DATA VISUALIZATION FOR ANALYTICS

FIFA 2021 Data Visualization

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Part 1

Introduction to Tableau

Tableau software is one of the leading software tools available for data visualization and exploratory data analysis. In this course, *Tableau will be used as the primary tool* for visualizing one-dimensional data (e.g., temporal data); two-dimensional data (e.g., geospatial data); multidimensional data (e.g., mapping relational data in n-dimensional space); as well as hierarchical tree data. Tableau provides a powerful toolset for identifying patterns and trends in complex datasets as well as creating spectacular visualizations of data from variety of domains (e.g., science, business, engineering, social media, etc.). In addition, Tableau has an intuitive user interface; it is compatible with a multitude of platforms; and easily handles large scale datasets.

While your hands-on work using Tableau will begin in future weeks, your assignment for this week is to download and install Tableau Desktop and begin watching the Tableau training videos to familiarize yourself with the basic features and functionality of Tableau. The Tableau software company provides an extensive suite of tutorial resources that you may find valuable throughout the course. Prior to future weeks assignments, please make sure that you have viewed the training videos listed below.

Instructions for Downloading and Installing Tableau Desktop

Each student should go to the landing page (see link below) to download the most recent version of Tableau Desktop and enter the product key noted below. This key will activate Tableau for the duration of the course. Note: if you already have the latest version of Tableau Desktop loaded on your computer and an active license, there is no need to re-install Tableau Desktop.

1. Download the latest version of Tableau Desktop and Tableau Prep Builder here
2. Click on the link above and select "Download Tableau Desktop" and "Download Tableau Prep Builder". On the form, enter your school email address for Business E-mail and enter the name of your school for Organization.
3. Activate with your product key
4. Already have a copy of Tableau Desktop installed. Update your license in the application: Help menu → Manage Product Keys

Note from Tableau: Students can continue using Tableau after the class is over by individually requesting their own one-year license through the Tableau for Students program here . Tableau has also provided you with access to their 'Tableau Prep' software, which is a powerful tool for data processing and cleaning. Although we will not use Tableau Prep in this course, you are welcome to explore the features and functionality of this powerful software tool on your own. If you choose to do so, the activation key above can also be used to activate Tableau Prep.

View the following Tableau training videos at:

Getting Started section, please watch the following 3 videos (http://www.tableau.com/learn/training#getting-started):

    - Getting Started (25 min)
    - The Tableau Interface (4 min)
    - Distributing and publishing (4 min)

- **Under Connecting to Data, please watch the following video:**
    - Data Prep with Text and Excel Files (5 min)

Part 2

Goal of the project: Leveraging the design principles and techniques that you will be learning in this course, you have to create an interactive, exploratory dashboard that includes at least three well-designed data visualizations as well as filter controls for key variables of interest that will allow the user to explore the data at a deeper level. Note: the three visualizations and filter controls should all be integrated into a SINGLE dashboard design. Storyboards that link a sequence of separate worksheet visualizations using a narrative are not acceptable for this project.

You may use any data set (other than the pre-packaged datasets that come with Tableau) that you find interesting and intriguing to create a dashboard that tells a compelling story. You have complete freedom in choosing the data domain as well as the visualization techniques but make sure you produce a high quality, interactive visualizations for your exploratory dashboard.

This goal can be achieved over the period of 5 weeks (week 2 till week 6).

In order to archive the goal of the course project we will perform the following steps

1. Define a research/business goal.
2. Describe the research/business queries related to the goal.
3. Identify the dataset for the research.
4. Explore the dataset and the visualization techniques.
5. Create an interactive and exploratory dashboard.

In this week you have to complete the following tasks

1. Define your research/business goal.
   - To analyze which nations, produce top players and their strengths with respect to the position, how physical attributes relate to the quality of a player, and the monetary value of the players.
2. Briefly describe the queries (research/business questions) you want to address. Limit the number of queries to a maximum of four.
   - Analyze which club and national team has best rated players
   - Assess the strength of the team at a particular position of a nation and club
   - Ideal players on the team based on the current wages
   - Ideal body type to be best in soccer
3. Briefly discuss the source(s) from which you are planning to collect the data to address your research/business queries.
   - The data set can be taken from Kaggel, it was made by Karan Gadiya.
   - The data can be scraped from https://sofifa.com/
   - The data set can be taken from Kaggel, it was made by Stefano Leone.

Part 3

In this week your goal will be to identify the data set that will help you address your business/research goals. In addition to that you have to briefly discuss about the dataset. The following data repositories can be explored to identify a dataset to address your business/research goals

- Data Science Central
- National Science Fund
- Quora
- Scribble

Please remember this is not an exhaustive list of data repositories.

Once you have identified the dataset you have to complete the following tasks:

- Provide a brief description of the dataset. The description could involve listing the following: the attributes, the data types of the attributes, number of instances, attribute values, missing values, other types of issues in the dataset if any, etc. You can follow the format for the data description provided in the Car Evaluation database (archive.ics.uci.edu/ml/machine-learning-databases/car/car.names)
  1. **Title**: - FIFA 21
  2. **Source**: -
     - **Creator**: - Stefano Leone
     - **Data Scrapped from**: - https://sofifa.com/
     - **Dated**: - 08/10/2020.
  3. **Past Usage**: -
     The data scrapped from sofifa.com has been used throughout the history by many people to analyze the attributes of the players. Below are some of the instances:
     - https://www.kaggle.com/karangadiya/fifa19
     - https://www.kaggle.com/stefanoleone992/fifa-21-complete-player-dataset?select=players_20.csv
     - https://www.kaggle.com/roshansharma/fifa-data-visualization
     - https://www.kaggle.com/ekrembayar/fifa-data-analysis-visualization/

  4. **Relevant information paragraphs**: -

     The FIFA 21 database is obtained from the FIFA 21 game made by EA sports by SOFIFA.com. The model evaluates the players based on the following concept structure: -
     FIFA 21
     - **PHYSICAL ATTRIBUTES**: -
       - **age**: - Age of the player
       - **height**: - Height of the player
       - **weight**: - Weight of the player

- **AFFILIATION**: -
  - **nationality**: - Country the player represents
  - **club_name**: - The club the player plays for
  - **league_name**: - The league the player plays in

- **RANKING AND OVERALL RATINGS**: -
  - **player Ratings**: - Rating given to the player
    - **overall Ratings**: - The current rating of the player based on attributes
    - **potential Ratings**: - The future rating that is predicted based on player growth and his potential
- **PRICE**: -
  - **value_eur**: - Value of the player in regard to the current player market
  - **wage_eur**: - Wage of the player provided by his current team
- **SKILL**: -
  - **player_Position**: - The position the player plays in
  - **preferred foot**: - The foot the player is more comfortable using more often
  - **weak_foot**: - Proficiency of the player in using is weaker foot
  - **skill_moves**: - The ability of the player to perform skilled abilities with the ball
  - **work_rate**: - Work rate of the player
    - **defensive work_rate**: -The amount of defensive work the player carries out
    - **offensive work_rate**: -The amount of offensive work the player carries out
- **RATINGS**: - Player's ratings in skill and position-based categories: -
  - **SKILL BASED RATINGS**: - Ratings based on physical and footballing skills of the player. This includes pace, shooting, passing, dribbling, defending, physicality, goal keeping(gk) diving, gk_handling, gk_kicking, gk_reflexes, gk_speed, gk_positioning.
  - **POSITION BASED RATINGS**: - Ratings based on the proficiency of the player on that particular position. This includes ls, st, rs, lw, lf, cf, rf, rw, lam, cam, ram, lm, lcm, cm, rcm, rm, lcdm, cdm, rcdm, lwb, lb, lcb, cb, rcb, rb, rwb.

