Python Mini Project

Project:

Premier League 22/23 Season Team Performance Analysis

Abstract:

My Python-driven data analysis project unfolds the intricacies of the Premier League 22/23 Season, meticulously exploring over 20+ pivotal parameters for each team. Utilizing Pandas, Matplotlib, and Seaborn, the analysis transcends mere scores, delving deep into possession stats, goal differentials, and various performance metrics. This comprehensive approach offers a nuanced perspective on team dynamics, providing unique insights into strategic nuances that influenced outcomes.

From champions to challengers, the data-driven methodology captures the essence of each team's journey, illustrating the ebb and flow of their performance. The project serves as a dynamic platform for engaging discussions, inviting enthusiasts to decipher the untold narratives embedded in the numbers. By reshaping the understanding of football dynamics through statistical analysis, we unravel the stories behind the scores, making the beautiful game even more fascinating.

Analysis Functions:

1. Two-Team Comparison Function:

🤝 Unlocking tactical nuances, this function dissects two teams in the Premier League 22/23 Season. From possession to goals, it unveils a detailed head-to-head analysis, revealing the unique dynamics shaping their matchups.

2. All Teams Comparison Function:

🌐 Casting a wide net, this function meticulously compares a specific parameter across all teams in the Premier League. Offering a holistic view of performance trends, it transforms raw data into comprehensive insights, shaping a collective narrative for the season.

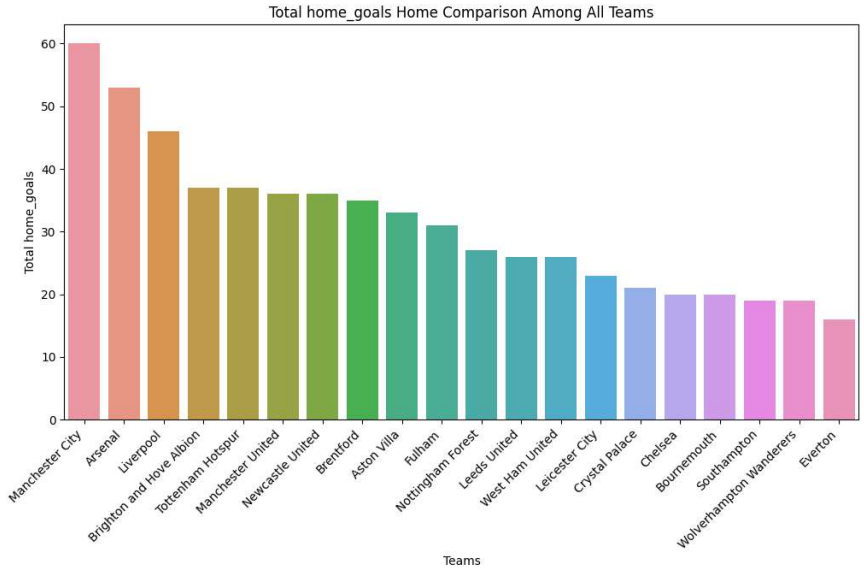
Dataset:
https://drive.google.com/file/d/1S0N_sCroN_4dAFnjjFPTeX4uRlg7Gcmp/view?usp=sharing

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

def read_csv(file_path):
    return pd.read_csv(file_path)

def compare_teams_parameter(data_frame, team1_name, team2_name, parameter, match_type, team_colors):
    if match_type.lower() == 'home':
        team1_parameter = data_frame[data_frame['Home Team'] == team1_name][parameter].sum()
        team2_parameter = data_frame[data_frame['Home Team'] == team2_name][parameter].sum()
    elif match_type.lower() == 'away':
        team1_parameter = data_frame[data_frame['Away Team'] == team1_name][parameter].sum()
        team2_parameter = data_frame[data_frame['Away Team'] == team2_name][parameter].sum()
    else:
        raise ValueError("Invalid match_type. Please use 'home' or 'away'.")

