Process Book

Tyler Allen and Dallon Haley

Table of Contents

Overview and Motivation

For our project, we wanted to base it off of something that both of us know and enjoy, and Rocket League was the perfect choice. We enjoy watching, playing, and talking about Rocket League, so we decided to make a visualizing website that shows off statistics related to it. Rocket League is a video game that pits players against each other in soccer matches that are either 1v1, 2v2, 3v3, or 4v4. However, Rocket League isn't just simply soccer, each player controls a car that must drive around and hit the ball in a variety of ways to score on the opponent. Using different methods like boost (allows players to go faster), aerials (jumping off the ground, using boost, to hit the ball while it is airborne), and many other methods, the objective of the game is to score goals on your opponent. In Rocket League, there is a "ranked" game mode that allows competitive players to rank themselves on a ladder of a variety of ranks. These ranks include (from worst players to best players) Bronze, Silver, Gold, Platinum, Diamond, Champion, Grand Champion, and Supersonic Legend. Each of these ranks further divide into divisions (1-4), and players can improve their divisions and ranks by winning games (and derank by losing games). This website is not only something that we will enjoy using, as we plan on including statistics that are fun to see and important to know, but also will give people outside of this class a resource to visualize their own Rocket League statistics.

Features

On our website, we made a list of features that we broke into two main categories: "must-haves" that we knew we wanted to have at minimum, and a list of "nice-to-haves" that, if we had the time, we would include into the project.

Must-Haves

The following list is an overview of the features we knew we wanted to provide:

- Collect game data for a wide variety of users and games
- Ability to select a player for data we have collected
- Ability to select any game a player has played in
- See the basic stats of the selected game (goals/shots/assists/etc.)
- See more detailed stats of the selected game (demos/shot percentage/boost stats/etc.)

Along with this list, we wanted to provide a good amount of interactivity to the visualizations planned.

Nice-To-Haves

The following list is an overview of features that, given time, we would implement into the project:

- Ability for users to upload their replays to ballchasing.com and prompt our website to update each player's games data live
- Much more detailed graphs/charts/maps, including:
    - More detailed boost statistics
    - Player movement statistics
    - Player positioning map
    - Player boost map
- Visualizations that go into detail about whole population stats i.e. every game we collected
    - These would allow you to filter the stats by rank, date/season (season 1, season 2, etc.)

Related Work

As discussed further later, the site: https://sunsiu.github.io/poke-data/ was good inspiration as to how we will go about formatting our site and how we want to implement interactivity for the user. The statistics provided on ballchasing.com were also big inspirations, as the detail they go into for the visualizations is on a similar level to what we wanted to achieve when choosing a project on Rocket League.

Questions

When starting this project, we wanted to answer many different questions a Rocket league player would have while playing:

- What is a player's boost use during a given game?
- What is a player's goals/assists/saves in a given game?
- I just played a great game, what is my (insert statistic here) from that game?
- How did my boost statistics from this game compare to this other game?
- How do each of my games compare to each other?
- What is (insert player here)'s statistics?
- And many more.

Because Rocket League is such a dynamic game with such a high skill-ceiling, improvement is one of the main driving forces in playing the game. We hope to aid players in seeing their statistics, how they compare to other players, and much more.

Data

Our data was taken by the website ballchasing.com, which provides an API with the ability to upload Rocket League replays and retrieve game statistics from them.