Input attributes are printed in lowercase. The target concept is FIFA 21. It includes concepts such as Physical Attributes, Affiliation, Rankings and Overall Ratings, Price, Skill and Ratings, each with its own sub concepts which will help us to visualize the dataset.

5. **Number of instances**: - 18945

6. **Number of attributes**: - 53
7. **Attribute Values**: -
    - **Age**: - 1-99
    - **Height**: - 155-206
    - **Weight**: - 50-110
    - **Nationality**: - Argentina, Brazil, Germany and more
    - **Club Name**: - Barcelona, Arsenal and more
    - **League Name**: - La liga, Premier league and more
    - **Overall**: - 1-99
    - **Potential**: - 1-99
    - **Value_eur**: - 0- 105500000
    - **Wage_eur:** - 0-560000
    - **Player_position:** - gk, cb, cm, st and more
    - **Preferred_foot:** - left or right
    - **Weak_foot:** - 1-5
    - **Skill_move:** - 1-5
    - **Work_rate:** - Low; Medium; High
    - **Pace:** - 1-99
    - **Shooting:** - 1-99
    - **Passing:** - 1-99
    - **Dribbling:** - 1-99
    - **Defending:** - 1-99
    - **Physical: -** 1-99
    - **Gk_diving: -** 1-99
    - **Gk_handling: -** 1-99
    - **Gk_Kicking: -** 1-99
    - **Gk_Reflex: -** 1-99
    - **Gk_Speed: -** 1-99
    - **Gk_Positioning: -** 1-99
    - **Ls**: - 1-99
    - **St**: - 1-99
    - **Rs**: - 1-99
    - **Lw**: - 1-99
    - **Lf**: - 1-99
    - **Cf**: - 1-99
    - **Rf**: - 1-99
    - **Rw**: - 1-99
    - **Lam**: - 1-99
    - **Cam**: - 1-99
    - **Ram**: - 1-99
    - **Lm**: - 1-99
    - **Lcm**: - 1-99
    - **Cm**: - 1-99
    - **Rcm**: - 1-99
    - **Rm**: - 1-99
    - **Lcdm**: - 1-99

    - **Cdm**: - 1-99
    - **Rcdm**: - 1-99
    - **Lwb**: - 1-99
    - **Lb**: - 1-99
    - **Lcb**: - 1-99
    - **Cb**: - 1-99
    - **Rcb**: - 1-99
    - **Rb**: - 1-99
    - **rwb**: - 1-99
- Describe the types of data and measurement scales (nominal, ordinal, interval, and ratio) across each attribute. For additional details, please view Types of Data and Measurement Scales
    - **Age**: - Discrete
    - **Height**: - Interval
    - **Weight**: - Interval
    - **Nationality**: - Nominal
    - **Club Name**: - Nominal
    - **League Name**: - Nominal
    - **Overall**: - Discrete
    - **Potential**: - Discrete
    - **Value_eur**: - Interval
    - **Wage_eur:** - Interval
    - **Player_position:** - Nominal
    - **Preferred_foot:** - Nominal
    - **Weak_foot:** - Discrete
    - **Skill_move:** - Discrete
    - **Work_rate:** - Ordinal
    - **Pace:** - Discrete
    - **Shooting:** - Discrete
    - **Passing:** - Discrete
    - **Dribbling:** - Discrete
    - **Defending:** - Discrete
    - **Physical: -** Discrete
    - **Gk_diving: -** Discrete
    - **Gk_handling: -** Discrete
    - **Gk_Kicking: -** Discrete
    - **Gk_Reflex: -** Discrete
    - **Gk_Speed: -** Discrete
    - **Gk_Positioning: -** Discrete
    - **Ls**: - Discrete
    - **St**: - Discrete
    - **Rs**: - Discrete
    - **Lw**: - Discrete
    - **Lf**: - Discrete
    - **Cf**: - Discrete
    - **Rf**: - Discrete

- **Rw**: - Discrete
- **Lam**: - Discrete
- **Cam**: - Discrete
- **Ram**: - Discrete
- **Lm**: - Discrete
- **Lcm**: - Discrete
- **Cm**: - Discrete
- **Rcm**: - Discrete
- **Rm**: - Discrete
- **Lcdm**: - Discrete
- **Cdm**: - Discrete
- **Rcdm**: - Discrete
- **Lwb**: - Discrete
- **Lb**: - Discrete
- **Lcb**: - Discrete
- **Cb**: - Discrete
- **Rcb**: - Discrete
- **Rb**: - Discrete
- **rwb**: - Discrete

Part 4

In this week your task will be to provide details about the purpose of the dashboard, who its users will be, what data will drive each visualization in the dashboard, a list of analytic questions and queries that a person should be able to answer using the dashboard visualizations.

Purpose of dashboard

In the world of soccer, there is always a debate about who are the best players, nations, and clubs in the. Soccer being the one of the most popular sport in the world it is no surprise that a large amount of data is generated. In this dashboard our goal is to develop an interactive visualization for analyzing soccer data, identifying patterns, correlations and insights. Using data scraped from sofifa.com we can make some insights into points related to these questions. Which nations and clubs best rated players and what their strengths according to their position, do physical attributes relate to the how good a player is, and what is monetary value of the players and how is it related to different attributes

Who is the audience?

As mentioned above soccer is one of the most popular sport in the world and has enormous amount of audience. Opinions vary greatly on among these individuals regarding players, teams or nations. Through the dashboard the members of FIFA audience will be able to come to conclusion regarding the teams and players.

What data will drive each of the visualizations in the dashboard?

1. **For the visualization of best national teams in the world: -** Nationality; Overall
2. **For the visualization of best clubs in the world: -** Club Name; Overall
3. **For the visualization of the strongest position of top-rated clubs and national teams: -** Club name; Nationality; Position; Overall
4. **For the visualization of the best team based on different ranges of wage: -** Player Name; Overall; Wages; Position
5. **For the visualization of ideal body type for each position: -** Height; Weight; Work rate; Pace; Physical; Overall; Position
6. **For the visualization of important qualities of a player for each position: -** Overall; Pace; Dribbling; Physical; Defending; Shooting; Passing; Skill Move; Weak Foot; Goalkeeper (GK) Positioning; GK Kicking; GK Handling; GK Diving; GK Reflex; GK Speed
7. **For the visualization of the best U23 players in the world based on potential in each position: -** Player Name; Potential; Position

Questions that can be answered using the dashboard

Through the dashboard one will be able to compare teams in various ways, determining the best performing clubs and we can assess strengths of individual players based of different features. We will be able to answer questions like:

- Which nation has the best players?
- Which club has the best players?
- What are the qualities which play a role in determining the quality of a player?
- What are the strengths of individual player?
- What nation or club has the strongest position?
- What the strength of the team at a particular position of a nation and club?
- Which player has the highest monetary value?
- What are the features which determine the monetary value of a player?
- Which body type is ideal for a player?
- Who is the best U23 player based on potential for each position?

Part 5

In this week your task will be to provide the rationale for the different design principles and techniques you will be using in creating the interactive dashboard visualizations.

The dashboard which we will create are exploratory and do not have any animations.

1. **For the visualization of best national teams in the world**
   The aim of this visualization is to find the best national teams using the overall value. We use 2 graphs namely bar charts and cartograms. The bar chart has the x axis as the national teams across the world and y axis as the average overall stat of the players.This stat that is being represented is for the year of 2020. As there are many nations in the world, the visualization will only be able to represent only few nations at a time. This problem again is overcome by using a cartogram in conjecture with the bar graph, so both combined provides a clearer understanding of which club is better or worse comparatively. In the bar graph, the length of the bar represents the average overall rating of all the players belonging to a particular squad. In the cartogram the saturation of the color changes in accordance with the value of the average overall.
   We can observe that the Gestalt Principles of similarity where the best and worst clubs have a similar color saturation. This visualization will also follow Stephen few principle 3: Use the lengthsor 2-D locations of objects to encode quantitative values in graphs unless they have already been used for other variables.

