



Dataset

The dataset that I decided to use was the FIFA Football Players Dataset. The FIFA Football Players Dataset is a dataset that represents real football players and attributes given to these players in the FIFA video game. Based on how they play in real life different attribute values are given to players in game which determines how well they play in the game. This data can be used to reflect how good different football players are in real life and how good they are going to play in game.

The following attributes are given in the dataset and have the following attribute types:

- Name: Contextual Attribute
- Country: Categorical Attribute
- Height: Quantitative Continuous Attribute
- Weight: Quantitative Continuous Attribute
- Age: Quantitative Discrete Attribute
- Club: Categorical Attribute
- Player Value: Quantitative Continuous Attribute
- Football Attributes Scores (1-100): Quantitative Discrete Ordinal Attribute

For gaming or football enthusiasts visualising the different attributes of these players can be very interesting and helpful. For example, choosing a team in game can be difficult as you may need to pick players who play together in real life and have high value attributes, instead of having to cycle through hundreds of players it would be easier to have a visualisation capable of conveying this information quickly and easily.

Tools/Technology

To make the visualisations for my FIFA dataset I used a few different tools/technologies, the main one being React.js. Using React.js I made a web application that incorporated my visualisations. I also utilised multiple libraires for the visualisations including the D3.js library and Recharts. These allowed me to include multiple different interactive graphs which presented relevant information in an appealing and easy to understand way. Although there is a lot of data to begin with in the dataset, I decided add some extra data based off the existing data. I did this by splitting the football into four distinct categories(positions), goalkeeping attributes, defender attributes, midfielder attributes, and attacking attributes. Once I had split the attributes, I calculated scores for each of the positions by averaging the attributes associated with the position. Once I had a score for each of the positions for every player, I sorted each player into the position that their scores said they were best suited for. This meant I now had a position on the pitch for every player, values that represented how good each player would perform in each position and I also decided to calculate an overall score for each player by taking the average of their positional scores.

Tasks

One of the tasks I intended to support in my visualisation was to lookup desired attributes from the dataset. The main goal of the visualisation was for the user to be able to find a team based on the attribute that most interested them. Because of this the visualisation has a drop-down menu which allows the user to select their desired attribute to query the dataset with. Once this is done the visualization will build a team with the highest values in the queried attribute and present the team in their given positions.

Another main task of my visualisation is to compare and contrast different players and their values. Firstly, as mentioned above teams are built using given attributes. Once this team is made, each player has a circle around them that has an area based on the value of the given attribute. This means the user can easily compare the players based on the value of the given attribute. Other parts of the visualisation directly compare different attributes of the given players on the pitch including their positional scores, their market value (Price tag), as well as their overall player score. This allows the user to easily evaluate players and choose which players best suit them.

Encoding Channels and Idioms

I used multiple encoding channels as well as idioms throughout my visualisation. Firstly, for the pitch view at the top left of the visualisation there were three different encoding channels used position, colour and size. Position was used to show the position each player plays on the pitch. Colour was used to show relationships between players based on them playing for the same club or being from the same country. Colour was chosen as it draws the eye of the user and is easy to see the relationships between the players. Size was used to show the value each player had for the attribute the team was built around. This shows the user which player on the pitch has the highest value for the attribute as well as how the values for the rest of the team are distributed.

An idiom that I used for my visualisation was a heatmap. The encoding channel I used for the heat map was brightness/intensity. The heat map shows the number of players that are from each country. The more people there are from each country the greater the intensity of the colour in the country.

Another idiom I used in my visualisation to help with the comparisons was a stacked bar chart. Each bar in the bar chart is split into four parts, each part representing a positional stat of each player. Each positional stat of each player is represented by a different colour. This easily distinguishes the different stats that make up each player. This allows the user to compare the positional within a player but also compare these stats to the other players in the team, showing which player is the most all rounded player.

Lastly, I used a multi-line chart to show the relationship between the players and some of their attributes, including the overall score and their value. For all parts of my visualisations additional information can be obtained by hovering over different parts of the idioms. This includes exactly the number of players from each country, the exact attribute values of each player as well as the exact overall and positional scores of each player.

Novelty

When it comes to building a team in FIFA or choosing a team of players in real life there a lot of factors that get taken into consideration. In the game FIFA factors like weather people play together in real life or what position they play have to be considered as if they aren't the team won't work. This is why I decided to incorporate a pitch that shows each player in their correct position. This allows the user to easily make a team without having to think about these factors in their head. They can clearly see how each player links together by team or country and where on the pitch they belong.

As the user may want to change the team around based on the different attributes the have a drop-down option so they can choose what attribute they want to build their team around and all the data will change to represent the eleven players in the current team. Making the visualisation interactive gives the user the chance to really engage with the visualisation rather than having one continuous hard coded visualisation.

Critical Analysis

The goal of the visualisation was to show player stats and information quickly and easily to the user, so they get the overall idea of how the player performs in different areas. I think that the visualisation does this very well and shows a great deal of information but having said that there are always strengths and weaknesses. When it comes to the heat map the use of colour really attracts the eye to areas with a lot of players and therefor the user can infer which areas have the most football players in this case Europe has a lot more then anywhere else. Although this is beneficial it is also not very accurate. Some countries with quite different numbers of players may have similar colours as in the grand scheme of things they are closer than other countries.

The use of charts that breakdown the teams' stats side by side is an easy way for the user to compare all players on the team and get a more in depth look at what kind of player they are in all aspects. Having said this it may lead to some annoyance as some irrelevant stats may be shown that the user doesn't care about, such as seeing the goalkeeping stats of an outfield player. Overall, I am happy with how the visualization turned out and think it's a helpful visualisation for building teams and finding player breakdowns.

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- [1] *Recharts*. Available at: <https://recharts.org/>
- [2] Bostock, M. (2023) *D3 Gallery, Observable*. Available at:
https://observablehq.com/@d3/gallery?utm_source=d3js-org&utm_medium=hero&utm_campaign=try-observable
- [3] *Datavis 2020 episode 29 - making a world map with React & D3* (2020) *YouTube*.
Available at: <https://www.youtube.com/watch?v=mzZ1fCXq-uo&t=190s>