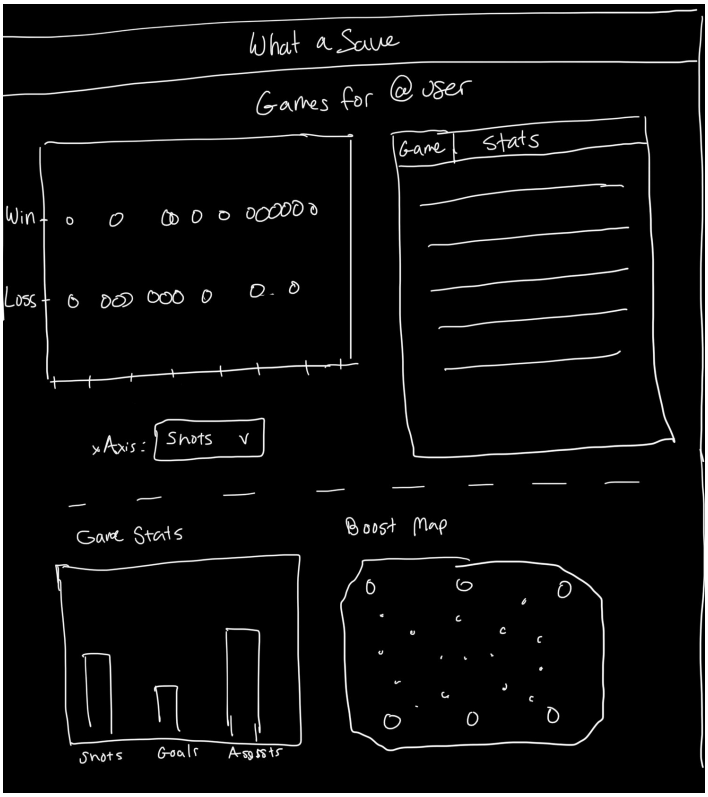
Data Acquisition

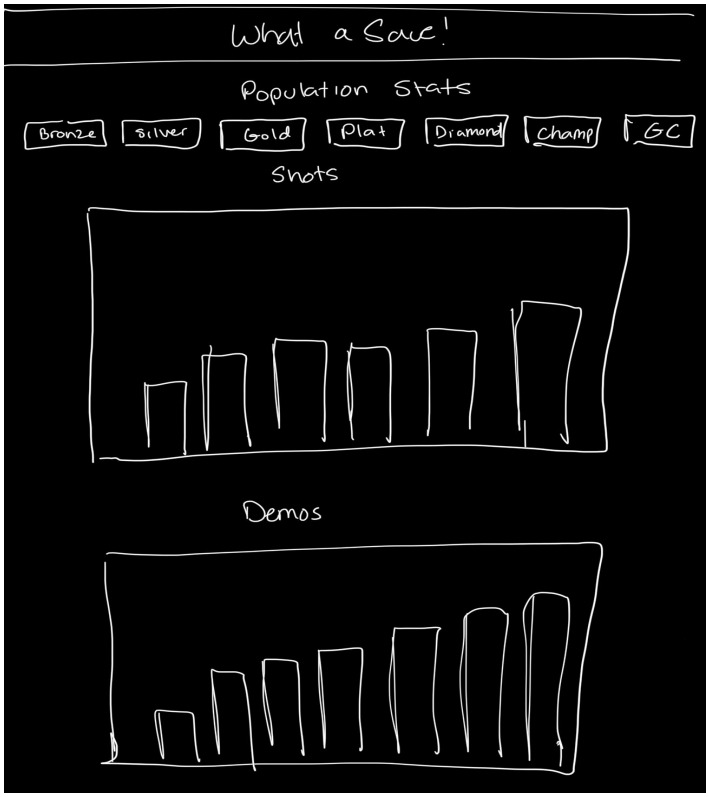
Using Python, we were able to make a API scraper that connects to their API to pull game statistics in the form of JSON. The API allows you to grab any number of replay information with basic data about the game (IDs, match data, players, etc.), but does not immediately give all of the detailed statistics about the game. To do so, you have to loop through each of the IDs retrieved from the previous request and send a request to get one game's data from that ID, in which you are given a JSON of the data. From that data, we were able to save each of the game data responses in a JSON file that will allow loading from and saving to with ease.

Exploratory Data Analysis

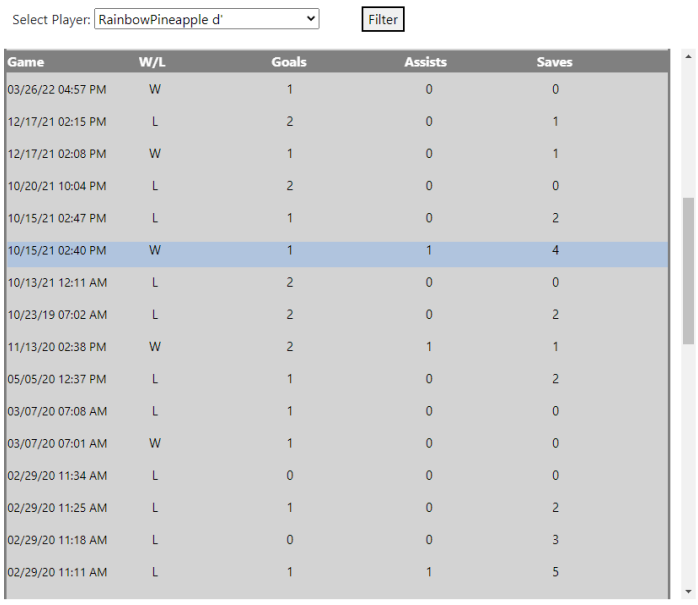
Looking through previous projects, we were inspired by the "Pokedata" project, where they split their visualizations into two main categories: individual Pokemon statistics, and a generalization of all pokemon through their types. Each of these sections had some form of interactivity as well as statistics, which gave us a good starting point on how we wanted to begin sketching our project. We wanted to incorporate how their site is laid out and how it separates the statistics into two main sections, each displaying different options/filters and data. We incorporated this into our end prototype because keeping different types of information grouped in different sections helps both with user experience and usability.

