | M |
| 11 | 9 #####  | Man Unite | Newcastle   | 2    | 0 H  |     | 0    | 0    | 0    | 0    | 0        | 0          | 0 M | M   | M   | M   | M   | M   | M   | M   | M   | M   | M |
| 12 | 10 ##### | Arsenal   | Liverpool   | 2    | 0 H  |     | 0    | 1    | 1    | 0    | 0        | 1.5 L      | M   | M   | M   | M   | W   | M   | M   | M   | M   | M   | M |
| 13 | 11 ##### | Bradford  | Chelsea     | 2    | 0 H  |     | 0    | 4    | 1    | 2    | 0        | 1.5 L      | M   | M   | M   | M   | W   | M   | M   | M   | M   | M   | M |
| 14 | 12 ##### | ipwich    | Man Unite   | 1    | 1 NH |     | 1    | 2    | 3    | 0    | 0        | 1.5 L      | M   | M   | M   | M   | W   | M   | M   | M   | M   | M   | M |
| 15 | 13 ##### | Middlesbr | Tottenham   | 1    | 1 NH |     | 3    | 3    | 1    | 1    | 1.5      | 1.5 W      | M   | M   | M   | M   | W   | M   | M   | M   | M   | M   | M |
| 16 | 14 ##### | Everton   | Charlton    | 3    | 0 H  |     | 0    | 4    | 2    | 0    | 0        | 1.5 L      | M   | M   | M   | M   | W   | M   | M   | M   | M   | M   | M |
| 17 | 15 ##### | Man City  | Sunderlan   | 4    | 2 H  |     | 0    | 1    | 4    | 0    | 0        | 1.5 L      | M   | M   | M   | M   | W   | M   | M   | M   | M   | M   | M |
| 18 | 16 ##### | Newcastle | Derby       | 3    | 2 H  |     | 0    | 2    | 2    | 2    | 0        | 0.5 L      | M   | M   | M   | M   | D   | M   | M   | M   | M   | M   | M |
| 19 | 17 ##### | Southamp' | Coventry    | 1    | 2 NH |     | 2    | 1    | 2    | 3    | 0.5      | 0 D        | M   | M   | M   | M   | L   | M   | M   | M   | M   | M   | M |
| 20 | 18 ##### | West Ham  | Leicester   | 0    | 1 NH |     | 2    | 0    | 4    | 0    | 0        | 0.5 L      | M   | M   | M   | M   | D   | M   | M   | M   | M   | M   | M |
| 21 | 19 ##### | Arsenal   | Charlton    | 5    | 3 H  |     | 0    | 4    | 1    | 0    | 0        | 1.5 L      | M   | M   | M   | M   | W   | M   | M   | M   | M   | M   | M |
| 22 | 20 ##### | Bradford  | Leicester   | 0    | 0 NH |     | 2    | 1    | 1    | 0    | 1        | 1.333333 W | L   | M   | M   | M   | W   | D   | M   | M   | M   | M   | M |
| 23 | 21 ##### | Everton   | Derby       | 2    | 2 NH |     | 3    | 4    | 2    | 5    | 1        | 0.333333 W | L   | M   | M   | M   | L   | D   | M   | M   | M   | M   | M |
| 24 | 22 ##### | ipwich    | Sunderlan   | 1    | 0 H  |     | 2    | 3    | 4    | 4    | 0.333333 | 1 D        | L   | M   | M   | M   | L   | W   | M   | M   | M   | M   | M |
| 25 | 23 ##### | Man City  | Coventry    | 1    | 2 NH |     | 4    | 3    | 6    | 4    | 1        | 1 W        | L   | M   | M   | M   | W   | L   | M   | M   | M   | M   | M |
| 26 | 24 ##### | Middlesbr | Leeds       | 1    | 2 NH |     | 4    | 4    | 2    | 1    | 1.333333 | 2 D        | W   | M   | M   | M   | W   | W   | M   | M   | M   | M   | M |
| 27 | 25 ##### | Newcastle | Tottenham   | 2    | 0 H  |     | 3    | 4    | 4    | 2    | 1        | 1.333333 W | L   | M   | M   | M   | D   | W   | M   | M   | M   | M   | M |

## CHAPTER 4

### Results and Discussion

Multiple Linear Regression Model gives the maximum efficiency for predicting goals scored by different teams and is used to predict goals for different matches. (Root Mean Square=1.2)

#### Away Team Regression Model

```
from sklearn.metrics import mean_squared_error
mean_squared_error(y_test, y_pred)

1.219298245614035
```

#### Home Goals Regression Model

```
from sklearn.metrics import mean_squared_error
mean_squared_error(y_test, y_pred)

1.1505847953216375
```

Accuracy ratio of Support Vector Model was found to be maximum while testing all prospective models for predicting match outcome; SVM model is used in website to predict match outcome (Accuracy: 52%)

#### SVM Classification Model

```
from sklearn.metrics import confusion_matrix, accuracy_score
cm = confusion_matrix(y_test, y_pred)
accuracy_score(y_test, y_pred)

0.5292397660818714
```

For Player Analysis, matplotlib and seaborn is used to display different graphs on to screen.

# **CHAPTER 5**

## **Conclusions and Learning**

### **5.1 Conclusion**

The field of Machine learning and Artificial Intelligence is evolving at an exponential rate. The hexa and decabytes of data collected today almost by every server is used to train these complex model structures than can technically think like a human brain. These models are used to solve complex mathematical problems that would be practically be impossible for a human to solve. We have successfully implemented two of these models to predict football match outcomes based on previous match data which forms the basis for prediction. Accuracy of our results is convincing when compared with the models out there which predict these types of outcomes. The accuracy can be increased by training the model on larger dataset. Machine Learning Models can be used to predict match outcomes but with a level of uncertainty that comes while prediction because of the anomalies present in the dataset. When sufficiently large dataset is used to train these models can predict outcomes more accurately. In future these models may be used a tool for betting purposes.

## **5.2 Scope for Future Work**

Models can be used for real time environments by increasing the accuracy by training models on a larger dataset to compute complex mathematical calculations. Models could be used further for legal betting on football matches.

Models can be used by team managers to improve the performance of the team by predicting the team formation which will yield maximum results in terms of performance and goals.

Models can be further modified to display various other player analysis which can be used to understand the strength and weaknesses of opposite team.

## **5.3 Learning**

From this project, we learned several technologies such as html, CSS, bootstrap, python, sqlite and Django. Using these technologies, we were able to effectively create a working website of Football Match Prediction, Player Analysis and Stats. We were able to gain an in-depth knowledge about the implementation of each of these languages and technologies and learned about error handling. We were able to think about different test cases considering each and every scenario and successfully implemented those features. By doing this project we not only gained technical skills, but we were also able to improve our soft skills such as planning, communication and teamwork.

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