

CSCE679: Data Visualization Project: Step 3

Team Members:

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Goalwise: An Interactive Insight into Team Triumphs & Trials

Giving a short summary, our project aims to create a website/dashboard containing the live statistics of all the teams in the premier division of Spanish Soccer (Known as La Liga) that provides a comparative assessment of each team's current standing. Through the dashboard, we intend to visualize the measurements which are usually considered for indicating teams' performance. Some examples of this could be Team Form and Home Advantage.

Project Progress

As mentioned in the previous steps, the final prototype of the website we create should contain the following visualizations:

LINE GRAPH: The data being plotted for this would be the team rating of the opponent against the months in a season. This would help understand when a team has a big match during the season.

BUMP CHART: A bump chart can be used to highlights changes in rank or position of a set of items over a specified period. We'll plot the form, position of each team over each Matchday.

MULTI-LINE GRAPH: Each line in the graph typically represents a distinct data series, making it easy to visualize and compare trends and patterns across these series. We'll plot the form, position, and points of each team over each Matchday.

STACKED BAR CHART: We'd be plotting the goals scored and conceded on every matchday and also have an indicator for a team having clean sheet on that matchday. This would be plotting using the data present in a fixture key-value pair.

BAND CHART: This type of graph depicts a data series within a specific range or band. We use this graph to understand how well a team's attack and defense has done over the course of previous seasons.

STAR CHART: In a star chart, each variable is represented by a spoke or axis radiating outward from a central point, and the length of each spoke corresponds to the magnitude or value of that variable. We use this graph to compare team's attack, defense, consistency, and performance against the big 5 (Usually considered as FC Barcelona, Real Madrid, Atletico Madrid, Valencia, Sevilla)