    fig, ax = plt.subplots(figsize=(6, 4))
    team_colors = [team_colors[team1_name], team_colors[team2_name]]
    sns.barplot(x=[team1_name, team2_name], y=[team1_parameter, team2_parameter], palette=team_colors)

    ax.set_title(f'Total {parameter} {match_type.capitalize()} Comparison between {team1_name} and {team2_name}')
    ax.set_xlabel('Teams')
    ax.set_ylabel(f'Total {parameter}')

    plt.show()

    print("\n| {:<25}   {:10} |".format("TOTAL STATS", ""))
    print("| {:<25} | {:10} |".format("========================", "=========="))
    print("| {:<25} | {:10} |".format("TEAM", parameter))
    print("| {:<25} | {:10} |".format("========================", "=========="))
    print("| {:<25} | {:10} |".format(team1_name, format(team1_parameter, ".2f")))
    print("| {:<25} | {:10} |".format(team2_name, format(team2_parameter, ".2f")))
    print("| {:<25} | {:10} |".format("DIFFERENCE", format(abs(team1_parameter - team2_parameter), ".2f")))
    print("| {:<25} | {:10} |".format("========================", "=========="))

    print("\n\n| {:<25}   {:10} |".format("PER MATCH AVERAGE", ""))
    print("| {:<25} | {:10} |".format("========================", "=========="))
    print("| {:<25} | {:10} |".format("TEAM", parameter))
    print("| {:<25} | {:10} |".format("========================", "=========="))
    print("| {:<25} | {:10} |".format(team1_name, format(team1_parameter/38, ".2f")))
    print("| {:<25} | {:10} |".format(team2_name, format(team2_parameter/38, ".2f")))
    print("| {:<25} | {:10} |".format("DIFFERENCE", format(abs((team1_parameter/38) - (team2_parameter/38)), ".2f")))
    print("| {:<25} | {:10} |\n".format("========================", "=========="))

    if(team1_parameter>team2_parameter):
      print(team1_name,"had a greater",parameter,"stat than",team2_name)
    elif(team1_parameter<team2_parameter):
      print(team2_name,"had a greater",parameter,"stat than",team1_name)
    else:
      print(team1_name,"and",team2_name,"had equal",parameter)

def compare_all_teams(data_frame, parameter, match_type):
    teams = data_frame['Home Team'].unique()
    total_parameters = []

    for team_name in teams:
        if match_type.lower() == 'home':
            team_parameter = data_frame[data_frame['Home Team'] == team_name][parameter].sum()
        elif match_type.lower() == 'away':
            team_parameter = data_frame[data_frame['Away Team'] == team_name][parameter].sum()
        else:
            raise ValueError("Invalid match_type. Please use 'home' or 'away'.")

        total_parameters.append((team_name, team_parameter))

    total_parameters.sort(key=lambda x: x[1], reverse=True)

    top_team_name, top_team_parameter = total_parameters[0]

    fig, ax = plt.subplots(figsize=(12, 6))
    sns.barplot(x=[team[0] for team in total_parameters], y=[team[1] for team in total_parameters])

    ax.set_title(f'Total {parameter} {match_type.capitalize()} Comparison Among All Teams')
    ax.set_xlabel('Teams')
    ax.set_ylabel(f'Total {parameter}')

    plt.xticks(rotation=45, ha='right')
    plt.show()

    print(f"\nThe team with the highest total {parameter} is {top_team_name} with a total of {top_team_parameter}.")
```

```
    top_team_parameter_1 = format(top_team_parameter/38, ".2f")
    print(f"\nThe team with the highest per match {parameter} is {top_team_name} with a total of {top_team_parameter_1}.")

