StatSoRaven

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December 02, 2022

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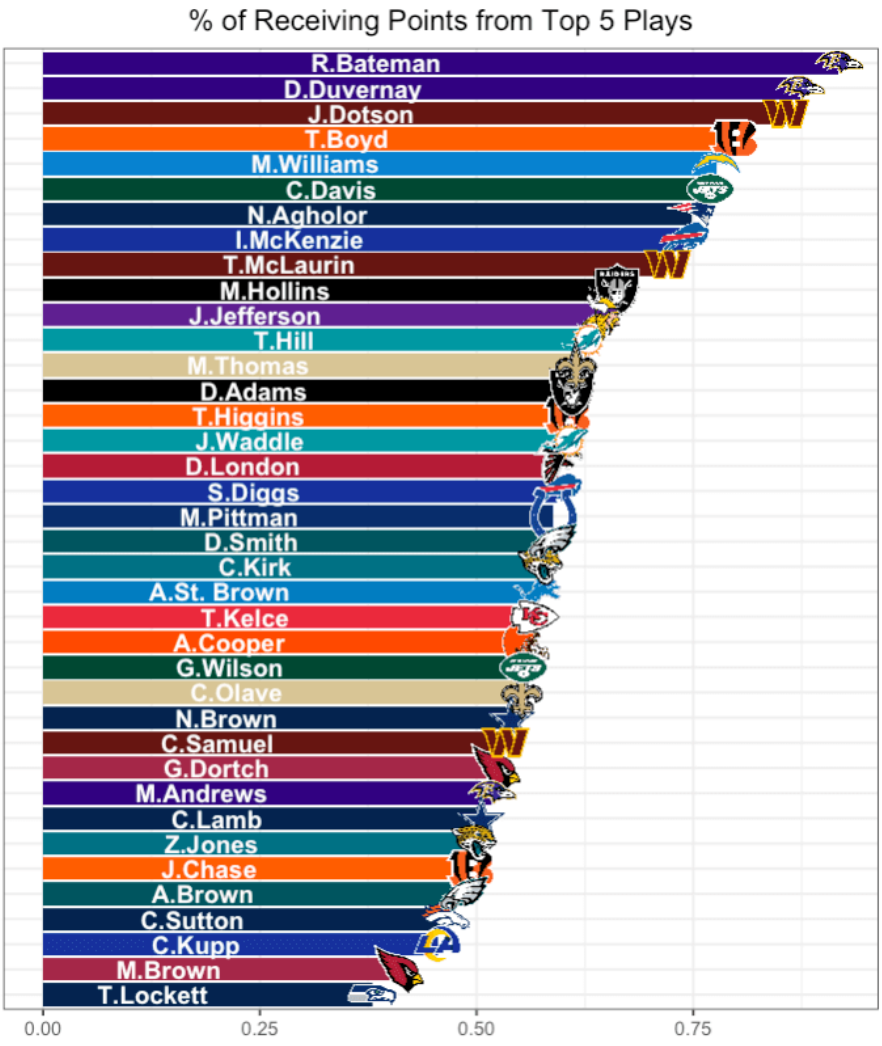
Overview and Motivation

This project is about creating a visualization for stats about the Baltimore Ravens as a team and their individual players. The main motivating reason for choosing this is simply because it is our favorite NFL team. In the world of sports, it is common to discuss stats amongst other fans. We want to create a fun project that we would be interested in that can display a visualization of these stats to help these kinds of discussions.

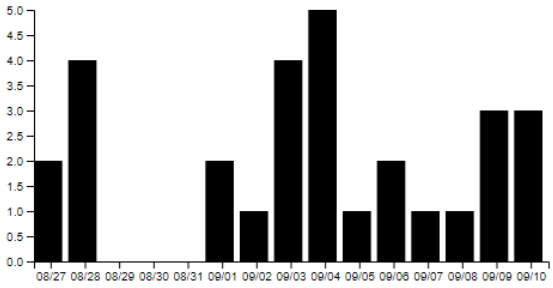
Related Work

There are a handful of things that we are using for inspiration. Of course, the myriad of stat visualizations that exist through the main sport channels are always good to base our work on like this for example.