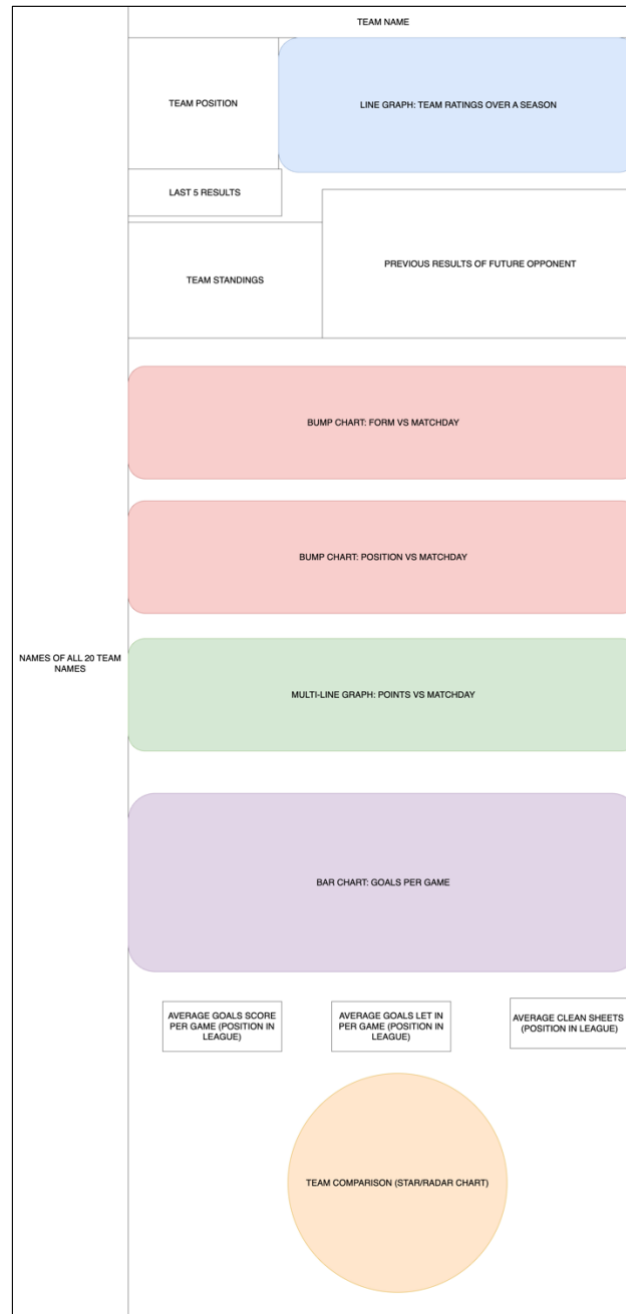
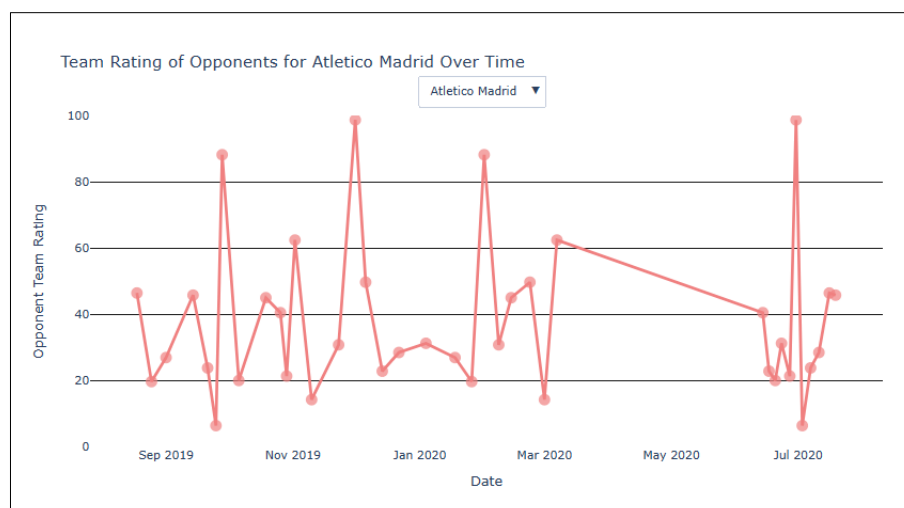
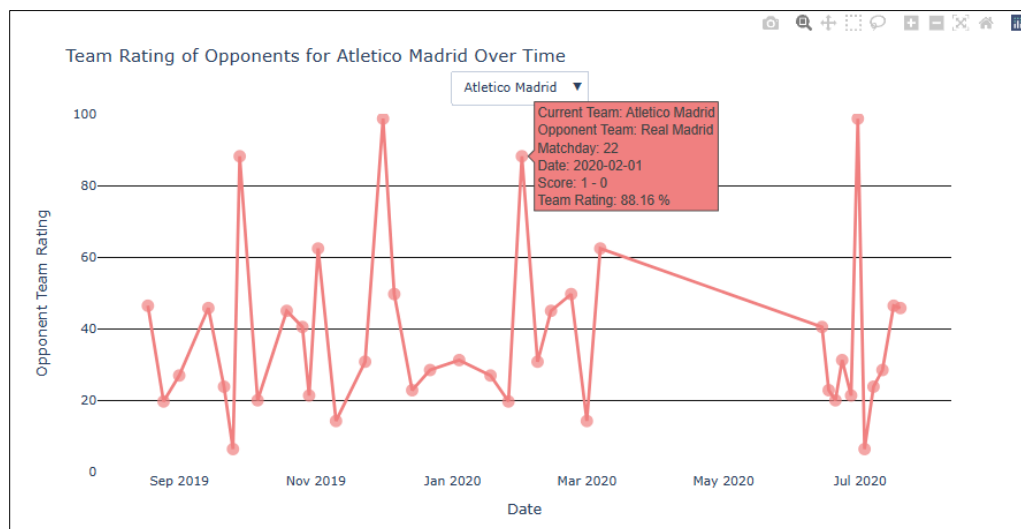
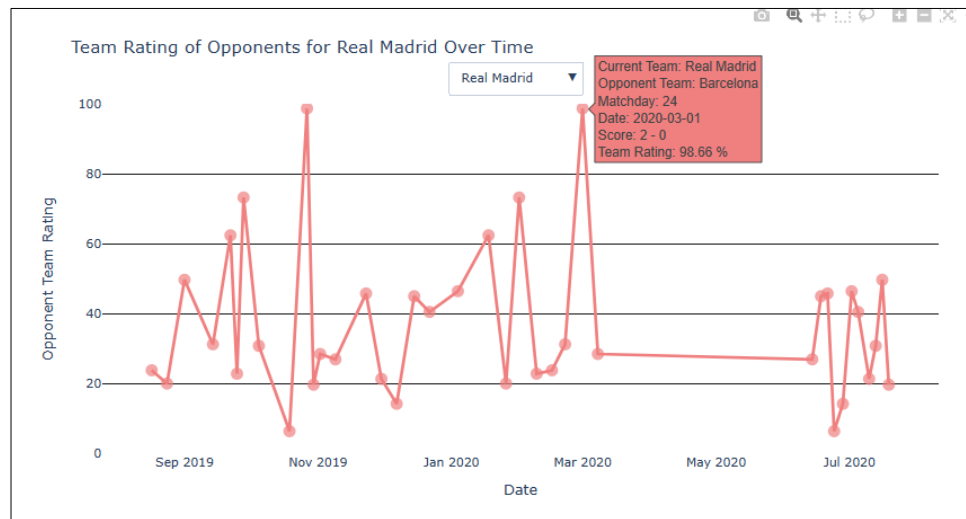