2. **For the visualization of best clubs in the world:**
   For this visualization we use 2 graphs namely bar charts and cartograms. The bar chart has the x axis as the clubs across the world and y axis as the average overall stat of the players. This stat that is being represented is for the year of 2020. As there are many countries in the world and each contains many clubs, the visualization will only be able to represent only few clubs at a time. This problem again is overcome by using a cartogram in conjecture with the bar graph, so both combined provides a clearer understanding of which club is better or worse comparatively. In the bar graph, the length of the bar represents the average overall rating of all the players belonging to a particular squad. In the cartogram the saturation of the color changes in accordance with the value of the average overall.
   We can observe that the Gestalt Principles of similarity where the best and worst clubs have a similar color saturation.

3. **For the visualization of the strongest position of top-rated clubs and national teams:**
   This visualization involves bar charts and maps each for club and the national team based on each position This is used to identify the best position each club or nationality has abundance of depth to call upon during a match. For example, a country like England has a lot of really good right back(rb) options compared to any other nation. The y axis of the bar chart gives the average overall of players and the x axis gives the

country/club's name and this is repeated for each position. The map uses different color saturation to represent the different average overall of the clubs in each position and the color hue to represent different position.
We can observe that the Gestalt Principles of similarity where the teams which are equally strong in a particular position are colored similarly. This visualization will also follow Stephen few principle 1 and 3: Display neither more or less than what is relevant to your message.Use the lengths or 2-D locations of objects to encode quantitative values in graphs unless they have already been used for other variables.

4. **For the visualization of the best team based on different ranges of wage: -**
   This visualization involves the identification of best teams based on wages and if the wage bill of a particular team reflects or have any relevance with the performance and the potential of the club sides. This involves using a bar chart, scatter plot and a map. The y axis of the bar chart is the wage of the players, and the x axis represents the club. In the scatterplot, the x axis represents players overall ratings, and the y axis represents the wages of the player. The map represents the team based on higher to lower wages based on saturation.
   We can observe that the Gestalt Principles of continuation where the wages are observed to follow a trend from highest to lower wages in the bar chart. We can also see Gestalt Principles of enclosure where the average density of rich clubs are based in Europe than the rest of the world. It is also possible to observe Gestalt Principles of similarity where in the map the clubs with similar average wage are having similar color saturation.

5. **For the visualization of ideal body type for each position: -**
   The aim of this visualization is to find if physical factors like weight, height play any role in assigning the value of overall. The height, weight and overall, of each of the players is a quantitative value so it is best perceived by its length. Each of these attributes are assigned a color so that it can easily be perceived the audience. The overall of each player is used to filter the best players to know their physical attributes. We can observe gestalt's proximity, encloser principals as the attributes of each player are closely place and are enclosed by a line. This visualization will also follow Stephen few principle 6 and 3: Use the lengths or 2-D locations of objects to encode quantitative values in graphs unless they have already been used for other variables. Make the information that is most important to your message more visually salient in a graph than information that is less important.

6. **For the visualization of important qualities of a player for each position: -**
   In this visualization we try to find out which quality is the most important skills or qualities that is required for a player for each position. For this we use multiple bar charts where the x axis represents the different types of skills like passing, shooting, etc. and the y axis represents the average value of the skill in question. For this visualization we filter out the players with the overall of 80 or above since we want to learn the most important attribute required only based on the best and not the average or weak players.

7. **For the visualization of the best U23 players in the world based on potential in each position: -**

   This visualization involves finding the best players under the age of 23 with respect to their potential in each position. We will be using a tree chart for this visualization as we will be able to compare between different players. Here age filter will be applied so that we can consolidate the players under 23 years. The potential attribute is a quantitative value, so it is depicted by using the size of the node in the tree map. We can observe gestalts principal of connection as all the members are connected as they belong to under 23 age group. This visualization will also follow Stephen few principle 4 and 5: Differences in the visual properties that represent values (that is, differences in their lengths or 2-D locations) should accurately correspond to the actual differences in the values they represent. Do not visually connect values that are discrete (i.e., distinct from one another), thereby suggesting a relationship that does not exist in the data.

Part 6

In this week you have to submit your interactive and exploratory dashboard that you have created as part of your course project. Please submit a single packaged workbook (.twbx) that contains all the resources needed for users to run the dashboard in the canvas dropbox.

Part 7

Prepare a series of screenshots along with informative captions to illustrate the capabilities of your dashboard and guide a viewer through a particular use case.

Suggestion: Use as many screenshots as necessary to adequately communicate the dashboard capabilities and an example use of your dashboard.

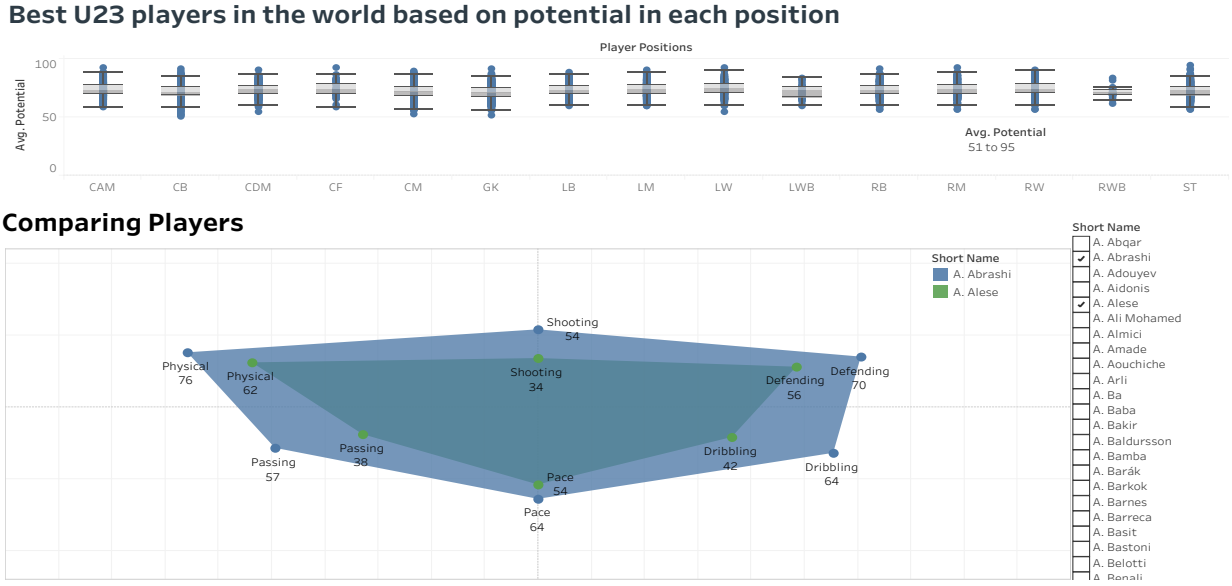
In addition to that the team will have an opportunity to present their interactive and exploratory dashboard in the classroom for about 10-15 minutes.

Dashboard 1:

The below dashboards have 2 components:

The box plot is used to best players under the age of 23 with respect to their potential in each position. On the y axis we have the average potential of the players and on the x axis we have different positions.

