zerotopandas-course-project

November 14, 2020

1 FIFA19 Players Data Analysis

FIFA19 is the official football game of EA Sports. Queries in the following project are based on the Player Dataset of FIFA19. This Dataset is available in Kaggle which is a hub of datasets. This dataset consists of details of players and their stats in the year 2019. This can be used to determine success ratio, ratings, top players etc.

In this project I have used Numpy, Pandas, Matplotlib and Seaborn. This project is part of the course Data Analysis with Python: Zero to Pandas. It is a mandatory project to mark the success of the course (untill evaulated to PASS).

1.1 Table of Contents

1.1.1 How to run the code

This is an executable *Jupyter notebook* hosted on Jovian.ml, a platform for sharing data science projects. You can run and experiment with the code in a couple of ways: *using free online resources* (recommended) or *on your own computer*.

Option 1: Running using free online resources (1-click, recommended) The easiest way to start executing this notebook is to click the "Run" button at the top of this page, and select "Run on Binder". This will run the notebook on mybinder.org, a free online service for running Jupyter notebooks. You can also select "Run on Colab" or "Run on Kaggle".

Option 2: Running on your computer locally

1. Install Conda by following these instructions. Add Conda binaries to your system `PATH`, so you can use the `conda` command on your terminal.
2. Create a Conda environment and install the required libraries by running these commands on the terminal:

```
conda create -n zerotopandas -y python=3.8
conda activate zerotopandas
pip install jovian jupyter numpy pandas matplotlib seaborn opendatasets --upgrade
```

3. Press the "Clone" button above to copy the command for downloading the notebook, and run it on the terminal. This will create a new directory and download the notebook. The command will look something like this:

```
jovian clone notebook-owner/notebook-id
```

4. Enter the newly created directory using `cd directory-name` and start the Jupyter notebook.

```
jupyter notebook
```

You can now access Jupyter's web interface by clicking the link that shows up on the terminal or by visiting http://localhost:8888 on your browser. Click on the notebook file (it has a `.ipynb` extension) to open it.

1.2 1. Downloading the Dataset

Datasets can be downloaded withing Jupyter using the opendatasets Python Library.

[1]:
```
!pip install jovian opendatasets --upgrade --quiet
```

Let's begin by downloading the data, and listing the files within the dataset.

[2]:
```
dataset_url = 'https://www.kaggle.com/karangadiya/fifa19'
```

[3]:
```
import opendatasets as od
od.download(dataset_url)
```

```
Please provide your Kaggle credentials to download this dataset. Learn more:
http://bit.ly/kaggle-creds
Your Kaggle username: gauravbisht005
Your Kaggle Key: ·····
```

```
100%|      | 2.18M/2.18M [00:00<00:00, 103MB/s]
```

```
Downloading fifa19.zip to ./fifa19
```

The dataset has been downloaded and extracted.

[4]:
```
data_dir = './fifa19'
```

[5]:
```
import os
os.listdir(data_dir)
```

[5]:
```
['data.csv']
```

Let us save and upload our work to Jovian before continuing.

[6]:
```
project_name = "FIFA19-Player-Data-Analysis"
```

[7]:
```
!pip install jovian --upgrade -q
```

[8]:
```
import jovian
```

[9]:
```
jovian.commit(project=project_name)
```

```
<IPython.core.display.Javascript object>
```

```
[jovian] Attempting to save notebook..
[jovian] Please enter your API key ( from https://jovian.ml/ ):
API KEY: ·····
[jovian] Updating notebook "gauravbisht005/fifa19-player-data-analysis" on
https://jovian.ml/
[jovian] Uploading notebook..
[jovian] Capturing environment..
[jovian] Committed successfully! https://jovian.ml/gauravbisht005/fifa19-player-
data-analysis
```

[9]:
```
'https://jovian.ml/gauravbisht005/fifa19-player-data-analysis'
```

1.3 2. Data Preparation and Cleaning

Data Cleaning is the process of finding and correcting inaccurate or incomplete records in dataset by replacing/ modifying/ removing those records so that the dataset is prepared to be operated.

[10]:
```
import pandas as pd
```

[11]:
```
fifa19_df = pd.read_csv(data_dir + "/data.csv")
```

[12]:
```
fifa19_df
```

[12]:

	Unnamed: 0	ID	Name	Age	\
0	0	158023	L. Messi	31	
1	1	20801	Cristiano Ronaldo	33	

```
2              2  190871           Neymar Jr   26
3              3  193080              De Gea   27
4              4  192985        K. De Bruyne   27
…            …    …                   …  …
18202      18202  238813        J. Lundstram   19
18203      18203  243165  N. Christoffersson   19
18204      18204  241638           B. Worman   16
18205      18205  246268      D. Walker-Rice   17
18206      18206  246269           G. Nugent   16

                                                  Photo Nationality  \
0      https://cdn.sofifa.org/players/4/19/158023.png   Argentina
1       https://cdn.sofifa.org/players/4/19/20801.png    Portugal
2      https://cdn.sofifa.org/players/4/19/190871.png      Brazil
3      https://cdn.sofifa.org/players/4/19/193080.png       Spain
4      https://cdn.sofifa.org/players/4/19/192985.png     Belgium
…                                                  …           …
18202  https://cdn.sofifa.org/players/4/19/238813.png     England
18203  https://cdn.sofifa.org/players/4/19/243165.png      Sweden
18204  https://cdn.sofifa.org/players/4/19/241638.png     England
18205  https://cdn.sofifa.org/players/4/19/246268.png     England
18206  https://cdn.sofifa.org/players/4/19/246269.png     England

                                    Flag  Overall  Potential  \
0      https://cdn.sofifa.org/flags/52.png       94         94
1      https://cdn.sofifa.org/flags/38.png       94         94
2      https://cdn.sofifa.org/flags/54.png       92         93
3      https://cdn.sofifa.org/flags/45.png       91         93
4       https://cdn.sofifa.org/flags/7.png       91         92
…                                       …      …          …
18202  https://cdn.sofifa.org/flags/14.png       47         65
18203  https://cdn.sofifa.org/flags/46.png       47         63
18204  https://cdn.sofifa.org/flags/14.png       47         67
18205  https://cdn.sofifa.org/flags/14.png       47         66
18206  https://cdn.sofifa.org/flags/14.png       46         66

                     Club  … Composure Marking StandingTackle  \
0              FC Barcelona  …      96.0    33.0           28.0
1                  Juventus  …      95.0    28.0           31.0
2       Paris Saint-Germain  …      94.0    27.0           24.0
3         Manchester United  …      68.0    15.0           21.0
4           Manchester City  …      88.0    68.0           58.0
…                     …  …       …     …            …
18202      Crewe Alexandra  …      45.0    40.0           48.0
18203       Trelleborgs FF  …      42.0    22.0           15.0
18204     Cambridge United  …      41.0    32.0           13.0
18205      Tranmere Rovers  …      46.0    20.0           25.0
```

```
18206      Tranmere Rovers  …      43.0    40.0          43.0

       SlidingTackle GKDiving  GKHandling  GKKicking  GKPositioning  \
0               26.0      6.0        11.0       15.0           14.0
1               23.0      7.0        11.0       15.0           14.0
2               33.0      9.0         9.0       15.0           15.0
3               13.0     90.0        85.0       87.0           88.0
4               51.0     15.0        13.0        5.0           10.0
…                …       …          …          …              …
18202           47.0     10.0        13.0        7.0            8.0
18203           19.0     10.0         9.0        9.0            5.0
18204           11.0      6.0         5.0       10.0            6.0
18205           27.0     14.0         6.0       14.0            8.0
18206           50.0     10.0        15.0        9.0           12.0

      GKReflexes Release Clause
0            8.0        €226.5M
1           11.0        €127.1M
2           11.0        €228.1M
3           94.0        €138.6M
4           13.0        €196.4M
…           …           …
18202        9.0          €143K
18203       12.0          €113K
18204       13.0          €165K
18205        9.0          €143K
18206        9.0          €165K

[18207 rows x 89 columns]
```

1.3.1 2.1 Determining the number of attributes in the dataset

[13]:
```
fifa19_df.columns
```

[13]:
```
Index(['Unnamed: 0', 'ID', 'Name', 'Age', 'Photo', 'Nationality', 'Flag',
       'Overall', 'Potential', 'Club', 'Club Logo', 'Value', 'Wage', 'Special',
       'Preferred Foot', 'International Reputation', 'Weak Foot',
       'Skill Moves', 'Work Rate', 'Body Type', 'Real Face', 'Position',
       'Jersey Number', 'Joined', 'Loaned From', 'Contract Valid Until',
       'Height', 'Weight', 'LS', 'ST', 'RS', 'LW', 'LF', 'CF', 'RF', 'RW',
       'LAM', 'CAM', 'RAM', 'LM', 'LCM', 'CM', 'RCM', 'RM', 'LWB', 'LDM',
       'CDM', 'RDM', 'RWB', 'LB', 'LCB', 'CB', 'RCB', 'RB', 'Crossing',
       'Finishing', 'HeadingAccuracy', 'ShortPassing', 'Volleys', 'Dribbling',
       'Curve', 'FKAccuracy', 'LongPassing', 'BallControl', 'Acceleration',
       'SprintSpeed', 'Agility', 'Reactions', 'Balance', 'ShotPower',
       'Jumping', 'Stamina', 'Strength', 'LongShots', 'Aggression',
       'Interceptions', 'Positioning', 'Vision', 'Penalties', 'Composure',
```

```
       'Marking', 'StandingTackle', 'SlidingTackle', 'GKDiving', 'GKHandling',
       'GKKicking', 'GKPositioning', 'GKReflexes', 'Release Clause'],
      dtype='object')
```

1.3.2 2.2 Cleaning the dataset

[14]:
```
missing_data = pd.isna(fifa19_df.columns).sum()
missing_data
```

[14]:
```
0
```

Fortunately, there was no missing data in the dataset!!

[15]:
```
fifa19_df.drop("Unnamed: 0",axis=1, inplace= True)
fifa19_df
```

[15]:

	ID	Name	Age	\
0	158023	L. Messi	31	
1	20801	Cristiano Ronaldo	33	
2	190871	Neymar Jr	26	
3	193080	De Gea	27	
4	192985	K. De Bruyne	27	
…	…	…	…	
18202	238813	J. Lundstram	19	
18203	243165	N. Christoffersson	19	
18204	241638	B. Worman	16	
18205	246268	D. Walker-Rice	17	
18206	246269	G. Nugent	16	

	Photo	Nationality	\
0	https://cdn.sofifa.org/players/4/19/158023.png	Argentina	
1	https://cdn.sofifa.org/players/4/19/20801.png	Portugal	
2	https://cdn.sofifa.org/players/4/19/190871.png	Brazil	
3	https://cdn.sofifa.org/players/4/19/193080.png	Spain	
4	https://cdn.sofifa.org/players/4/19/192985.png	Belgium	
…	…	…	
18202	https://cdn.sofifa.org/players/4/19/238813.png	England	
18203	https://cdn.sofifa.org/players/4/19/243165.png	Sweden	
18204	https://cdn.sofifa.org/players/4/19/241638.png	England	
18205	https://cdn.sofifa.org/players/4/19/246268.png	England	
18206	https://cdn.sofifa.org/players/4/19/246269.png	England	