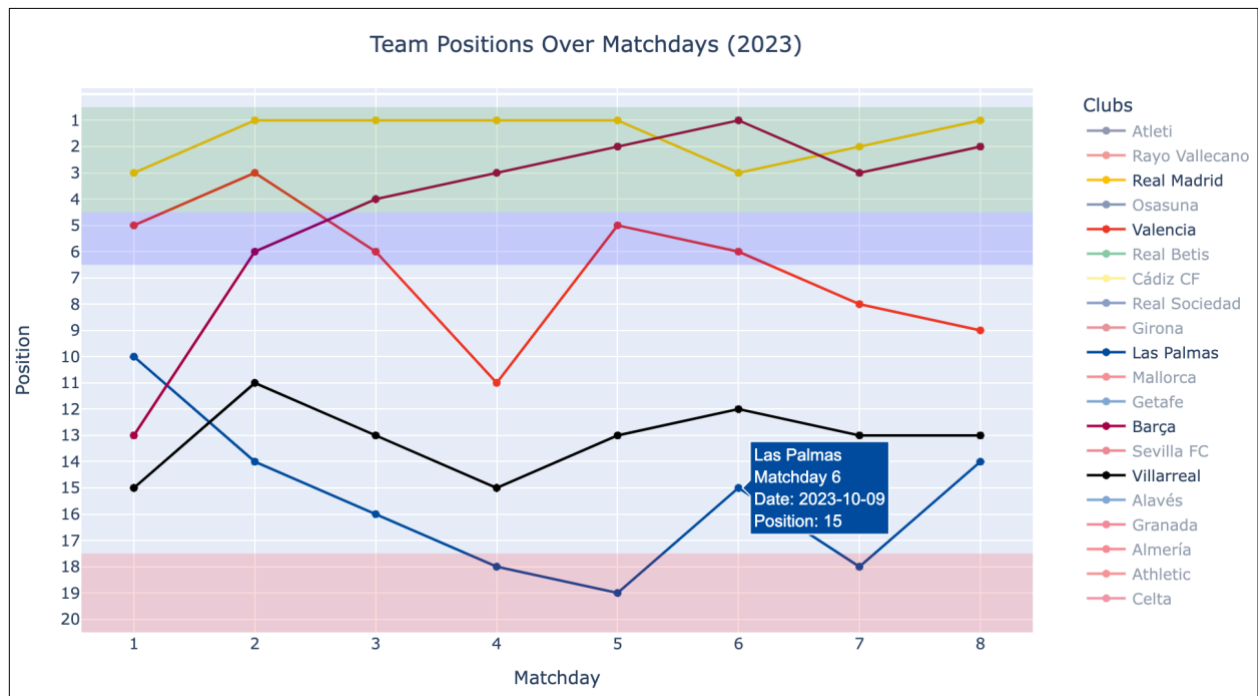
Figure: Prototype of Website



To improve interactivity, we use the tooltip while hovering to display additional information such as the score line and the opponent team on that matchday.