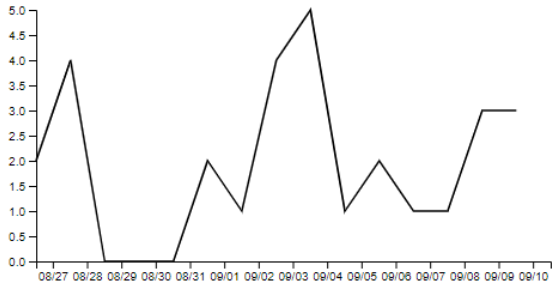


But the main thing we were inspired by was one of the homework assignments where we had four different charts: bar, line, scatterplot, area chart. We thought that implementing the line charts would be a good way to visually represent the progress overtime between the Ravens and their opponents. Another one that would be useful are the bar charts. This would be the best fit to compare players.

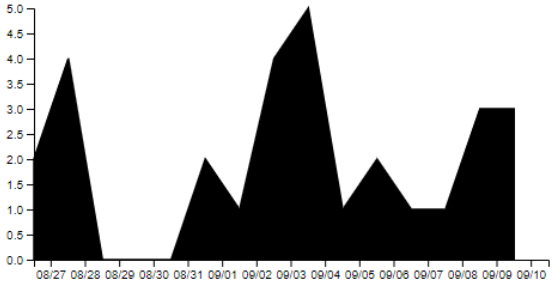
Bar Charts



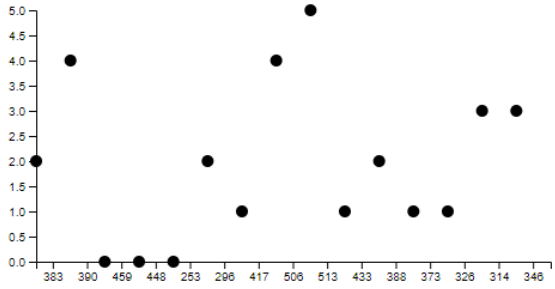
Line Charts



Area Charts



Scatterplot



Questions

Data visualization is already a part of sports today. Whether it's during the game, during talk shows, etc., different visualizations are created to help present information to fans depending on what the topic is. For our project, the main questions we want to answer are:

- How do the Ravens stats compare to their other years/seasons?
- How do individual players' stats compare to themselves?
- Are players/the team improving/digressing throughout time?
- What areas are the strengths and weaknesses?

The benefits of answering these questions are that the players themselves, since we can have this project go public, can view in a visual way what areas of improvement they need to work on for them. It is also beneficial from a pleasure standpoint. Sports at the end of the day are a form of entertainment. Hence, why professional sports here in the U.S generate a lot of revenue from broadcasting games nationally, selling merchandise, etc. Providing a visualization

project like this is entertaining for fans of the team and for other fans in general who like keeping up with these types of stats. An example of how it could be useful is through the use of Fantasy Football. Fans around the world compete in a statistical game of players' stats. This tool/project could be used to help aid in how they choose their players for their team.

Data

The main source that we are using is ESPN. The reason we originally chose them is because they had open-sourced APIs versus any other sporting outlet. However, the way that we are grabbing data is not through one. There was too much data that we were given while trying to connect to it, and we didn't feel that it was necessary to sort through that data and grab the specific info that we wanted. That would lead to unnecessary data collection. Instead, we are web scraping the data using the HTML Agility Pack in for VS Code. That way, we can easily grab the data that we are targeting specifically.