	Flag	Overall	Potential	\
0	https://cdn.sofifa.org/flags/52.png	94	94	
1	https://cdn.sofifa.org/flags/38.png	94	94	
2	https://cdn.sofifa.org/flags/54.png	92	93	
3	https://cdn.sofifa.org/flags/45.png	91	93	

```
4       https://cdn.sofifa.org/flags/7.png       91         92
…                                      …      …        …
18202  https://cdn.sofifa.org/flags/14.png       47         65
18203  https://cdn.sofifa.org/flags/46.png       47         63
18204  https://cdn.sofifa.org/flags/14.png       47         67
18205  https://cdn.sofifa.org/flags/14.png       47         66
18206  https://cdn.sofifa.org/flags/14.png       46         66

                     Club                                        Club Logo  \
0              FC Barcelona    https://cdn.sofifa.org/teams/2/light/241.png
1                  Juventus     https://cdn.sofifa.org/teams/2/light/45.png
2       Paris Saint-Germain     https://cdn.sofifa.org/teams/2/light/73.png
3         Manchester United     https://cdn.sofifa.org/teams/2/light/11.png
4           Manchester City     https://cdn.sofifa.org/teams/2/light/10.png
…                       …                                             …
18202       Crewe Alexandra    https://cdn.sofifa.org/teams/2/light/121.png
18203        Trelleborgs FF    https://cdn.sofifa.org/teams/2/light/703.png
18204      Cambridge United   https://cdn.sofifa.org/teams/2/light/1944.png
18205       Tranmere Rovers  https://cdn.sofifa.org/teams/2/light/15048.png
18206       Tranmere Rovers  https://cdn.sofifa.org/teams/2/light/15048.png

       … Composure Marking  StandingTackle SlidingTackle  GKDiving  \
0      …       96.0    33.0            28.0          26.0       6.0
1      …       95.0    28.0            31.0          23.0       7.0
2      …       94.0    27.0            24.0          33.0       9.0
3      …       68.0    15.0            21.0          13.0      90.0
4      …       88.0    68.0            58.0          51.0      15.0
…    …         …       …               …             …          …
18202  …       45.0    40.0            48.0          47.0      10.0
18203  …       42.0    22.0            15.0          19.0      10.0
18204  …       41.0    32.0            13.0          11.0       6.0
18205  …       46.0    20.0            25.0          27.0      14.0
18206  …       43.0    40.0            43.0          50.0      10.0

       GKHandling  GKKicking GKPositioning GKReflexes Release Clause
0            11.0       15.0          14.0        8.0        €226.5M
1            11.0       15.0          14.0       11.0        €127.1M
2             9.0       15.0          15.0       11.0        €228.1M
3            85.0       87.0          88.0       94.0        €138.6M
4            13.0        5.0          10.0       13.0        €196.4M
…             …          …             …          …           …
18202        13.0        7.0           8.0        9.0          €143K
18203         9.0        9.0           5.0       12.0          €113K
18204         5.0       10.0           6.0       13.0          €165K
18205         6.0       14.0           8.0        9.0          €143K
18206        15.0        9.0          12.0        9.0          €165K
```

```
[18207 rows x 88 columns]
```

There was no missing data in the dataset but an unnecessary attribute which has been removed above.

[16]:
```
import jovian
```

[17]:
```
jovian.commit()
```

```
<IPython.core.display.Javascript object>
```

```
[jovian] Attempting to save notebook..
[jovian] Updating notebook "gauravbisht005/fifa19-player-data-analysis" on
https://jovian.ml/
[jovian] Uploading notebook..
[jovian] Capturing environment..
[jovian] Committed successfully! https://jovian.ml/gauravbisht005/fifa19-player-
data-analysis
```

[17]:
```
'https://jovian.ml/gauravbisht005/fifa19-player-data-analysis'
```

1.4 3. Exploratory Analysis and Visualization

In the following segment, I have analysed datasets to summarise general main characterstics using visual methods with the help of Python Libraries such as Matplotlib.pyplot and Seaborn.

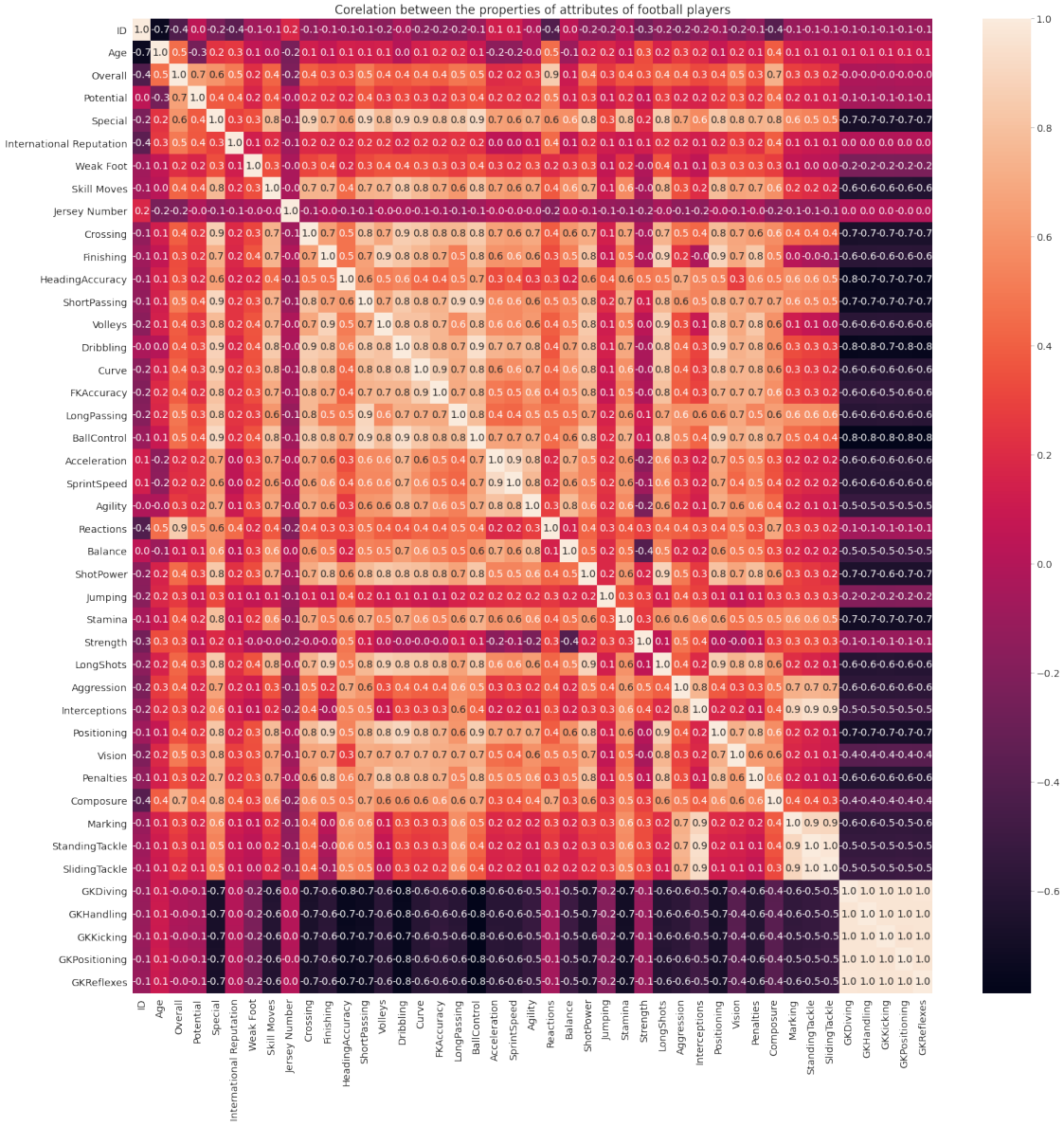
Let's begin by importing`matplotlib.pyplot` and `seaborn`.