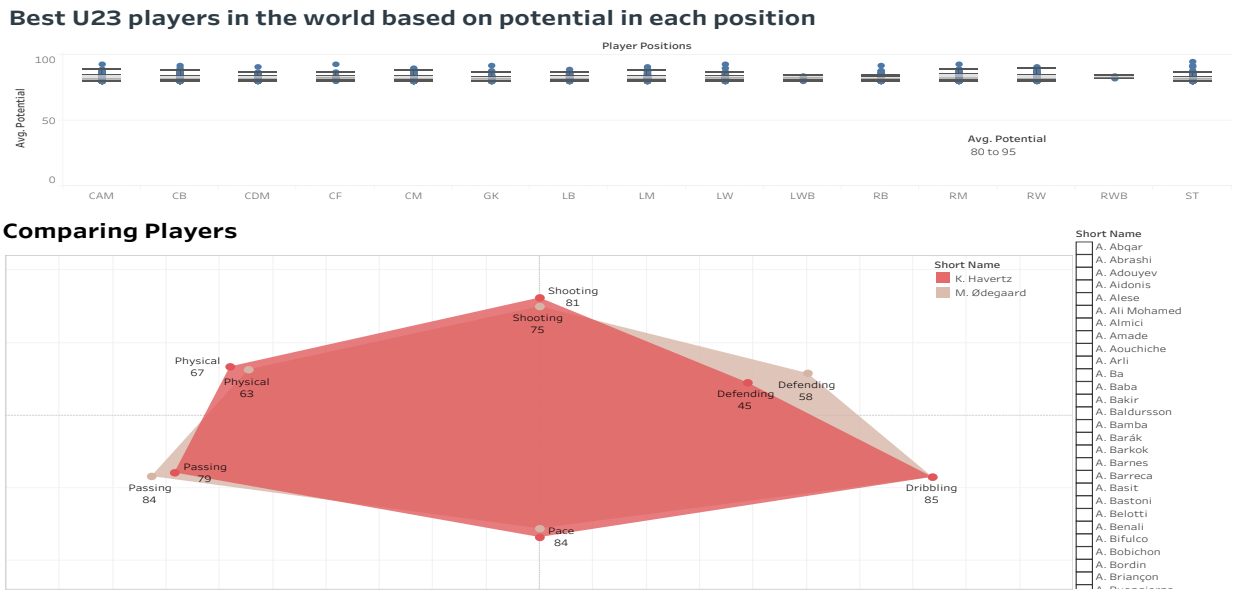
The radar chart is used to compare players based on all they skill. The players can be compared using their shooting, dribbling, defending, pace, passing, physical scores. Using this chart one can choose a player based on the requirement for a particular skill.



Below I will illustrate how to use the dashboard effectively to gain valuable inferences:

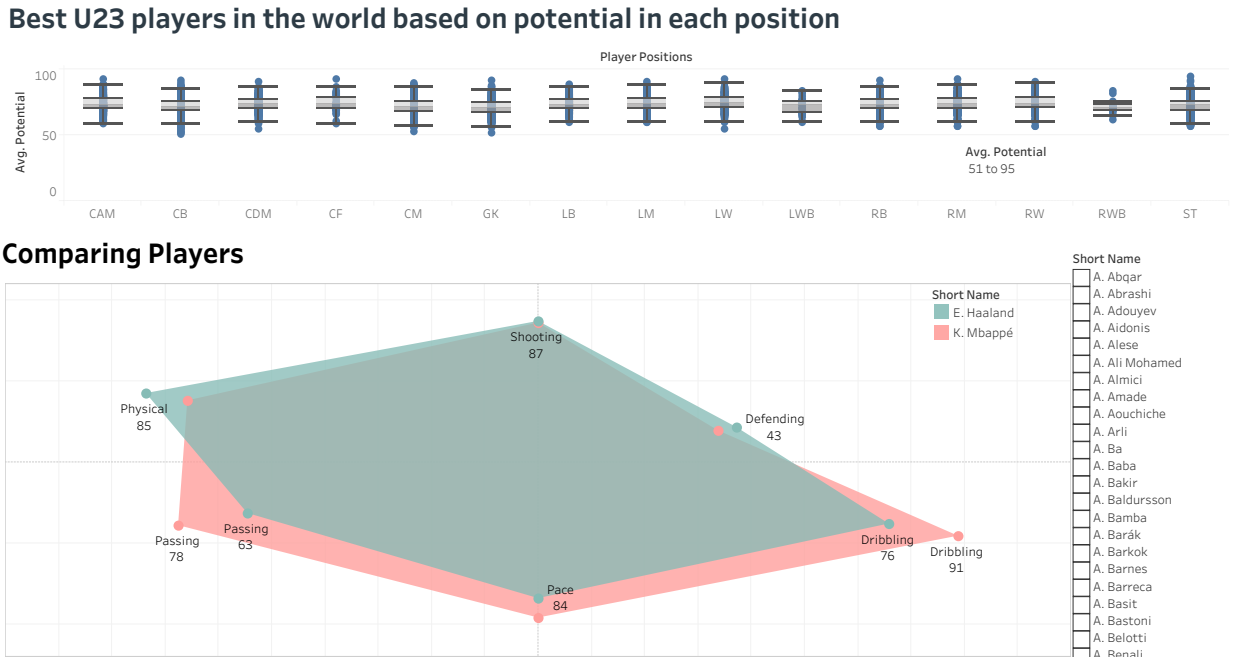
Scenario 1:

Suppose one wants a player for the position CAM with an overall score above 88 and with strong defending skills. We can adjust the min Avg potential to 88 and observe the CAM position. We will be able to find the topmost players to be M. Odegaard and K. Havertz. Now to check their defending capability, use the short name filter to check both the player. From the graph we can infer that M. Odegaard is better at defending compared to K. Havertz. So, the obvious choice would be K. Havertz.



Scenario 2:

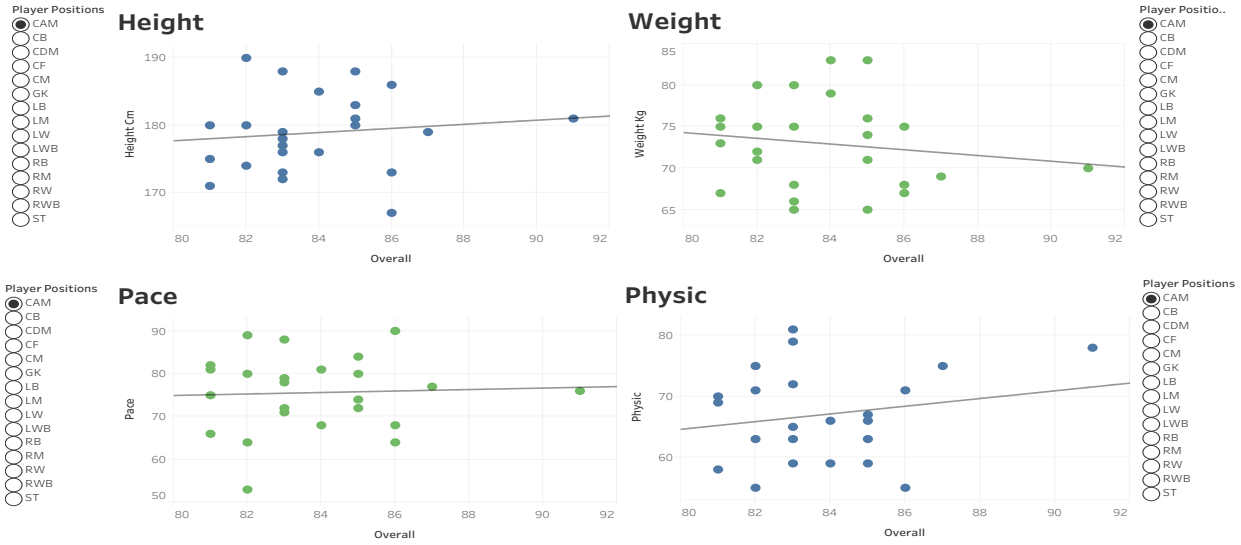
Suppose one wants a player for the position ST with an overall score above 90 and with strong dribbling and pace skills. We can adjust the min Avg potential to 90 and observe the ST position. We will be able to find the topmost players to be E. Haaland and K. Mbappe. Now to check their defending capability, use the short name filter to check both the player. From the graph we can infer that K. Mbappe is better at dribbling and pace compared to E. Haaland. So, the obvious choice would be K. Mbappe.