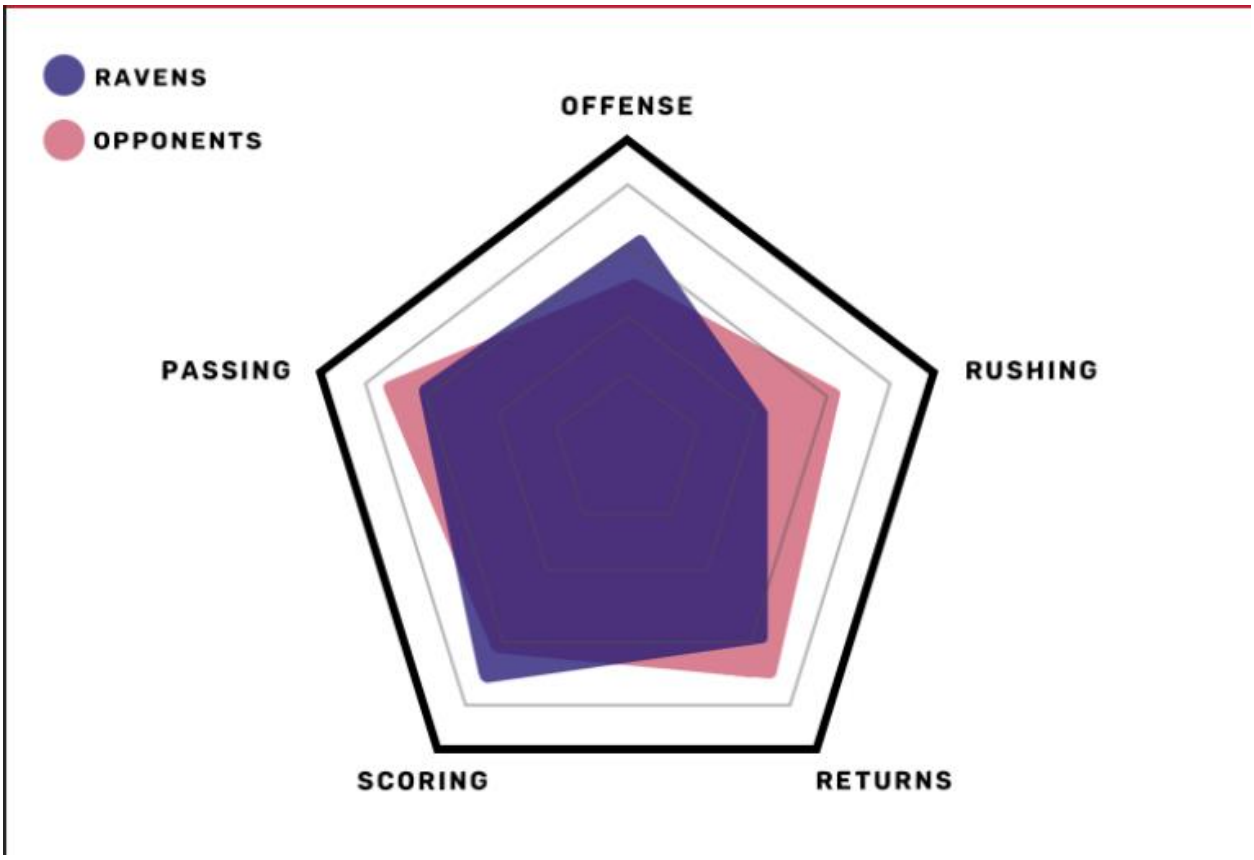
Exploratory Data Analysis

The NFL has a ton of visualizations that exist already for different stats all over the league. We looked at some through the official NFL website, ESPN, Bleacher Report, and the broadcasting channels that host NFL games weekly like CBS, Fox, and NBC. The ones that stood out to us were the line charts. Here is an example of one that we were inspired by.