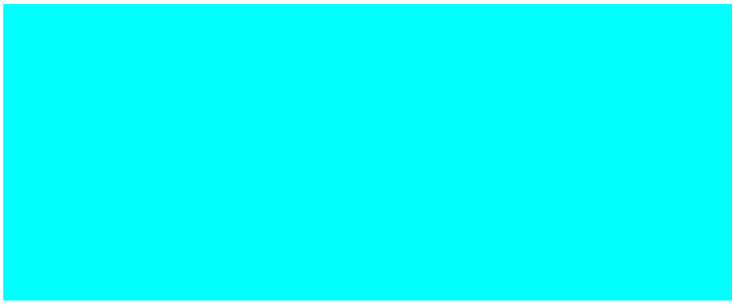
Design Evolution

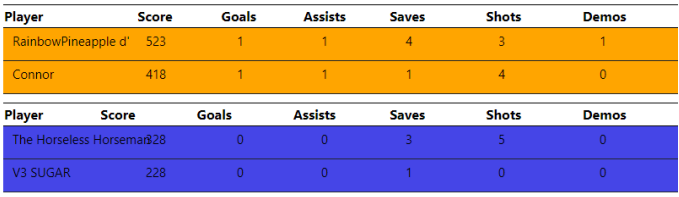




Initially, we had a wide variety of UI sketches that covered a variety of different statistics about a game of Rocket League: boost statistics, position statistics, core statistics (goals/assists/saves/shots), and more that would show unique parts of the game in different ways. We eventually combined a few sketches/ideas we had into each prototype and adjusted it as we went.