Dashboard 2:

The below dashboards have 4 components:

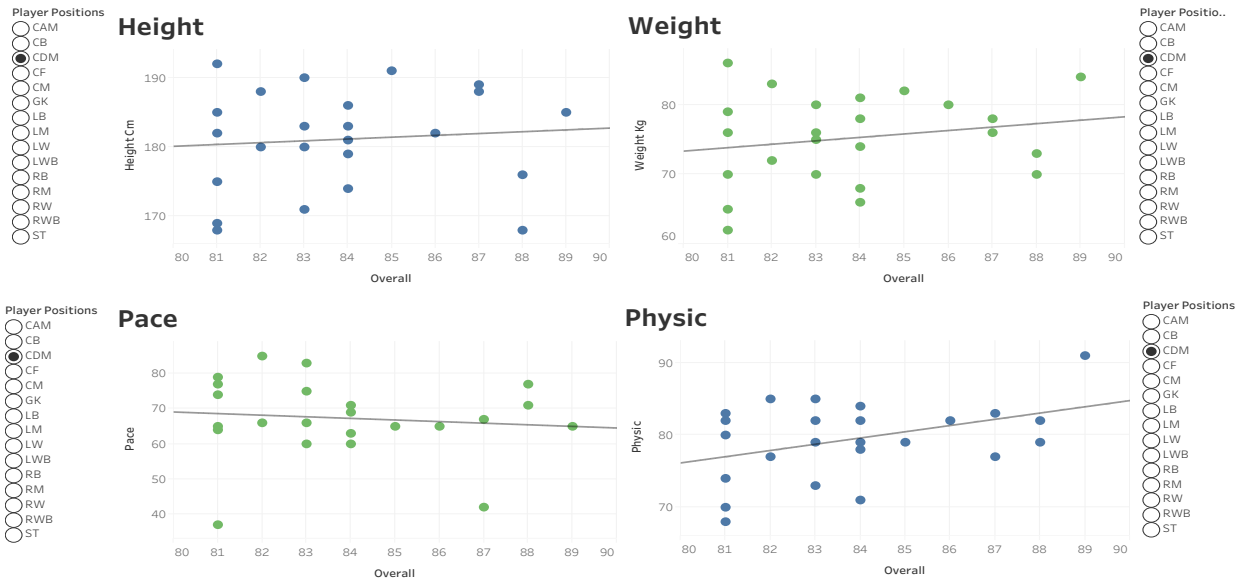
The 4 scatter plots are used to visualization of important qualities each position. For all the graphs we have Avg Overall on the x axis, and on the y axis we have players height, weight, pace, physic respectively. We will be able to infer weather a overall is dependent on physical aspects like height, weight, pace and physic.



Below I will illustrate how to use the dashboard effectively to gain valuable inferences:

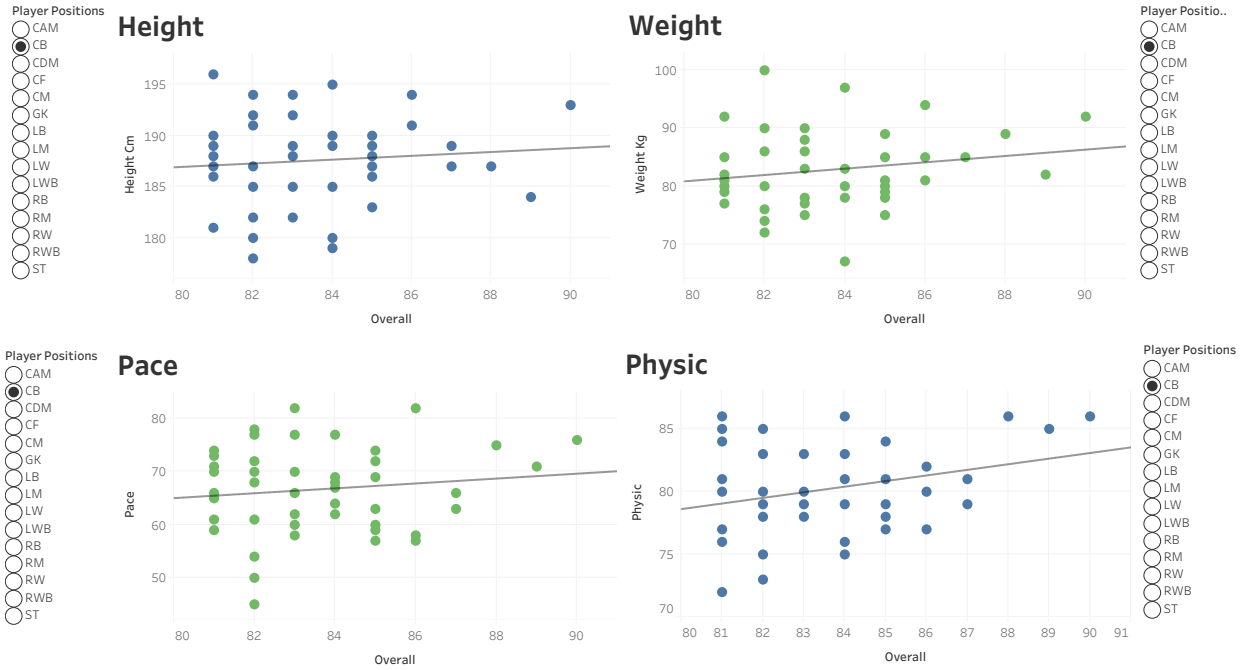
Scenario 1:

Suppose one wants to check the relation between avg overall and any of the physical attribute for the CDM position. The user will need to click on the CDM position on all the filters. Then he will observe the below graph, from the graph one can deduce that there is linear positive relationship between average overall and height, weight, and physic. But for pace we can observe a linear negative relationship. So, we can say that as the pace increase, we can observe a decrease in the avg overall for the CDM position.



Scenario 2:

Suppose one wants to check the relation between avg overall and any of the physical attribute for the CB position. The user will need to click on the CB position on all the filters. Then he will observe the below graph, from the graph one can deduce that there is linear positive relationship between average overall and height, weight, pace, and physic. So, we can say that as the pace, height, weight and physic increases we can observe an increase in the avg overall for the CB position.