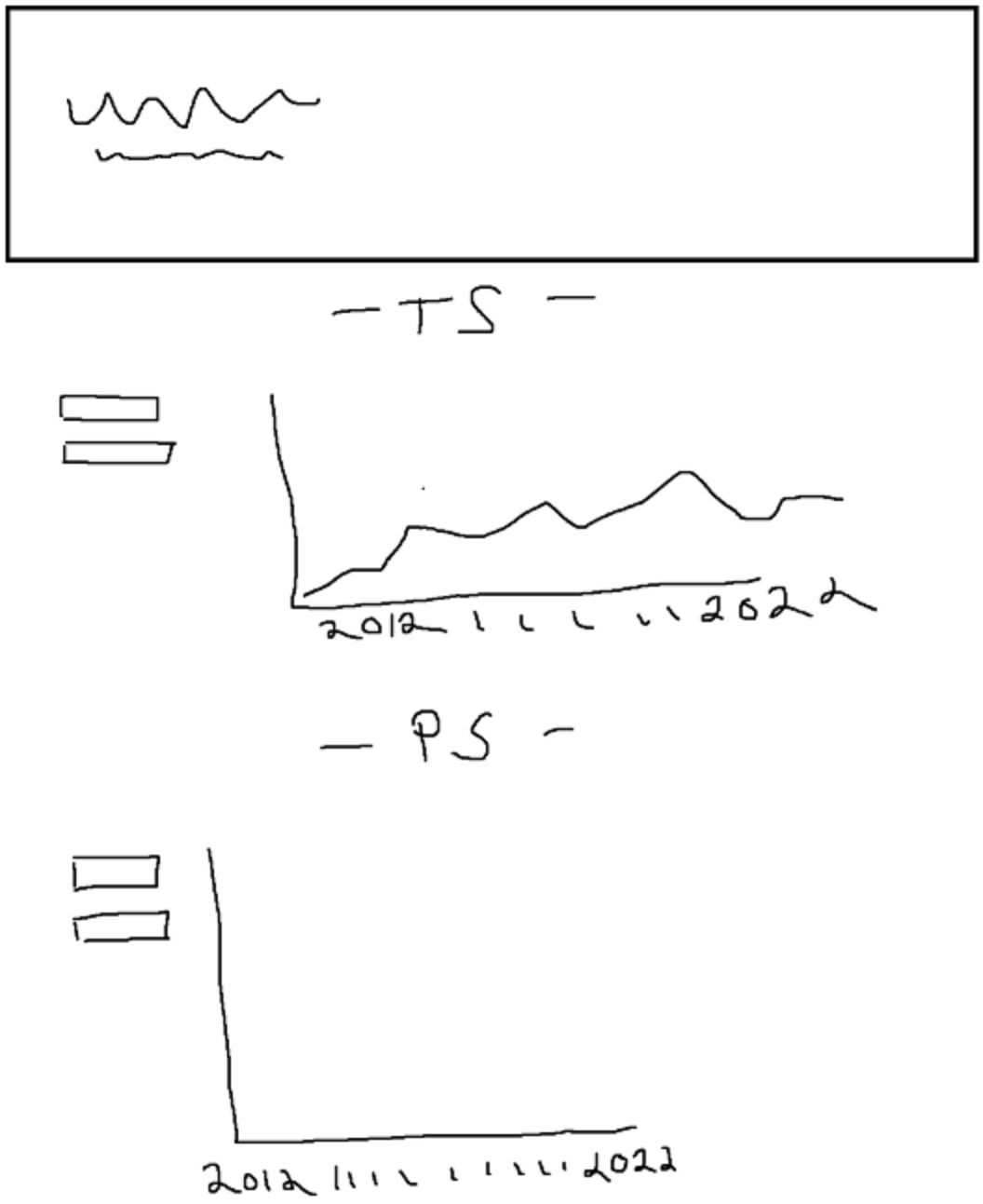
A line chart ended up being the first chart that we instantiated to represent the team stats for the past seasons. We found that a line chart is a good representation to show how something changes over time. We also noticed that it might be a good idea to add an option to toggle it to an area chart, to represent the areas that are good or bad depending on the context of the graph. The reason for this because the area chart highlights the parts that shows improvement/digression to the viewer immediately.