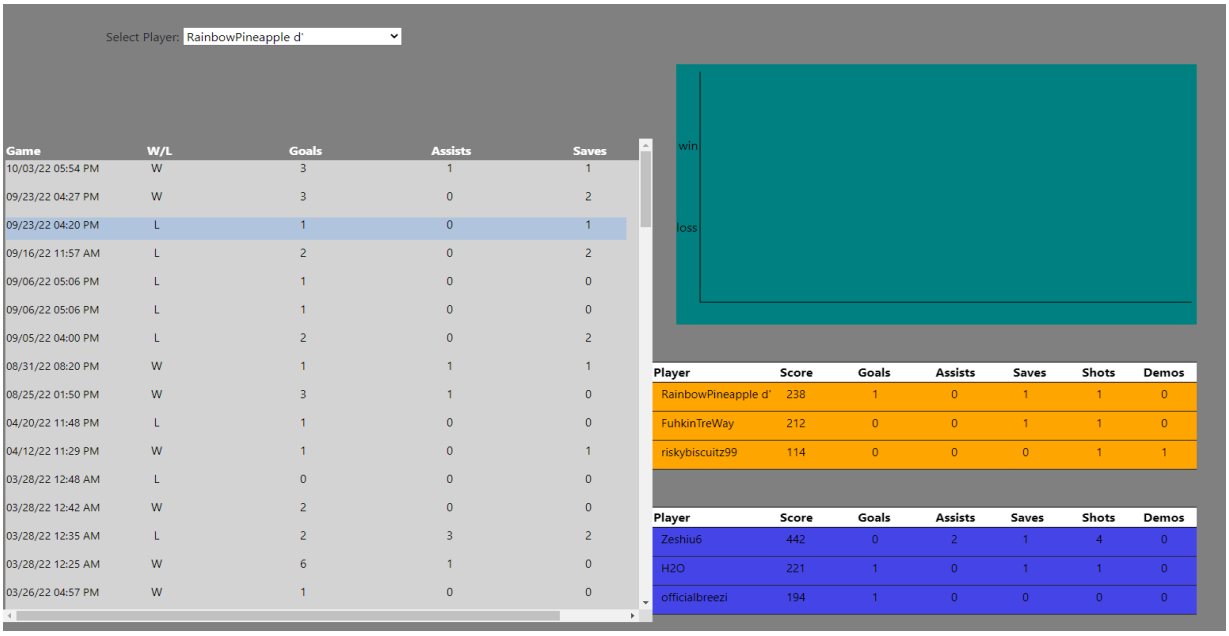


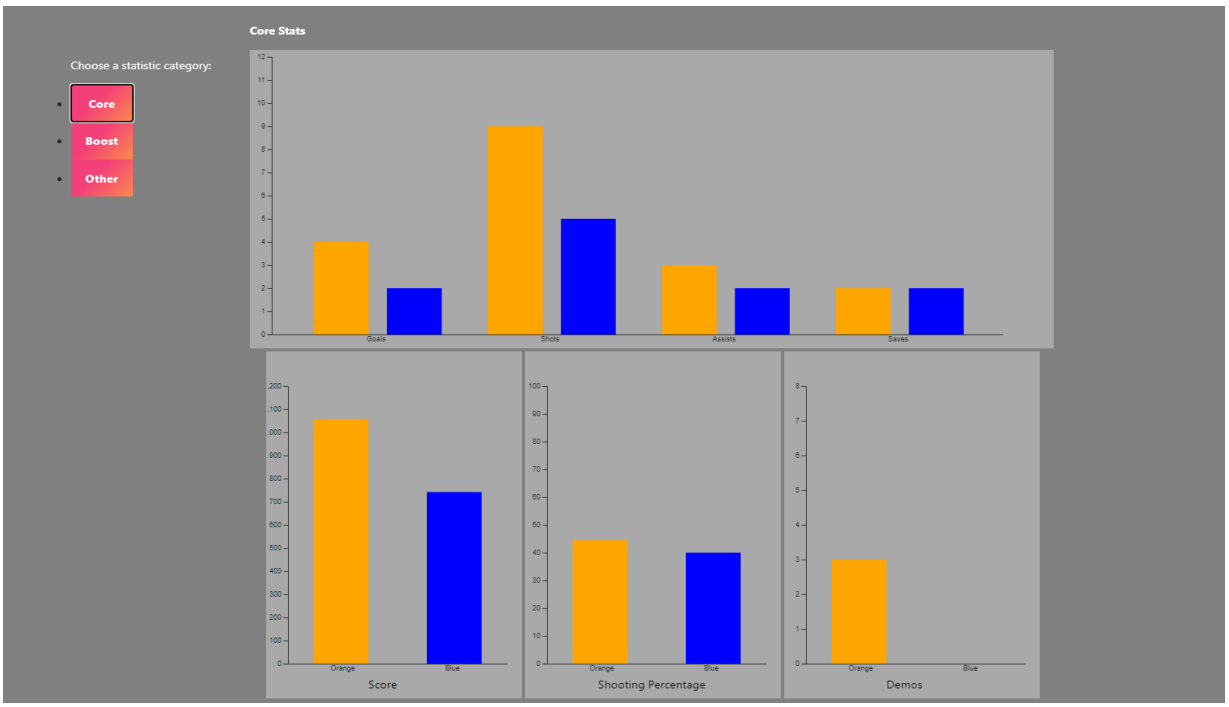


Prototype 1

When we were thinking of all of the different visualizations we could create, there were a huge number of different varieties we can display to the user. These visualizations could include information about individual games, players, or population statistics, where each of these would include graphs/charts about stats in the game like boost per minute (BPM), speed statistics, positioning statistics, and much more. However, many of the ideas we came up with would not be very interactive for the user, and would most likely just list statistics in simple bar or line charts. There were ideas of interactivity that we wanted to include, however. We wanted to give the user the ability to find themselves (if replays exist) in some sort of list and give them the ability to click on themselves to show a variety of statistics about them. Along with statistics, there would be some way to display each of the games they have played, and when clicked/found, it would pull up the individual game statistics for that game. This would allow any player to see their stats and each of the games they have played to help them track how they have played/progressed. The picture above displays the first prototype of the project, where on the left is the dropdown where you can select a player, along with the table that you can interact with to see statistics for an individual game. On the right is where we plan to display another chart to display games, as well as the scoreboard for which the game-specific stats are shown.