def main():
    file_path = 'Premier_League.csv'
    data_frame = read_csv(file_path)

    team_colors = {
      "Arsenal": "red",
      "Aston Villa": "purple",
      "Bournemouth": "brown1",
      "Brentford": "yellow",
      "Brighton and Hove Albion": "cyan",
      "Chelsea": "royalblue",
      "Crystal Palace": "cadetblue2",
      "Everton": "navy",
      "Fulham": "pink",
      "Leeds United": "gray85",
      "Leicester City": "darkblue",
      "Liverpool": "firebrick",
      "Manchester City": "skyblue",
      "Manchester United": "darkred",
      "Newcastle United": "black",
      "Nottingham Forest": "indianred1",
      "Southampton": "thistle",
      "Tottenham Hotspur": "purple",
      "West Ham United": "maroon",
      "Wolverhampton Wanderers": "gold"
    }

    while True:
        print("\n == Premier League 22/23 Team Stats Comparator ==\n")
        print("| {:<25}   {:<25} |".format("TEAMS", ""))
        print("| {:<25} | {:<25} |".format("========================", "========================"))
        print("| {:<25} | {:<25} |".format("Arsenal", "Aston Villa"))
        print("| {:<25} | {:<25} |".format("Bournemouth", "Brentford"))
        print("| {:<25} | {:<25} |".format("Brighton and Hove Albion", "Chelsea"))
        print("| {:<25} | {:<25} |".format("Crystal Palace", "Everton"))
        print("| {:<25} | {:<25} |".format("Fulham", "Leeds United"))
        print("| {:<25} | {:<25} |".format("Leicester City", "Liverpool"))
        print("| {:<25} | {:<25} |".format("Manchester City", "Manchester United"))
        print("| {:<25} | {:<25} |".format("Newcastle United", "Nottingham Forest"))
        print("| {:<25} | {:<25} |".format("Southampton", "Tottenham Hotspur"))
        print("| {:<25} | {:<25} |".format("West Ham United", "Wolverhampton Wanderers"))
        print("| {:<25} | {:<25} |".format("========================", "========================"))
        print("\n1. Compare Two Teams")
        print("2. Compare All Teams")
        print("3. Exit")

        choice = input("\nEnter your choice (1-3): ")

        if choice == '1':
            print("\n{:<20}  {:<20}  {:<20}".format("PARAMETERS AVAILABLE", "", ""))
            print("{:<20} | {:<20} | {:<20}".format("====================", "====================", "===================="))
            print("{:<20} | {:<20} | {:<20}".format("->", "home_goals", "away_goals"))
            print("{:<20} | {:<20} | {:<20}".format("home_red", "away_red", "home_possessions"))
            print("{:<20} | {:<20} | {:<20}".format("away_possessions", "home_shots", "away_shots"))
            print("{:<20} | {:<20} | {:<20}".format("home_on", "away_on", "home_off"))
            print("{:<20} | {:<20} | {:<20}".format("away_off", "home_blocked", "away_blocked"))
            print("{:<20} | {:<20} | {:<20}".format("home_pass", "away_pass", "home_chances"))
            print("{:<20} | {:<20} | {:<20}".format("away_chances", "home_corners", "away_corners"))
            print("{:<20} | {:<20} | {:<20}".format("home_offside", "away_offside", "home_tackles"))
            print("{:<20} | {:<20} | {:<20}".format("away_tackles", "home_duels", "away_duels"))
            print("{:<20} | {:<20} | {:<20}".format("home_saves", "away_saves", "home_fouls"))
            print("{:<20} | {:<20} | {:<20}".format("away_fouls", "home_yellow", "away_yellow"))
            team1_name = input("\nEnter the first team name: ")
            team2_name = input("Enter the second team name: ")
            parameter_to_compare = input("Enter the parameter to compare: ")

            try:
              if 'home' in parameter_to_compare.lower():
                  match_type = 'home'
              elif 'away' in parameter_to_compare.lower():
                  match_type = 'away'
              else:
                  raise ValueError("Invalid parameter. Please include 'home' or 'away' in the parameter name.")