Design Evolution

One of the first visualizations that we considered for the project was to use a radar chart to represent the different areas that the Ravens used versus the opponents. We originally wanted to implement this type of chart because we felt that it isn't used often. Growing up, bar charts, pie charts, and line charts were the most commonly used, for us in our school years at least. So, we came up with this mock representation to give us an idea of how a radar chart could be implemented.

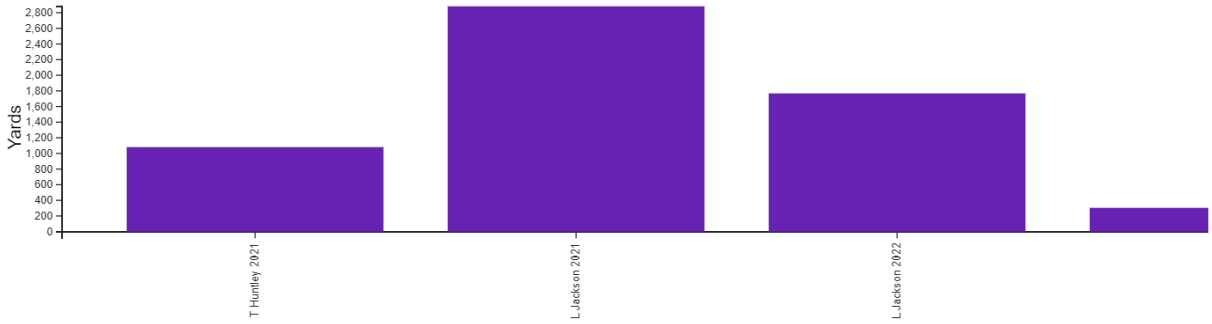


However, we found that with the stats that are provided on the ESPN site, it would not fit this type of mold well. Instead, we drew rough sketches of an idea of how we could implement a line chart. Instead, we drew up some mock drafts of what we thought could work with the current data we have.



This is the first concept art that we drew up of what we wanted our page to look like. We figured that a line chart would fit the type of data that was available to us. The reason for that is because the data we have are stats for the whole season. Since we are given previous seasons, we wanted to compare previous years and see where the Ravens have improved or declined over time. A line chart would be the best fit to represent that visually.

For the bar chart, we created simple ones that shows the different stats between players.