Prototype 2

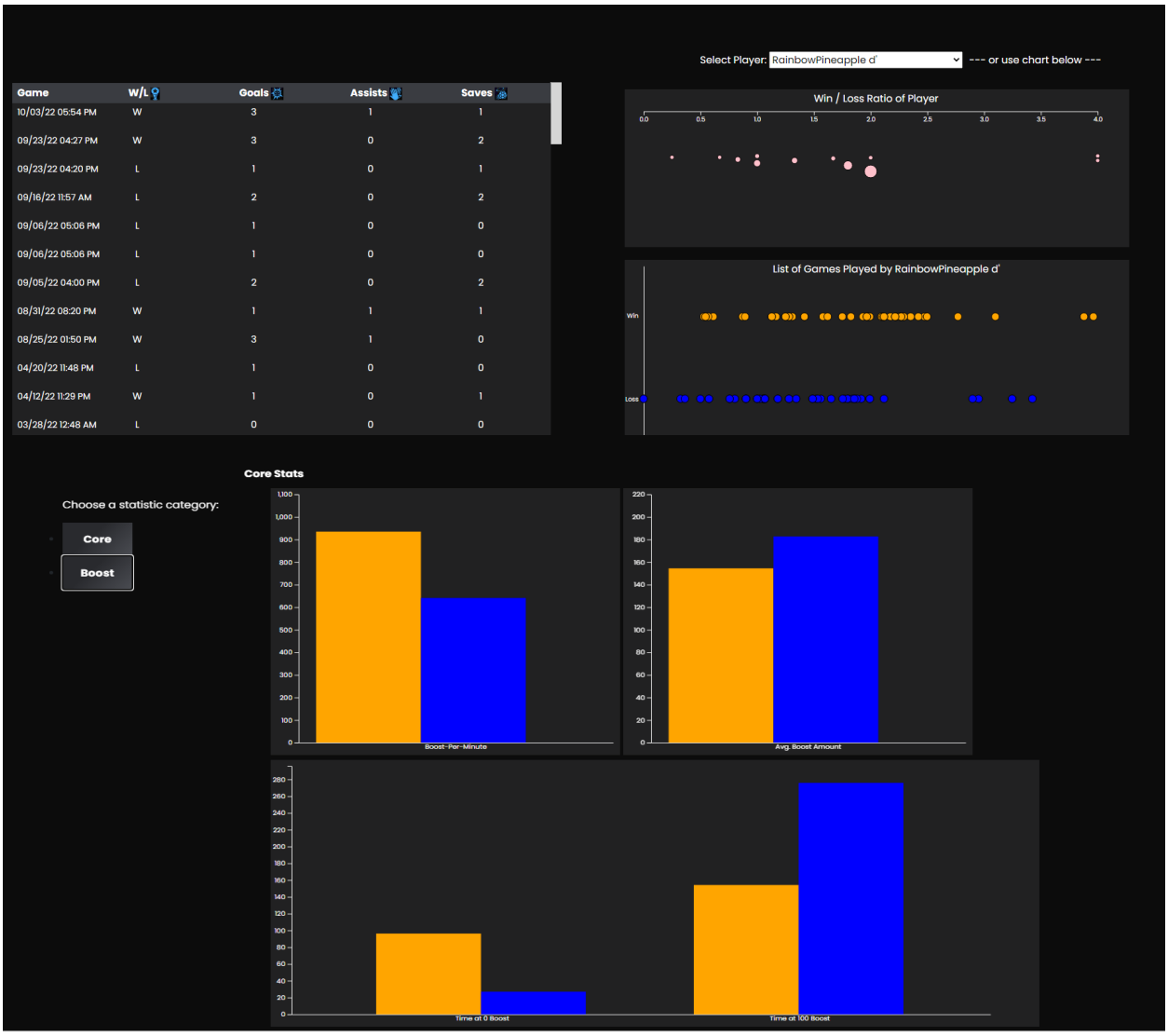




This prototype included a few new features that improved (and slightly worsened) the previous prototype. Along with reformatting the table, scoreboard, and future bubble chart, we added the new feature of core/boost graphs that display important statistics from the game you clicked on in the game table. These charts include statistics from both the team and the individuals, as it displays the team as a

whole on the chart, but when you hover over any of the bars it will give details about each of the players that contributed to that team. Along with these core statistics charts, we also have the button list to the left that have charts for not only the core stats, but also boost specific stats, and other important statistics that do not fit in either of the previous categories. We hoped that adding these statistics would help any player who wants to see stats from any match will have the detailed statistics they need to improve their game.