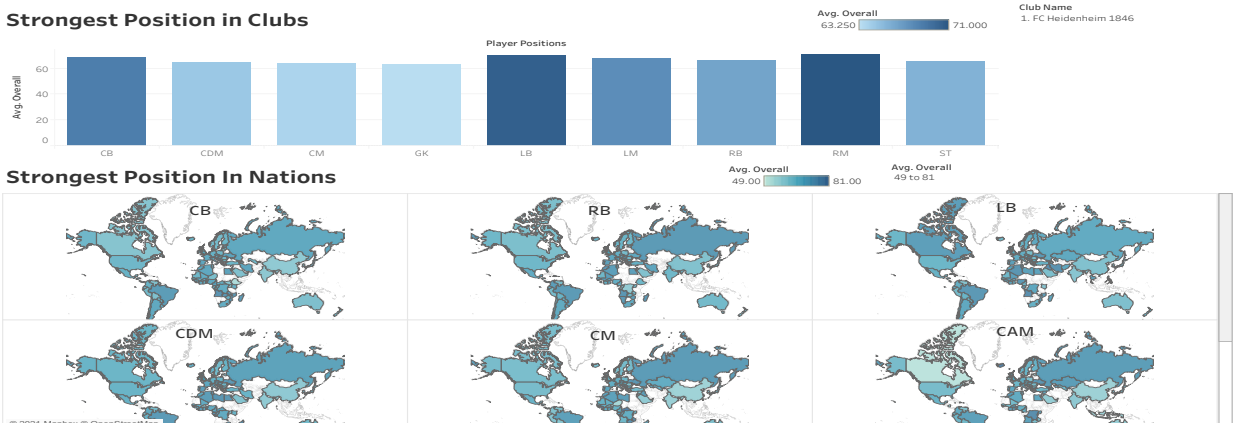


Dashboard 3:

The below dashboards have 2 components:

The bar graph is used to find the strongest position in a chosen club. The club can be selected using the filter. The x axis denotes the different positions, and the y axis denote the average overall.

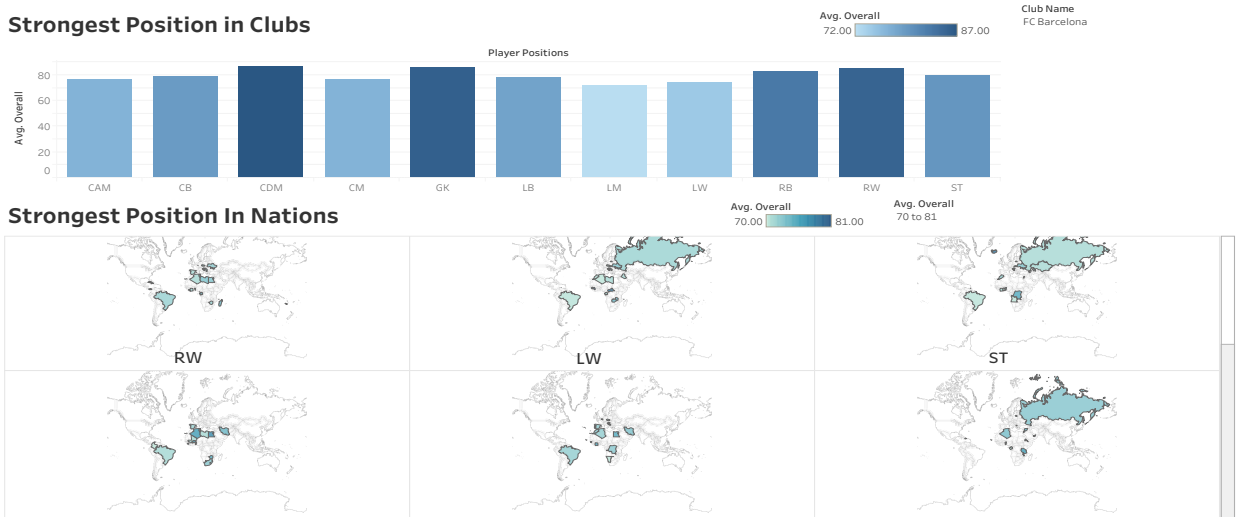
The small multiples of Chloropleth map are used to find the strength of positions nationwide. Here the color intensity signifies the average value. And by using the average value filter we can alter the range of average overall.



Below I will illustrate how to use the dashboard effectively to gain valuable infrerences:

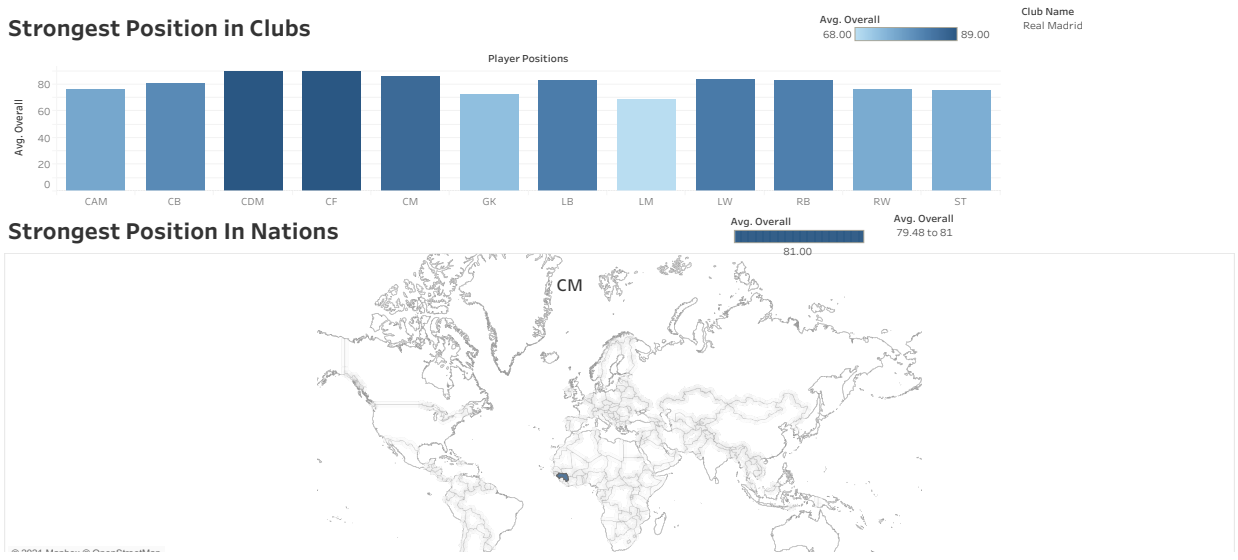
Scenario 1:

Suppose one wants to check the strength of a particular position in a FC Barcelona, this can be done by selecting FC Barcelona in the club name filter. The below graph can be obtained, from the graph we can say that CDM is the strongest position in FC Barcelona. If one wants to find the strongest positions in world nation wise with an average overall above 70, they will have to change the range's minimum value to 70 and the below graph will be observed. From the graph we can say that Russia has the strongest players in the RB, CM, CAM, ST.



Scenario 2:

Suppose one wants to check the strength of a particular position in a Real Madrid, this can be done by selecting Real Madrid in the club name filter. The below graph can be obtained, from the graph we can say that CDM, CF is the strongest position in Real Madrid. If one wants to find the strongest positions in world nation wise with an average overall above 80, they will have to change the range's minimum value to 80 and the below graph will be observed. From the graph we can say that Guinea has the strongest CM position above 80 overall.