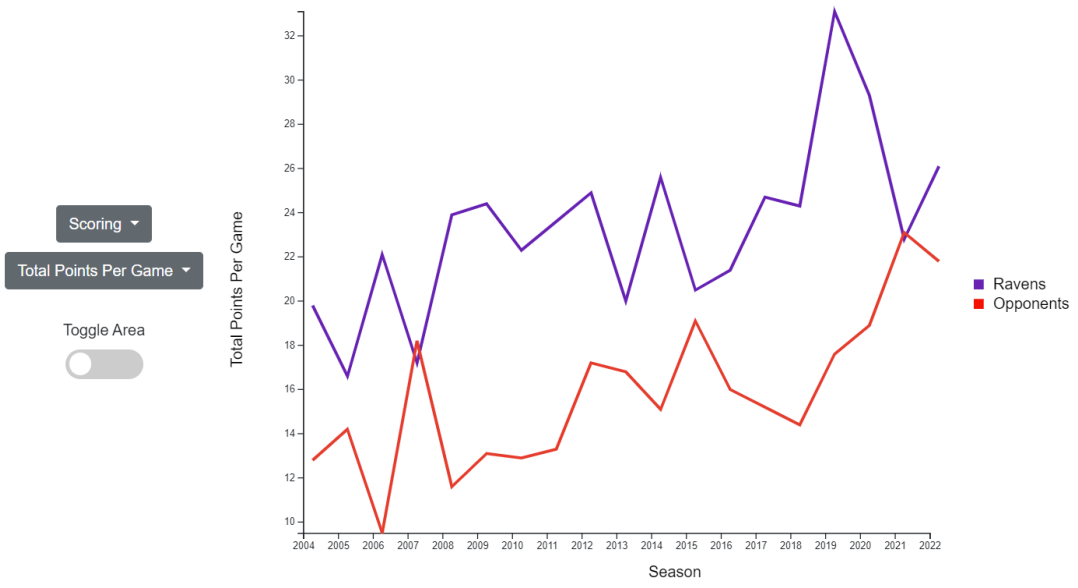


This chart does work for what our objective is, to simply display the total stats for a player. However, we wanted to add something else to emphasize the stats more and give the viewer another way of looking at the numbers instead of trying to match the bar to the y-axis. So, we created a table below the graph that explicitly states the stats itself. We also made it to where if you hover over a certain row in the table, then that bar in the chart that it corresponds to highlights.

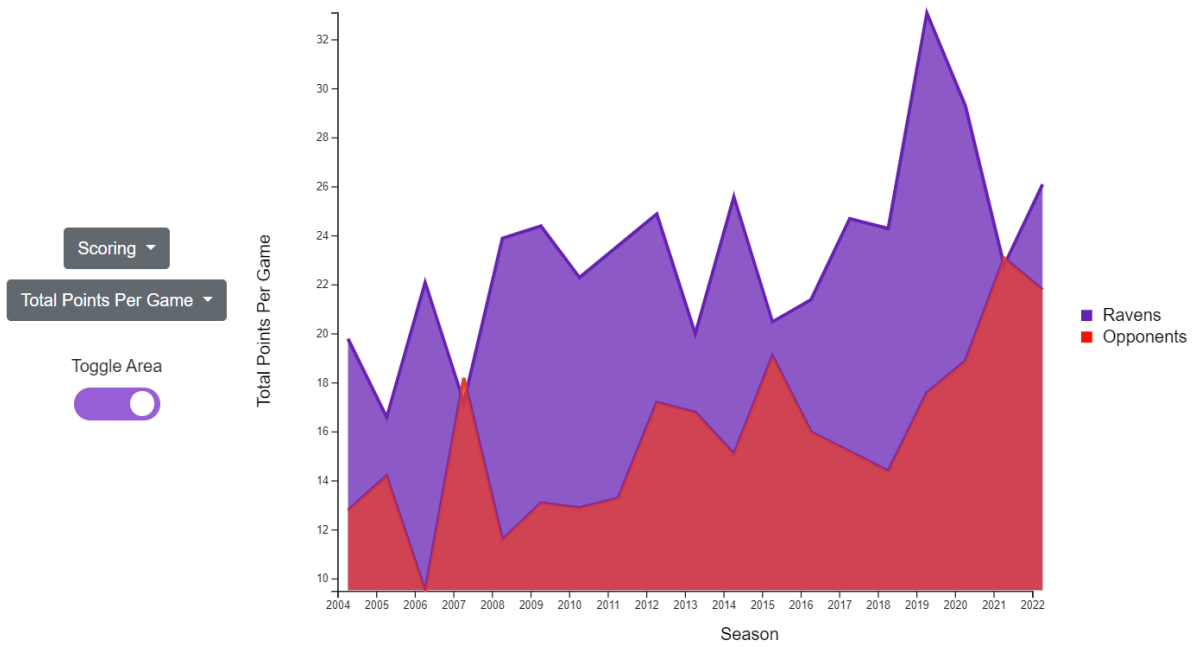
Player	Stat	Value
Boller , Kyle	Yards in 2005	1799
Griffin , Robert	Yards in 2019	225
Jackson , Lamar	Yards in 2019	3127
Wright , Anthony	Yards in 2005	1582