Final Design



Game	W/L	Goals	Assists	Saves
10/03/22 05:54 PM	W	3	1	1
09/23/22 04:27 PM	W	3	0	2
09/23/22 04:20 PM	L	1	0	1
09/16/22 11:57 AM	L	2	0	2
09/06/22 05:06 PM	L	1	0	0
09/06/22 05:06 PM	L	1	0	0
09/05/22 04:00 PM	L	2	0	2
08/31/22 08:20 PM	W	1	1	1
08/25/22 01:50 PM	W	3	1	0
04/20/22 11:48 PM	L	1	0	0
04/12/22 11:29 PM	W	1	0	1
03/28/22 12:48 AM	L	0	0	0

This prototype includes major changes to the project. It adds a few different visualizations that improve both the interactivity of the project as well as the clarity. When starting this prototype, we noticed that selecting players and any of theirs games lacked interactivity and the way we let the user select a player can be difficult as we have many players with only a few games. Therefore, we decided to

not only include each of the visualizations we had before, but reformat the page to include some extra charts: a beeswarm chart that would display each player, and a bubble chart that displays each game the selected player played in. The beeswarm chart was decided to only list the players that appeared in at least 5 games to prevent having thousands of players displayed, and would give the user a better way to sort through the long list of players. When a player is selected in the chart, it would update the bubble chart previously mentioned as well as the games table with the games the player appeared in. Separating the games based on win/loss, the bubble chart would rank the games based on score to allow the user to select games that caught their eye (high score but lost, low score but won, etc.). The chart would also allow the user to brush certain games a player played in to further filter the games table/bubble chart if they wanted to filter only certain games. Along with these visualization additions, we overhauled the look of the site to allow for more visual clarity, cleaner looks, and visuals to enhance everything. Finally, we added an “About the Project” tab at the top that gives more information for a random user who doesn’t know about Rocket League, as well as a few highlights about the creators of the project.

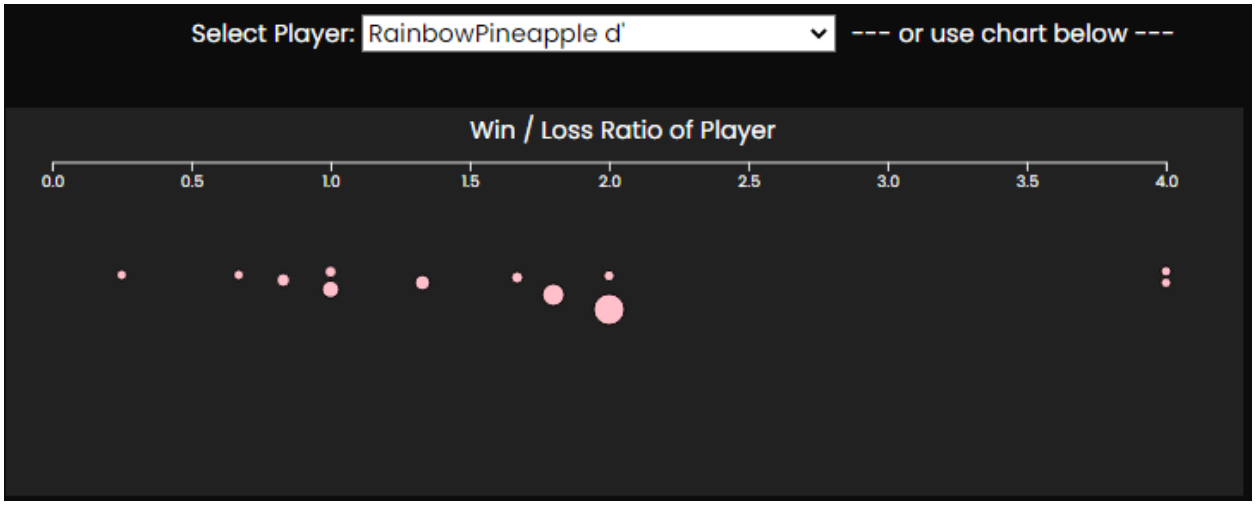
Overall

In the end, we decided to keep the decision of splitting the visuals into two main sections: the player/game selection, and the detailed charts that give more information about a specific game of Rocket League. Though we stuck with this design decision, we had to pivot our features a bit along the way. We decided that implementing the “Population” feature that would detail statistics for each game we have collected and allow you to filter them by competitive rank would take too long and wouldn’t align with the project we wanted to create.