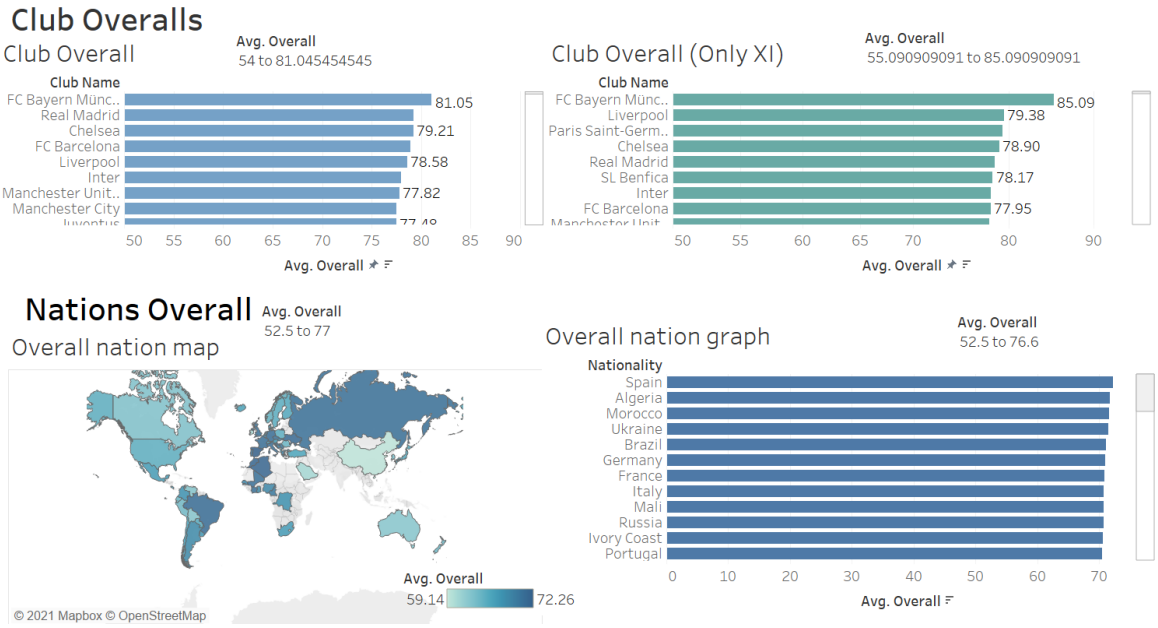


Dashboard 4:

This dashboard has 2 components.

The first component is uses 2 bar graphs which is used to compare the club's average overall ratings. The first of the bar chart is used to show the club overall which includes both the starting XI and the rest of the squad as well. The second graph is used to represent only the average overall ratings of the clubs XI.

The second is a combination of a of Choropleth map and a bar chart, which are used to represent the average overall of all the nations in the world that has a minimum of 25 players representing them in this dataset. The map gives a basic geographic representation, and the bar chart is used to get more insight into the details of this visualization.

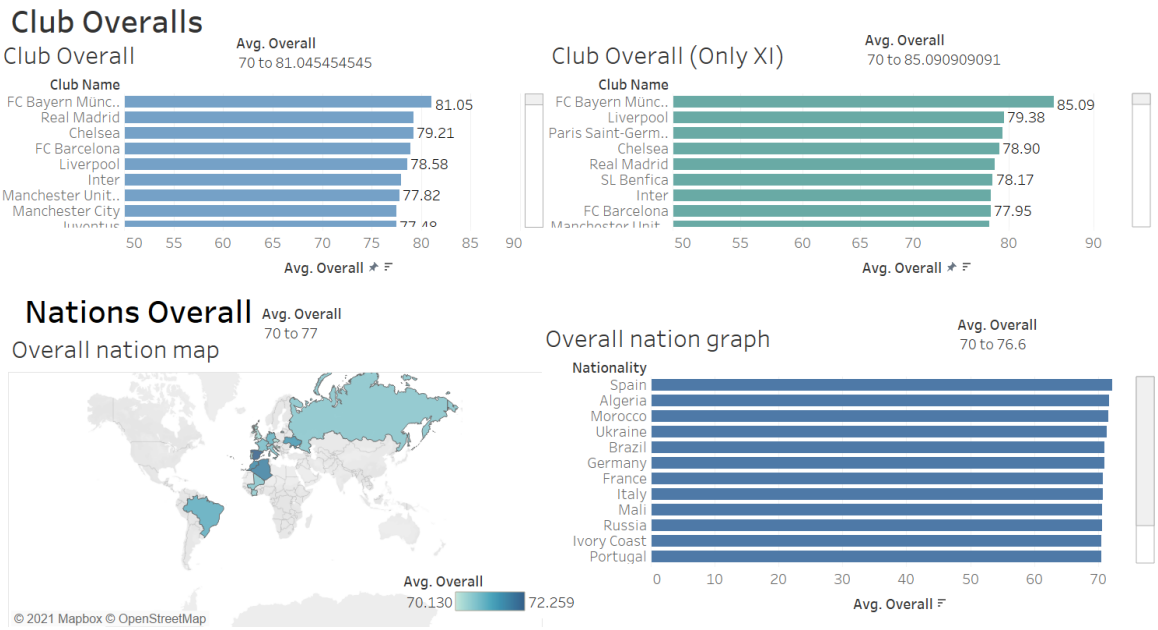


Below I will illustrate how to use the dashboard effectively to gain valuable inferences:

<u>Scenario 1:</u>

Suppose one wants to see only the teams whose overall ratings of the top teams whose ratings are above 70, they can do so by using the avg. overall slider filter provided and visualize the necessary details. We can see that in the teams above 70 Bayern are the strongest in both the charts, but the rest of the teams don't remain in their same rank as they do in the other chart (for example Liverpool rank 5th for club overall but when it comes to XI, they rank 2nd).

If one wants to do a similar filtration to the national overall, an avg. overall slider filter is also provided for it. We can see that only a few nations rank above 70 avg and most of them are clustered in Europe with nations like Algeria, Morocco and Brazil being the few exceptions.

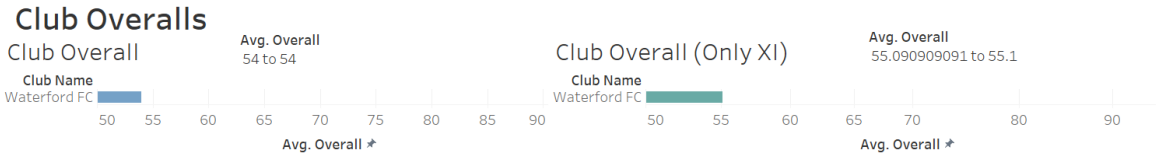


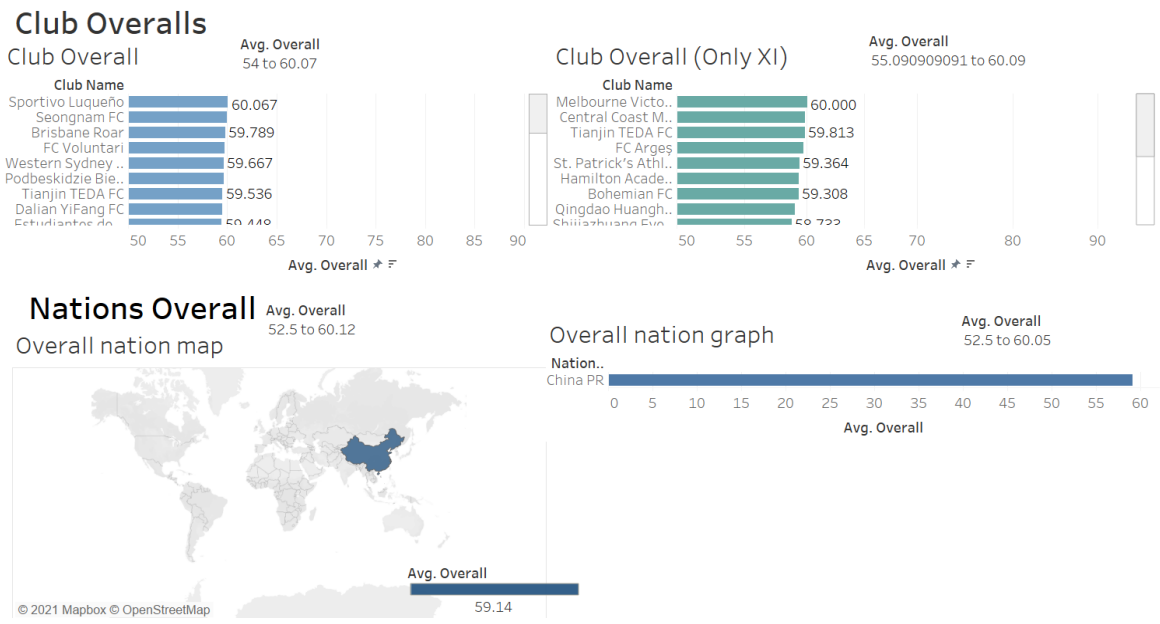
Scenario 1:

Similarly, we can use it to see the opposite too.