Implementation

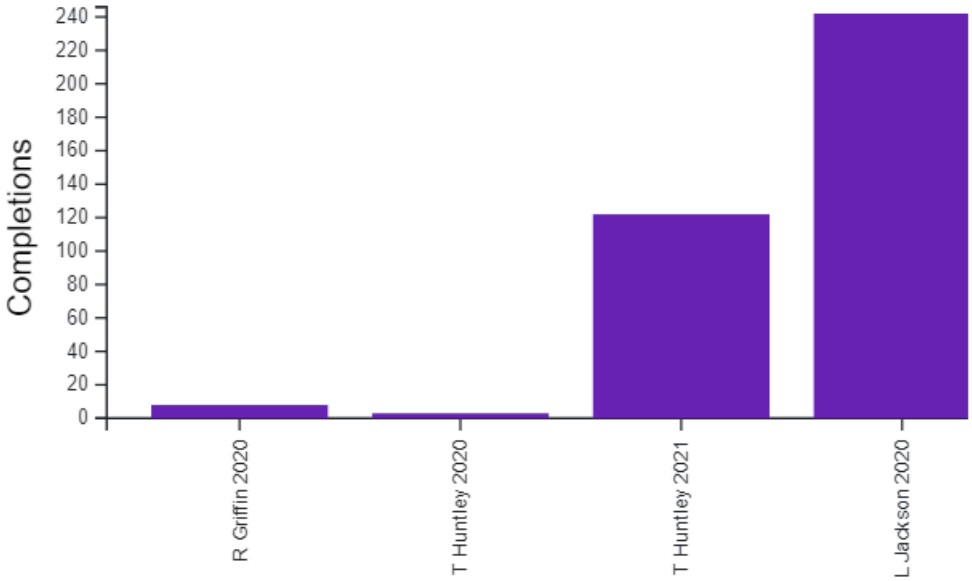
Our project has two main visualizations. The first one being a line chart that compares the Ravens stats over different seasons vs their opponents. For the line chart, the user can select different aspects of stats like total scoring, yards, points, etc. As you can see below, the two different lines are showing the progress between them. We wanted to show how the two differ from each other.



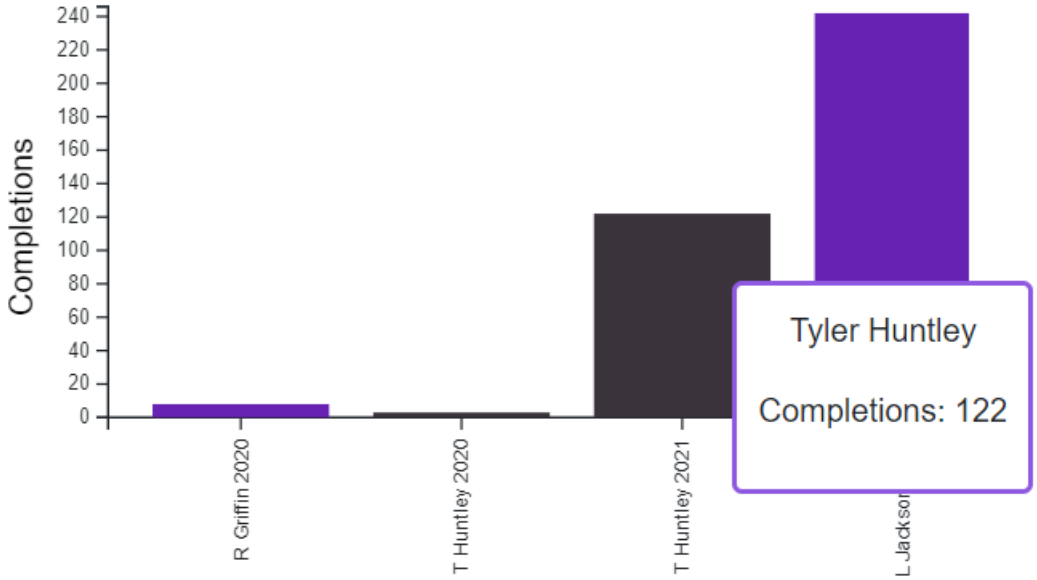
We added an option to toggle on the area between the two as well and used an area chart for this. The reason in doing so is because we wanted an option for the user to be able to see the areas emphatically where the Ravens are doing better/worse than the opponents. Sure, they should be able to tell from the line graph itself where one line is higher than the other, but highlighting the areas in between emphasizes it and draws more attention to the eye.