[18]:
```
import seaborn as sns
import matplotlib
import matplotlib.pyplot as plt
%matplotlib inline

sns.set_style('darkgrid')
matplotlib.rcParams['font.size'] = 14
matplotlib.rcParams['figure.figsize'] = (9, 5)
matplotlib.rcParams['figure.facecolor'] = '#00000000'
```

1.4.1 3.1 Heatmap representing relation between the properties of attributes of football players

[19]:
```
plt.figure(figsize = (25, 25))
sns.heatmap(fifa19_df.corr(), annot = True, fmt = '.1f')
plt.title("Corelation between the properties of attributes of football players")
plt.show()
```



The above representation is a heat map which represents the relation among the properties of the attributes of football players. From this we can understand that the goalkeepers in the FIFA19 are all closely rated as the GK skills in the heatmap show strong relations as compared to player skills signifying a high variation in the ratings if non-goal keeper players

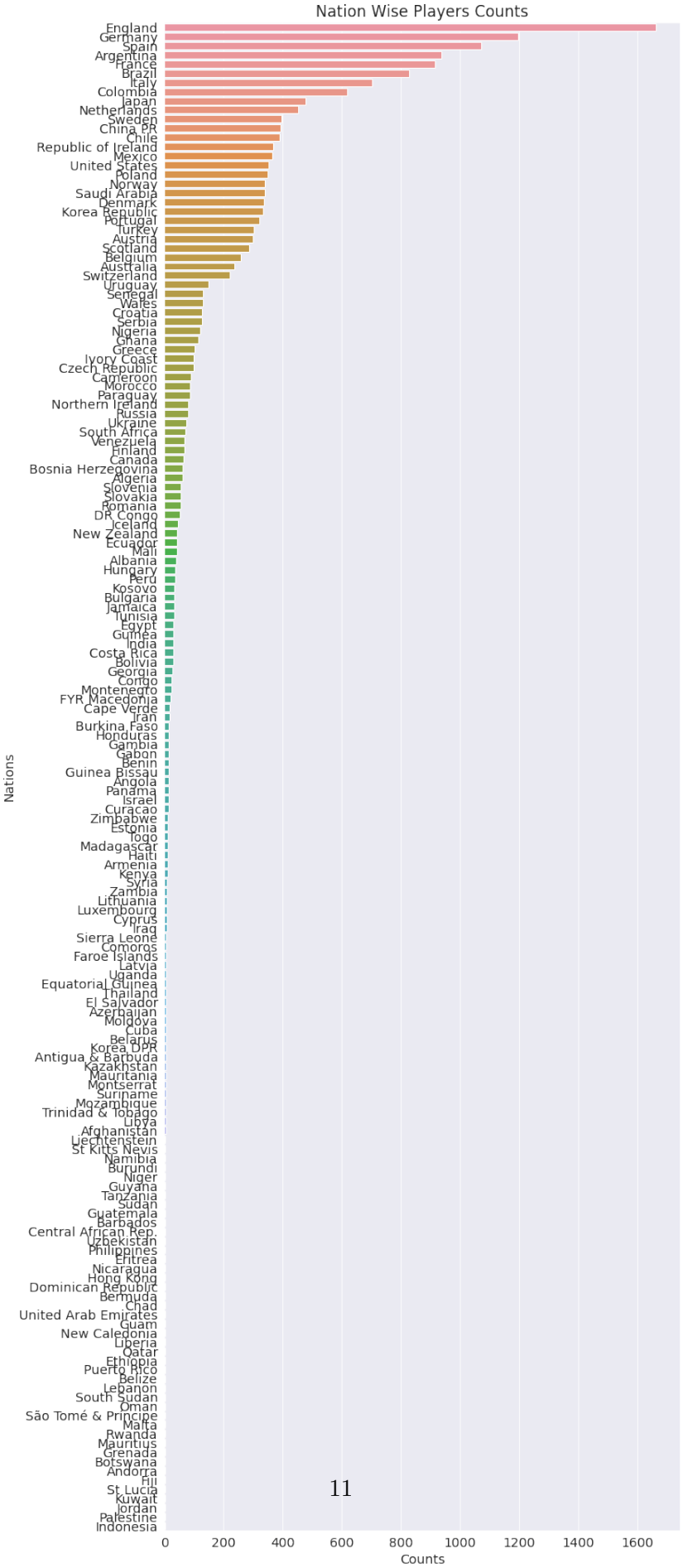
1.4.2 3.2 Nation wise list of players contributing to football