              print("\nGRAPH\n")
              compare_teams_parameter(data_frame, team1_name, team2_name, parameter_to_compare, match_type, team_colors)

            except KeyError:
              print(f"Invalid parameter: {parameter_to_compare}. Please enter a valid parameter.")
            except ValueError as e:
```

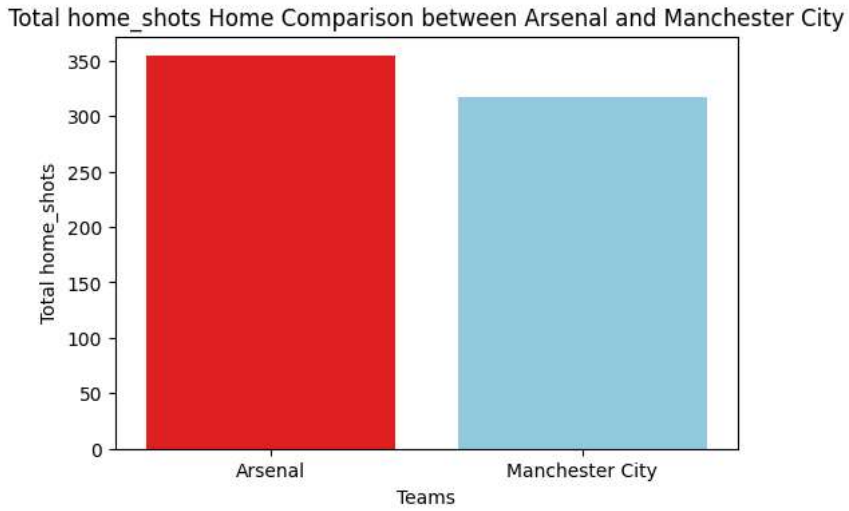
```
            print(f"Error: {e}")

        elif choice == '2':
            print("\n{:<20}  {:<20}  {:<20}".format("PARAMETERS AVAILABLE", "", ""))
            print("{:<20} | {:<20} | {:<20}".format("====================", "====================", "===================="))
            print("{:<20} | {:<20} | {:<20}".format("->", "home_goals", "away_goals"))
            print("{:<20} | {:<20} | {:<20}".format("home_red", "away_red", "home_possessions"))
            print("{:<20} | {:<20} | {:<20}".format("away_possessions", "home_shots", "away_shots"))
            print("{:<20} | {:<20} | {:<20}".format("home_on", "away_on", "home_off"))
            print("{:<20} | {:<20} | {:<20}".format("away_off", "home_blocked", "away_blocked"))
            print("{:<20} | {:<20} | {:<20}".format("home_pass", "away_pass", "home_chances"))
            print("{:<20} | {:<20} | {:<20}".format("away_chances", "home_corners", "away_corners"))
            print("{:<20} | {:<20} | {:<20}".format("home_offside", "away_offside", "home_tackles"))
            print("{:<20} | {:<20} | {:<20}".format("away_tackles", "home_duels", "away_duels"))
            print("{:<20} | {:<20} | {:<20}".format("home_saves", "away_saves", "home_fouls"))
            print("{:<20} | {:<20} | {:<20}".format("away_fouls", "home_yellow", "away_yellow"))
            parameter_to_compare = input("\nEnter the parameter to compare: ")

            try:
              if 'home' in parameter_to_compare.lower():
                  match_type = 'home'
              elif 'away' in parameter_to_compare.lower():
                  match_type = 'away'
              else:
                  raise ValueError("Invalid parameter. Please include 'home' or 'away' in the parameter name.")

              print("\nGRAPH\n")
              compare_all_teams(data_frame, parameter_to_compare, match_type)

            except KeyError:
              print(f"Invalid parameter: {parameter_to_compare}. Please enter a valid parameter.")
            except ValueError as e:
              print(f"Error: {e}")

        elif choice == '3':
            print("Exiting the program. Goodbye!")
            break
        else:
            print("Invalid choice. Please enter a valid number[1-3].")