Implementation

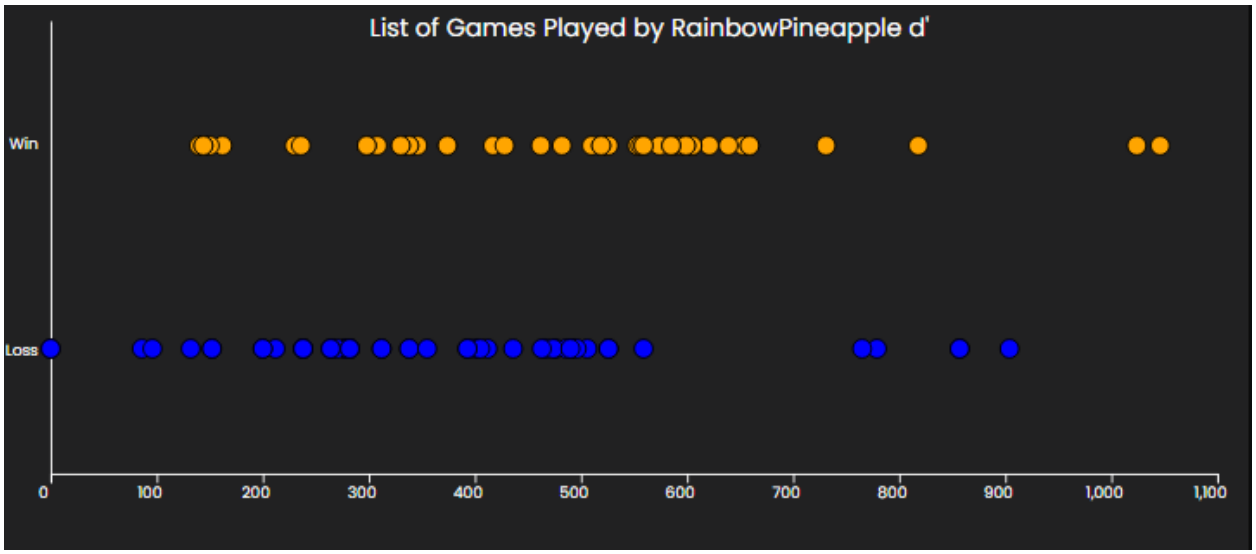
For our implementation, we wanted to give the ability for the user to interact with a variety of visualizations to allow them to see exactly what statistics they want. We wanted these visualizations to incorporate different statistics of a Rocket League game to allow the user to see in-depth statistics. These visualizations have many forms, including all of the charts shown below.