[20]:
```
counts_Nationality = fifa19_df["Nationality"].value_counts()
counts_Nationality = counts_Nationality.reset_index()
counts_Nationality.columns= ["Nations","Counts"]
counts_Nationality
```

[20]:
```
        Nations  Counts
0       England    1662
1       Germany    1198
2         Spain    1072
3     Argentina     937
4        France     914
..          …     …
159   St Lucia        1
160     Kuwait        1
161     Jordan        1
162  Palestine        1
163  Indonesia        1

[164 rows x 2 columns]
```

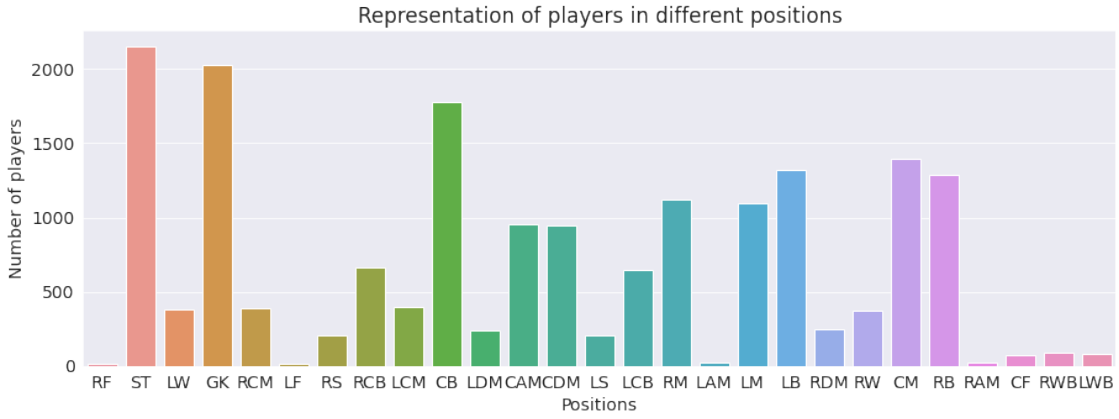
[21]:
```
plt.figure(figsize = (10, 30))
sns.barplot(x = "Counts", y = "Nations", data = counts_Nationality)
plt.title("Nation Wise Players Counts");
plt.show()
```


Nation Wise Players Counts
England
Germany
Spain
Argentina
France
Brazil
Italy
Colombia
Japan
Netherlands
Sweden
China PR
Chile
Republic of Ireland
Mexico
United States
Poland
Norway
Saudi Arabia
Denmark
Korea Republic
Portugal
Turkey
Austria
Scotland
Belgium
Australia
Switzerland
Uruguay
Senegal
Wales
Croatia
Serbia
Nigeria
Ghana
Greece
Ivory Coast
Czech Republic
Cameroon
Morocco
Paraguay
Northern Ireland
Russia
Ukraine
South Africa
Venezuela
Finland
Canada
Bosnia Herzegovina
Algeria
Slovenia
Slovakia
Romania
DR Congo
Iceland
New Zealand
Ecuador
Mali
Albania
Hungary
Peru
Kosovo
Bulgaria
Jamaica
Tunisia
Egypt
Guinea
India
Costa Rica
Bolivia
Georgia
Congo
Montenegro
FYR Macedonia
Cape Verde
Iran
Burkina Faso
Honduras
Gambia
Gabon
Benin
Guinea Bissau
Angola
Panama
Israel
Curacao
Zimbabwe
Estonia
Togo
Madagascar
Haiti
Armenia
Kenya
Syria
Zambia
Lithuania
Luxembourg
Cyprus
Iraq
Sierra Leone
Comoros
Faroe Islands
Latvia
Uganda
Equatorial Guinea
Thailand
El Salvador
Azerbaijan
Moldova
Cuba
Belarus
Korea DPR
Antigua & Barbuda
Kazakhstan
Mauritania
Montserrat
Suriname
Mozambique
Trinidad & Tobago
Libya
Afghanistan
Liechtenstein
St Kitts Nevis
Namibia
Burundi
Niger
Guyana
Tanzania
Sudan
Guatemala
Barbados
Central African Rep.
Uzbekistan
Philippines
Eritrea
Nicaragua
Hong Kong
Dominican Republic
Bermuda
Chad
United Arab Emirates
Guam
New Caledonia
Liberia
Qatar
Ethiopia
Puerto Rico
Belize
Lebanon
South Sudan
Oman
São Tomé & Principe
Malta
Rwanda
Mauritius
Grenada
Botswana
Andorra
Fiji
St Lucia
Kuwait
Jordan
Palestine
Indonesia
Nations
0
200
400
600
800
1000
1200
1400
1600
Counts

The above graph represents that the maximum number of players in FIFA19 are from England.

1.4.3 3.3 Comparison of positions to number of players

[22]:
```
plt.figure(figsize=(15,5))
sns.countplot('Position', data=fifa19_df)
plt.xlabel("Positions")
plt.ylabel("Number of players")
plt.title("Representation of players in different positions")
plt.show()
```



The above bar graph represents the number of players to the number of possible positions.