if __name__ == "__main__":
    main()
```

```
 == Premier League 22/23 Team Stats Comparator ==

| TEAMS                      |                            |
| ========================== | ========================== |
| Arsenal                    | Aston Villa                |
| Bournemouth                | Brentford                  |
| Brighton and Hove Albion   | Chelsea                    |
| Crystal Palace             | Everton                    |
| Fulham                     | Leeds United               |
| Leicester City             | Liverpool                  |
| Manchester City            | Manchester United          |
| Newcastle United           | Nottingham Forest          |
| Southampton                | Tottenham Hotspur          |
| West Ham United            | Wolverhampton Wanderers    |
| ========================== | ========================== |

1. Compare Two Teams
2. Compare All Teams
3. Exit

Enter your choice (1-3): 2

PARAMETERS AVAILABLE
==================== | ==================== | ====================
->                   | home_goals           | away_goals
home_red             | away_red             | home_possessions
away_possessions     | home_shots           | away_shots
home_on              | away_on              | home_off
away_off             | home_blocked         | away_blocked
home_pass            | away_pass            | home_chances
away_chances         | home_corners         | away_corners
home_offside         | away_offside         | home_tackles
away_tackles         | home_duels           | away_duels
home_saves           | away_saves           | home_fouls
away_fouls           | home_yellow          | away_yellow

Enter the parameter to compare: home_goals

GRAPH
```




```
The team with the highest total home_goals is Manchester City with a total of 60.

The team with the highest per match home_goals is Manchester City with a total of 1.9

 == Premier League 22/23 Team Stats Comparator ==

| TEAMS                      |                            |
| ========================== | ========================== |
| Arsenal                    | Aston Villa                |
| Bournemouth                | Brentford                  |
| Brighton and Hove Albion   | Chelsea                    |
| Crystal Palace             | Everton                    |
| Fulham                     | Leeds United               |
| Leicester City             | Liverpool                  |
| Manchester City            | Manchester United          |
| Newcastle United           | Nottingham Forest          |
| Southampton                | Tottenham Hotspur          |
| West Ham United            | Wolverhampton Wanderers    |
| ========================== | ========================== |

1. Compare Two Teams
2. Compare All Teams
3. Exit
```

```
Enter your choice (1-3): 1

PARAMETERS AVAILABLE
==================== | ==================== | ====================
->                   | home_goals           | away_goals
home_red             | away_red             | home_possessions
away_possessions     | home_shots           | away_shots
home_on              | away_on              | home_off
away_off             | home_blocked         | away_blocked
home_pass            | away_pass            | home_chances
away_chances         | home_corners         | away_corners
home_offside         | away_offside         | home_tackles
away_tackles         | home_duels           | away_duels
home_saves           | away_saves           | home_fouls
away_fouls           | home_yellow          | away_yellow

Enter the first team name: Arsenal
Enter the second team name: Manchester City
Enter the parameter to compare: home_shots

GRAPH
```




```
| TOTAL STATS                 |           |
| ========================== | ========= |
| TEAM                       | home_shots |
| ========================== | ========= |
| Arsenal                    | 354.00    |
| Manchester City            | 317.00    |
| DIFFERENCE                 | 37.00     |
| ========================== | ========= |


| PER MATCH AVERAGE           |           |
| ========================== | ========= |
| TEAM                       | home_shots |
| ========================== | ========= |
| Arsenal                    | 9.32      |
| Manchester City            | 8.34      |
| DIFFERENCE                 | 0.97      |
| ========================== | ========= |

Arsenal had a greater home_shots stat than Manchester City

 == Premier League 22/23 Team Stats Comparator ==

| TEAMS                      |                            |
| ========================== | ========================== |
| Arsenal                    | Aston Villa                |
| Bournemouth                | Brentford                  |
| Brighton and Hove Albion   | Chelsea                    |
| Crystal Palace             | Everton                    |
| Fulham                     | Leeds United               |
| Leicester City             | Liverpool                  |
| Manchester City            | Manchester United          |
| Newcastle United           | Nottingham Forest          |
| Southampton                | Tottenham Hotspur          |
| West Ham United            | Wolverhampton Wanderers    |
| ========================== | ========================== |

1. Compare Two Teams
2. Compare All Teams
3. Exit

Enter your choice (1-3): 3
Exiting the program. Goodbye!
```