Suppose one wants to see only the teams whose overall ratings of the worst performing teams whose ratings are below 60, they can do so by using the avg. overall slider filter provided and visualize the necessary details. We can see that in the teams below 60, Sportivo Luqueno are the strongest with respect to club overall but when it comes to XI the strongest is Melbourne Victory. Even though there are changes in the ranking in regard to other teams, like scenario 1 where the strongest team in both the graph was Bayern, the weakest team in both the graph is Waterford FC.

If one wants to do a similar filtration to the national overall, an avg. overall slider filter is also provided for it. We can see that only one nation ranks below 60 avg and that team is China.



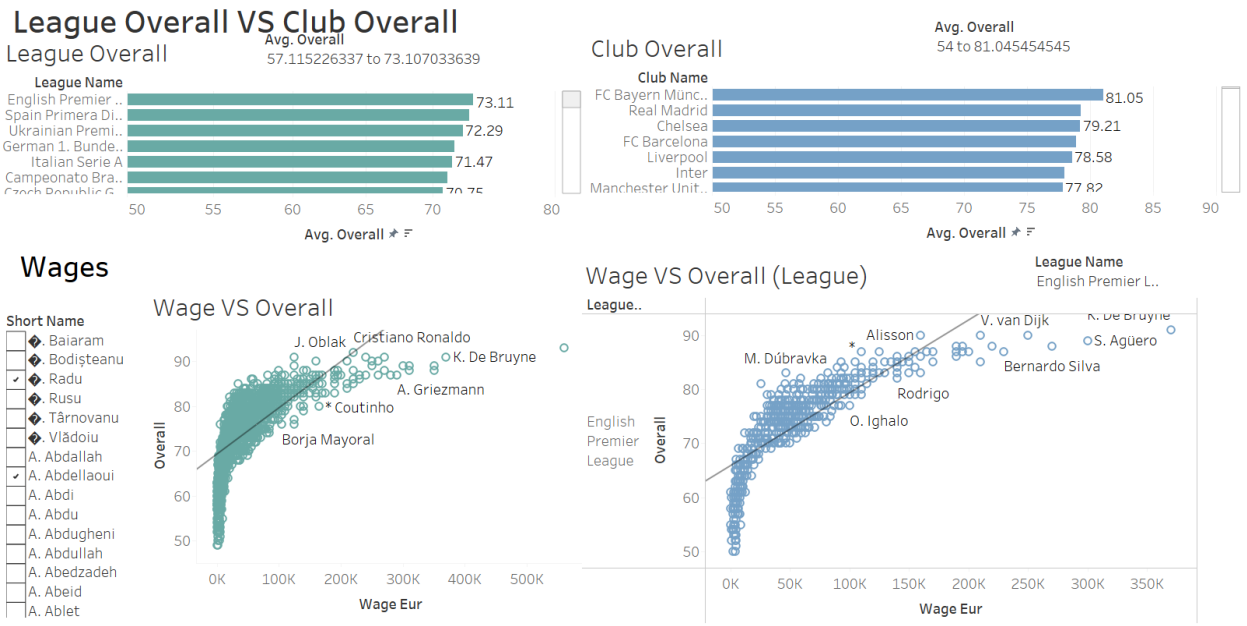


Dashboard 5:

This dashboard has 2 components.

The first component is uses 2 bar graphs which is used to compare the club's average overall ratings with the league's average overall ratings. The first of the bar chart is used to show the club overall which includes both the starting XI and the rest of the squad as well. The second graph is used to represent the average overall rating of all the leagues in the world.

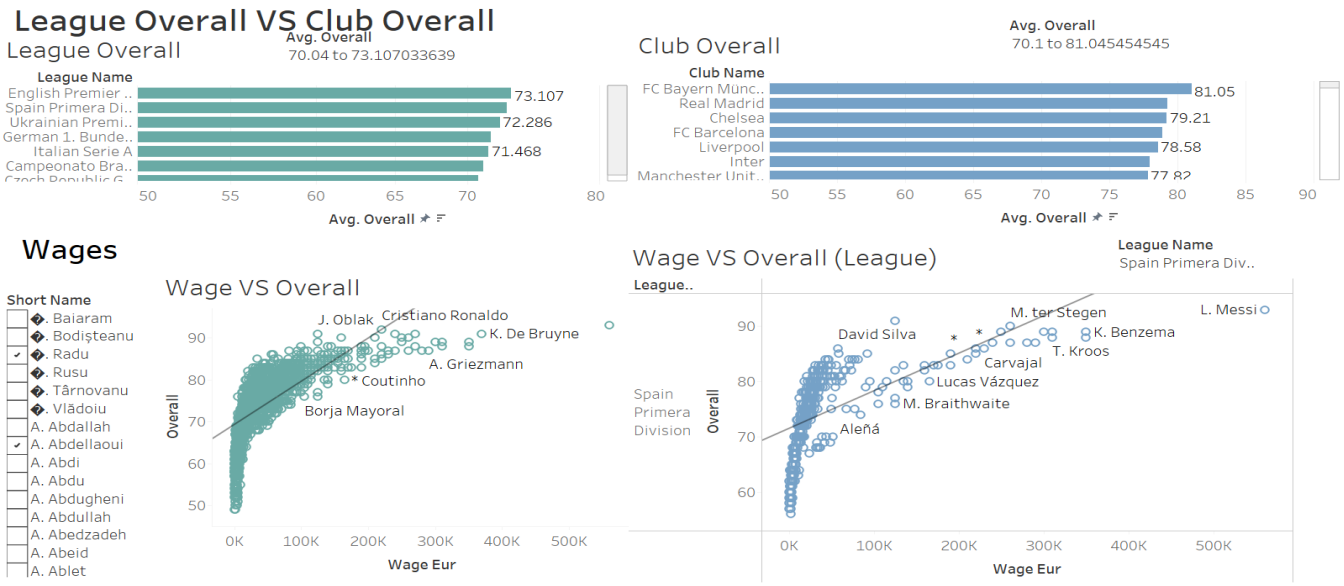
The second component consist of 2 scatterplot which is used compare the wages of the player in accordance with their overall. The first of the scatter plot is used to show the wages of all the players irrespective of the league the second one is used to represent the wage v overall league wise.



Below I will illustrate how to use the dashboard effectively to gain valuable inferences:

Like the previous dashboard the avg overall filter can be used to filter out the data that you want for example if you want to view the teams and league with overall above 70 you can use the slider and get the necessary value. You can see that Bayern is the top-rated club, but it is not playing in the topmost rated league (English Premier League). Similarly, you can filter out the worst teams and leagues.

There isn't much exploration regarding the first scatter plot as it gives you an overall insight to the wage v overall of all the players in the database. In the second scatter plot you can filter out players based on the league you select. For example, if you want to see the wage details of all the players playing in Spain Primera Division, simply search or choose Spain Primera Division in the dropdown filter in the filter provided.



Dashboard 6:

This dashboard has 1 component.

This dashboard is used to visualize the important Skill Attribute that is necessary for the players in each position. The positions include CB, RB, LB, CDM, CAM, CM, RW, LW and ST and the skills that are measured and compared include averages of Physical, Defense, Shooting, Passing, Dribbling and Pace.

This dashboard unlike others is more explanatory than exploratory, since the conditions of the visualization allows for little to no exploration.

We can see that when going from a defensive position to an offensive position the attributes like defense and physical reduces in importance and skills like shooting and dribbling takes precedence.