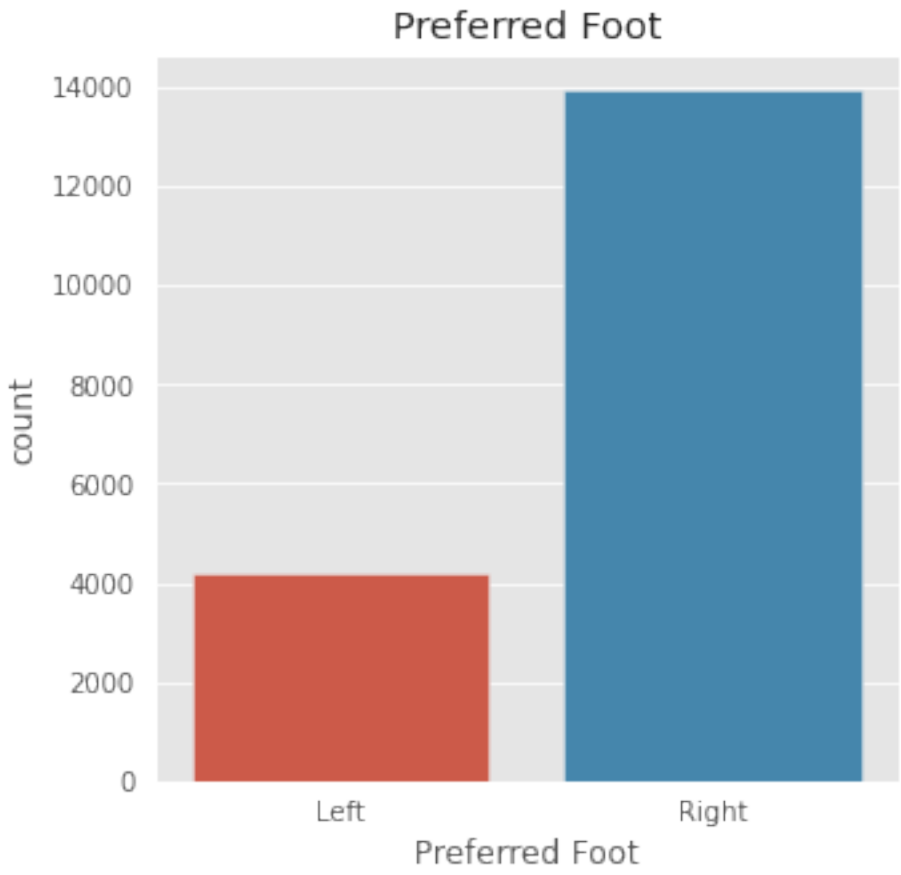
1.4.4 3.4 Preferred foot of players

[23]:
```
preferred_foot = fifa19_df['Preferred Foot'].value_counts().reset_index()
preferred_foot.columns = ['Foot', "Total Players"]
preferred_foot = preferred_foot.set_index('Foot')
preferred_foot
```

[23]:

Foot	Total Players
Right	13948
Left	4211

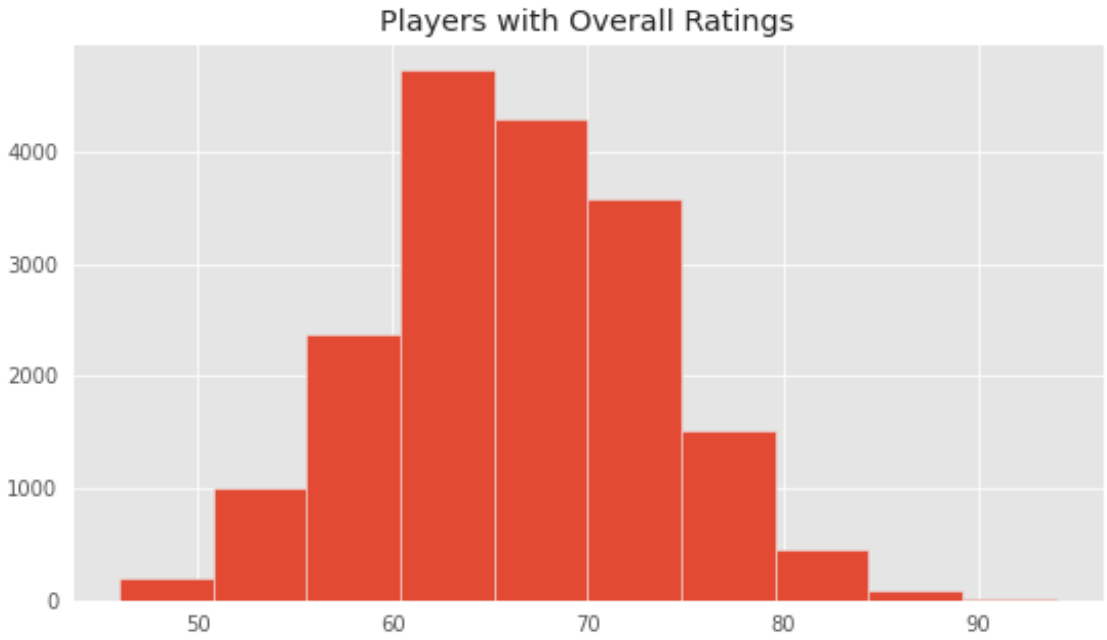
[24]:
```
plt.figure(figsize = (5,5))
plt.style.use('ggplot')
sns.countplot(x=fifa19_df['Preferred Foot'])
plt.title("Preferred Foot")
plt.show()
```



The above bargraph represents the number of players which prefer right foot to the number of players which prefer left foot.

1.4.5 3.5 Player's Overall (Rating) Distribution

[25]:
```
plt.title("Players with Overall Ratings")
plt.hist(fifa19_df.Overall);
```



The above shown graph is a histogram which depicts the number of players having an Overall Rating from 1- 100 in FIFA19.