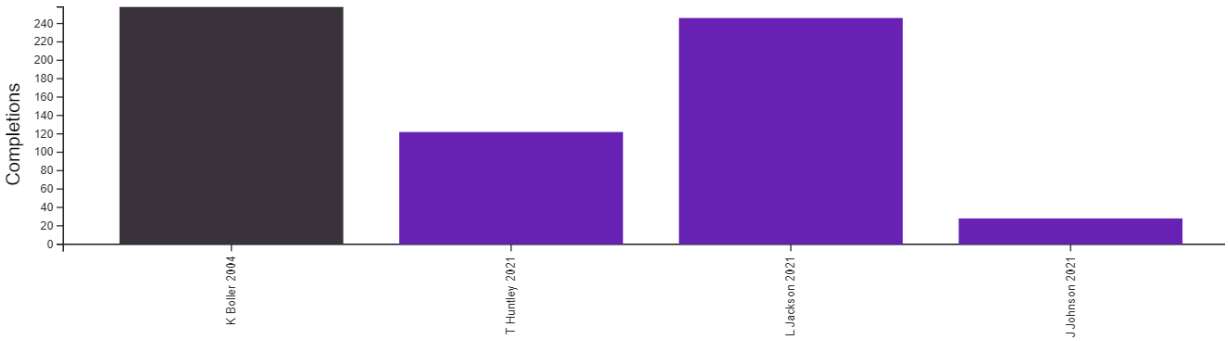
Our second visualization was one that was already mentioned before: the bar chart with a table beneath. The intent for this is to compare stats between different players. Here, a bar chart is the best to represent it because we are comparing categorical data and there aren't too many categories to compare.



The chart alone does the job it's intended for. However, it still leaves a problem. Simply by looking at the graph itself, it is impossible to know exactly what the value for a player is. To fix this, we added the interaction to hover over the bar and have a popup telling you.



We also thought a user might want to view all the data at once without having to hover over each bar individually. That's why we put the table underneath it. As you can see in the picture below, hovering over a row in the table will highlight both the row in the table as well as the bar it corresponds to.



Player	Stat	Value
Boller , Kyle	Completions in 2004	258
Huntley , Tyler	Completions in 2021	122
Jackson , Lamar	Completions in 2021	246
Johnson , Josh	Completions in 2021	28

Evaluation

Our project is fun to use for us because even though we implemented the functionality of the chart and grabbed the data itself, it's not like we were data scientists studying over the numbers and trying to draw conclusions from it. After finishing the project, we played around with the visualizations and learned a lot about the data itself. One example of this is learning about players we have never heard of from seasons long ago. There have been a ton of players throughout the years that have played for the Baltimore Ravens, so it is cool to see what kind of stats they have. Another thing we learned is how surprisingly good some players were compared to another. We realized that some players were vastly underrated compared to their reputation either at the time they played or even for today.

There are a few aspects of our project that we could improve. A way we can tweak the bar chart visualization is something that was mentioned before. We added the interactive popup to help read the numbers, but we could also adjust the axes to where it is much easier to gauge what values the bars align at. Another thing we could enhance is the line chart. We could add the hover affect that the bar chart has. A user could follow the line with their cursor and have the exact value show to them. Lastly, for the table, we could make a more interactive element by adding the ability to click on one of the rows and have it expand and show some of the sub-categories of that particular player.

Overall, our project answers all of the questions that we intended to answer. The reason why we think so is related to what was stated above. Playing around with the visualizations helped us learn different info about the data, and that includes learning the answers to our objectives. This was due largely to the visualizations. Having the bar chart is what helped us realize what players were underrated. Sure, you can look at the difference in numbers and compare it that way but seeing a visual representation makes it easier to process the information faster and it emphasizes the difference between players.