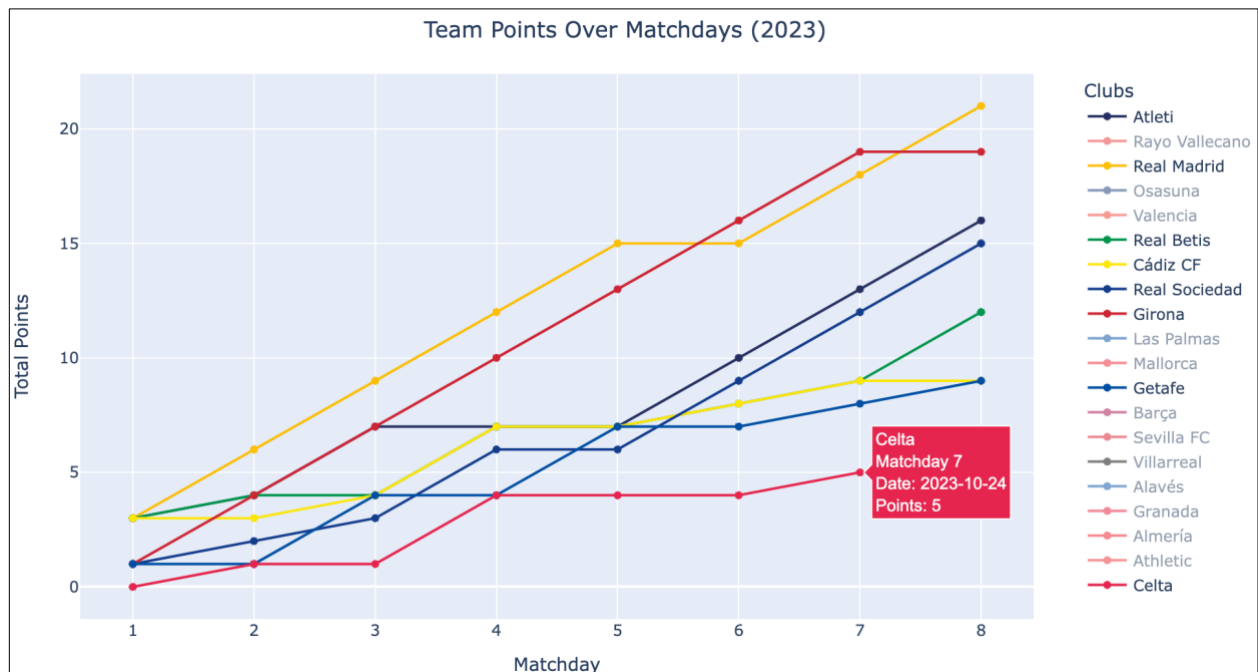


Another visualization implemented was the Bump Chart showing the position of all 20 clubs over the matchdays. An example visualization is the bump chart for this (2023-2024) season, with the 4 first teams qualifying for a competition called 'Champions League' and hence are green, while the bottom 3 teams are relegated to the second division of the Spanish League. The team in the 5th and 6th position qualify for the secondary European competition 'Europa League'.



An element of interactivity introduced was using a filter to view the specific clubs and using a tooltip when we hover over a datapoint to view additional information.

A Multi-Line Graph was also visualized to view how each team earned points over the matchdays. Using an example visualization for this season, we view the cumulative points earned for clubs in this season.



The remaining graphs mentioned above are yet to be implemented completely which were not realized yet due to time constraints in the development cycle. The next stage of the process is integrating the graphs to create a frontend dashboard.

Challenges Encountered

Some of the challenges encountered while working with the data for the project pertain to the API rate limit. Initially, the extensive implementation and testing required constant fetching of data from the API. In certain cases, the rate limit would be exceeded, leading to the saving of JSON data into a file, which was then imported as data frames.

Furthermore, since our initial API did not contain all the necessary data needed for our purposes, we had to search for alternative APIs to obtain the additional data required. This constant switching between different APIs resulted in data being in different formats, necessitating numerous adjustments to avoid discrepancies.

Next, for the visualization of team ratings, matchdays were not specified, so a custom dictionary with matchday dates was initialized. Additionally, multiple games were postponed or canceled on their original matchdays (with one team playing twice in the same matchday), requiring us to bring them back to their original matchday to ensure consistency in the data analysis process.

Finally, in the statistical calculations for ratings, finding a proper approach to ensure that the current seasons had higher weights was difficult to achieve. Upon research, exponential weighting was found to be the proper solution.

Final Step Plans

As of now, there are no major changes in the overall design of the webpage. Although, there would be refinements of the individual graphs and the general outline such as changing the filtering methods by using buttons, dropdowns, or sliders.

Timeline

The intended deadline to complete the project is by November 28th. The workload is divided into weekly updates.

WEEK 1

This week would mainly involve completing the remaining visualizations mentioned. The completion of those visualizations for the dashboard will involve not only the design and development of the plots but also the derivation of new metrics from the existing data. Some

examples of the metrics needed to be calculated are Consistency, Average Goals Scored, Average Goals Conceded and more. The plots to be completed:

- Stacked Bar Chart
- Band Chart
- Star/Radar Chart

This part of the development cycle will be executed by Gunjan with assistance on the metrics from Sreesh.

WEEK 2

This week would deal with integrating the visualizations plotted to a dashboard. Firstly, a coherent layout needs to be established that effectively showcases the plots in a dashboard format. This involves doubling down on a grid or flow layout that is both visually appealing and functionally logical, allowing users to navigate through the information seamlessly.

This part of the development cycle will be executed by Sreesh with assistance in building the frontend design from Gunjan.

WEEK 3

This week would mainly deal with hosting the website using frameworks such as Streamlit and then testing the dashboard to identify and resolve any bugs or usability issues. This would also deal with verifying the accuracy of the data displayed and simulating user interactions.

The final step of hosting the webpage would involve both team members along with doing the testing.