Let us save and upload our work to Jovian before continuing

[26]:
```
import jovian
```

[27]:
```
jovian.commit()
```

```
<IPython.core.display.Javascript object>
```

```
[jovian] Attempting to save notebook..
[jovian] Updating notebook "gauravbisht005/fifa19-player-data-analysis" on
https://jovian.ml/
[jovian] Uploading notebook..
[jovian] Capturing environment..
[jovian] Committed successfully! https://jovian.ml/gauravbisht005/fifa19-player-
data-analysis
```

[27]:
```
'https://jovian.ml/gauravbisht005/fifa19-player-data-analysis'
```

1.5 4. Asking and Answering Questions

In this segment I have answered some questions inferred from the earlier given data and the information gathered from the dataset.

Q1: What are the different nations that are a part of FIFA?

[28]:
```
Nations = fifa19_df.Nationality.unique()
Nations
```

[28]:
```
array(['Argentina', 'Portugal', 'Brazil', 'Spain', 'Belgium', 'Croatia',
       'Uruguay', 'Slovenia', 'Poland', 'Germany', 'France', 'England',
       'Italy', 'Egypt', 'Colombia', 'Denmark', 'Gabon', 'Wales',
       'Senegal', 'Costa Rica', 'Slovakia', 'Netherlands',
       'Bosnia Herzegovina', 'Morocco', 'Serbia', 'Algeria', 'Austria',
       'Greece', 'Chile', 'Sweden', 'Korea Republic', 'Finland', 'Guinea',
       'Montenegro', 'Armenia', 'Switzerland', 'Norway', 'Czech Republic',
       'Scotland', 'Ghana', 'Central African Rep.', 'DR Congo',
       'Ivory Coast', 'Russia', 'Ukraine', 'Iceland', 'Mexico', 'Jamaica',
       'Albania', 'Venezuela', 'Japan', 'Turkey', 'Ecuador', 'Paraguay',
       'Mali', 'Nigeria', 'Cameroon', 'Dominican Republic', 'Israel',
       'Kenya', 'Hungary', 'Republic of Ireland', 'Romania',
       'United States', 'Cape Verde', 'Australia', 'Peru', 'Togo',
       'Syria', 'Zimbabwe', 'Angola', 'Burkina Faso', 'Iran', 'Estonia',
       'Tunisia', 'Equatorial Guinea', 'New Zealand', 'FYR Macedonia',
       'United Arab Emirates', 'China PR', 'Guinea Bissau', 'Bulgaria',
       'Kosovo', 'South Africa', 'Madagascar', 'Georgia', 'Tanzania',
       'Gambia', 'Cuba', 'Belarus', 'Uzbekistan', 'Benin', 'Congo',
       'Mozambique', 'Honduras', 'Canada', 'Northern Ireland', 'Cyprus',
       'Saudi Arabia', 'Curacao', 'Moldova', 'Bolivia',
       'Trinidad & Tobago', 'Sierra Leone', 'Zambia', 'Chad',
       'Philippines', 'Haiti', 'Comoros', 'Libya', 'Panama',
       'São Tomé & Príncipe', 'Eritrea', 'Oman', 'Iraq', 'Burundi',
       'Fiji', 'New Caledonia', 'Lithuania', 'Luxembourg', 'Korea DPR',
       'Liechtenstein', 'St Kitts Nevis', 'Latvia', 'Suriname', 'Uganda',
       'El Salvador', 'Bermuda', 'Kuwait', 'Antigua & Barbuda',
       'Thailand', 'Mauritius', 'Guatemala', 'Liberia', 'Kazakhstan',
       'Niger', 'Mauritania', 'Montserrat', 'Namibia', 'Azerbaijan',
       'Guam', 'Faroe Islands', 'India', 'Nicaragua', 'Barbados',
       'Lebanon', 'Palestine', 'Guyana', 'Sudan', 'St Lucia', 'Ethiopia',
       'Puerto Rico', 'Grenada', 'Jordan', 'Rwanda', 'Qatar',
       'Afghanistan', 'Hong Kong', 'Andorra', 'Malta', 'Belize',
       'South Sudan', 'Indonesia', 'Botswana'], dtype=object)
```

Q2: What is the highest number of players for a single position?

[29]:
```
position_count = fifa19_df.groupby('Position').count()
position_count = position_count['ID']
position_count
```

[29]:
```
Position
CAM     958
CB     1778
CDM     948
```

```
CF       74
CM     1394
GK     2025
LAM      21
LB     1322
LCB     648
LCM     395
LDM     243
LF       15
LM     1095
LS      207
LW      381
LWB      78
RAM      21
RB     1291
RCB     662
RCM     391
RDM     248
RF       16
RM     1124
RS      203
RW      370
RWB      87
ST     2152
Name: ID, dtype: int64
```

Hence, from the information obtained above, we can come to conclusion that there are 2152 Strikers which is the position with most players in FIFA19.

Q3: What is the dominant foot of players?

[30]:
```
fifa19_df['Preferred Foot'].value_counts()
```

[30]:
```
Right    13948
Left      4211
Name: Preferred Foot, dtype: int64
```

Hence, from the above information, we can state that the preferred foot of most of the players is Right Foot.

Q4: What is the age distribution in FIFA19?

[31]:
```
max_age = fifa19_df.Age.max()
max_age
```

[31]:
```
45
```

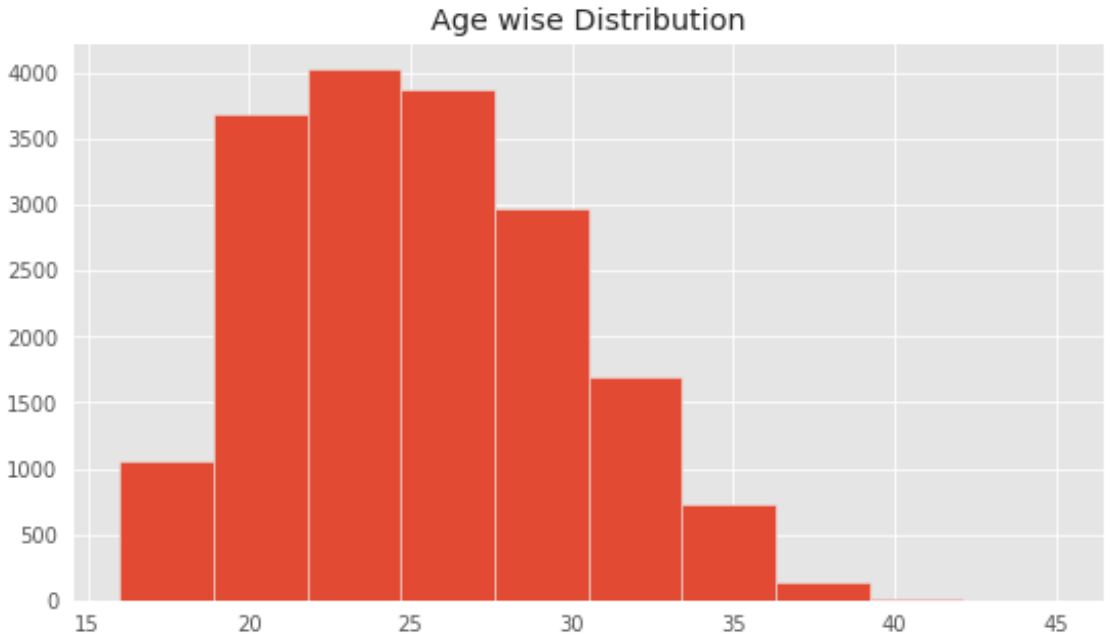
The above query shows that the highes aged player in FIFA19 is 45 years old.

[32]:
```
min_age = fifa19_df.Age.min()
min_age
```

[32]: 16

The above query shows that the youngest player in FIFA19 is just 16 years old.

[33]:
```
plt.title("Age wise Distribution")
plt.hist(fifa19_df.Age);
```



Hence, the maximum number of players are of the age group 23-25. The youngest being 16 years old and the eldest being 45 years old.

Q5: Which club has the highest Overall Rating?

[34]:
```
highest_overall_club = fifa19_df.groupby('Club').Overall.mean().reset_index().
↪sort_values(by='Overall', ascending=False)
highest_overall_club
```

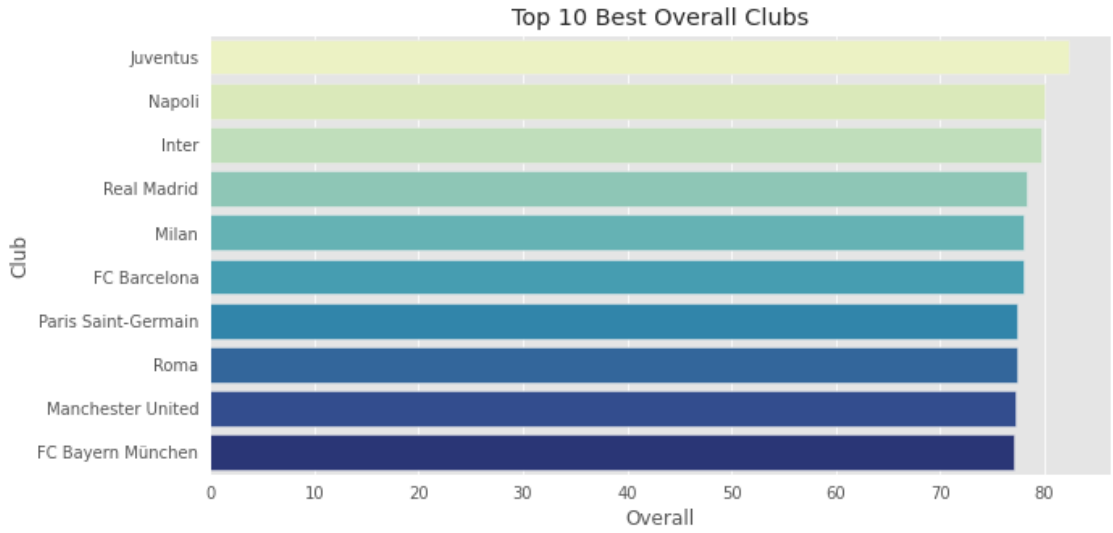
[34]:

	Club	Overall
326	Juventus	82.280000
398	Napoli	80.000000
315	Inter	79.750000
470	Real Madrid	78.242424
382	Milan	78.074074
..	…	…
543	Sligo Rovers	56.631579

```
188      Derry City  55.777778
83      Bohemian FC  55.000000
361     Limerick FC  54.526316
92   Bray Wanderers  53.652174

[651 rows x 2 columns]
```

[35]:
```
top10_clubs = highest_overall_club.head(10)
plt.figure(figsize = (10,5))
sns.barplot(x=top10_clubs.Overall, y=top10_clubs['Club'], palette='YlGnBu')
plt.title("Top 10 Best Overall Clubs");
```



Hence, from the above information, we can say that 'Juventus' as a club has the highest Overall rating in FIFA19.

[36]:
```
import jovian
```

[ ]:
```
jovian.commit()
```

```
<IPython.core.display.Javascript object>

[jovian] Attempting to save notebook..
```

1.6 5. Inferences and Conclusion

From all the cleaning, preparation, analysis and visualisation we can successfully conclude few things such as: - GK in FIFA 19 have a closer mean average rating in contrast to the non-goal keeper players. - 164 countries are a part of this FIFA 19. - England constitues the maximum number of players among any nation. - The game has maximum number of players who are strikers followed with goal keepers and Centre Backs. - More than 3/4th of the players are roght footed or

prefer right foot. - Youngest player in the game is 16 years old and the oldest player is 45 years old. - Juventus is the highest overall rated club/ team in the game with an overall mean rating of 82.

[ ]:
```
import jovian
```

[ ]:
```
jovian.commit()
```