Players Chart



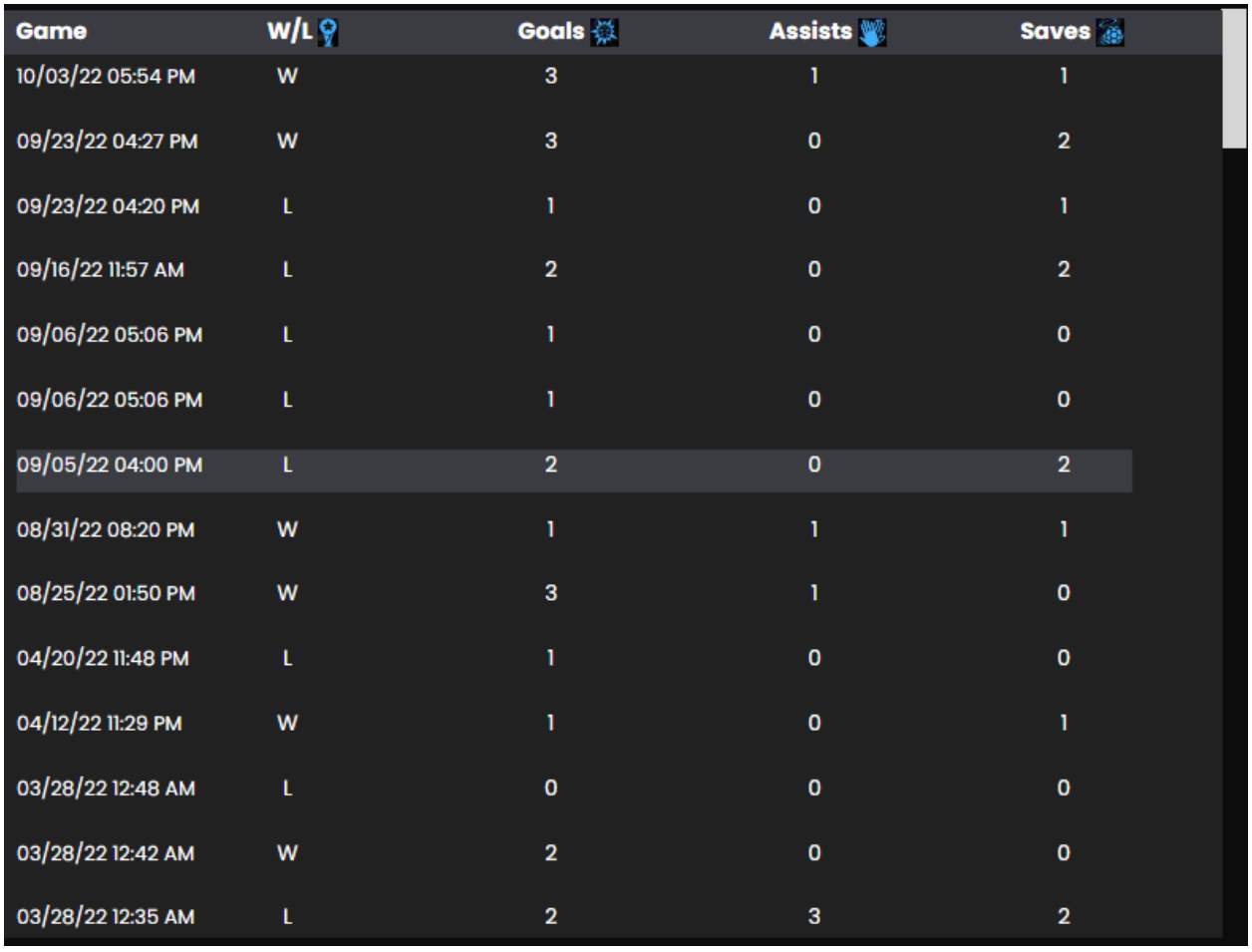
The above beeswarm chart/dropdown allow you to choose from each player we have collected games for, as well as a more refined list of players. While the dropdown displays the name of the thousands of players we have data for, the beeswarm chart refines that list down to only the players who have appeared in 5 or more games. These players are plotted on an axis that ranks them by total win/loss, meaning the number of games the player has won divided by the number of games the player has lost. The plot also allows you to hover over any of the circles to see who the player is, their win/loss ration, and the number of games they appeared in. Once a player you want to see more information about has been found, you can click on any of the bubbles to display/update a bunch of visualizations.

Games Chart



This bubble chart displays each of the games a player has appeared in on two main lines: each game they won, and each game they lost. This was done for both visual clarity and to allow the user to see the split in games if they are only interested in games that were won or lost. Along with the ability to click a circle to see more details on that game, the chart allows the user to brush the circles. Brushing any number of circles updates the games table (shown below), and will reset itself when the brush is removed.

Games Table



Game	W/L	Goals	Assists	Saves
10/03/22 05:54 PM	W	3	1	1
09/23/22 04:27 PM	W	3	0	2
09/23/22 04:20 PM	L	1	0	1
09/16/22 11:57 AM	L	2	0	2
09/06/22 05:06 PM	L	1	0	0
09/06/22 05:06 PM	L	1	0	0
09/05/22 04:00 PM	L	2	0	2
08/31/22 08:20 PM	W	1	1	1
08/25/22 01:50 PM	W	3	1	0
04/20/22 11:48 PM	L	1	0	0
04/12/22 11:29 PM	W	1	0	1
03/28/22 12:48 AM	L	0	0	0
03/28/22 12:42 AM	W	2	0	0
03/28/22 12:35 AM	L	2	3	2

This table has four main functions: selecting player names, filtering the game data, sorting the table, and viewing every game that player has appeared in. This table allows the user to scroll through all of the available games, and if they want to see one game more in-depth, they can click on the game to view more information.

When a game is clicked, many different visualizations appear, including:

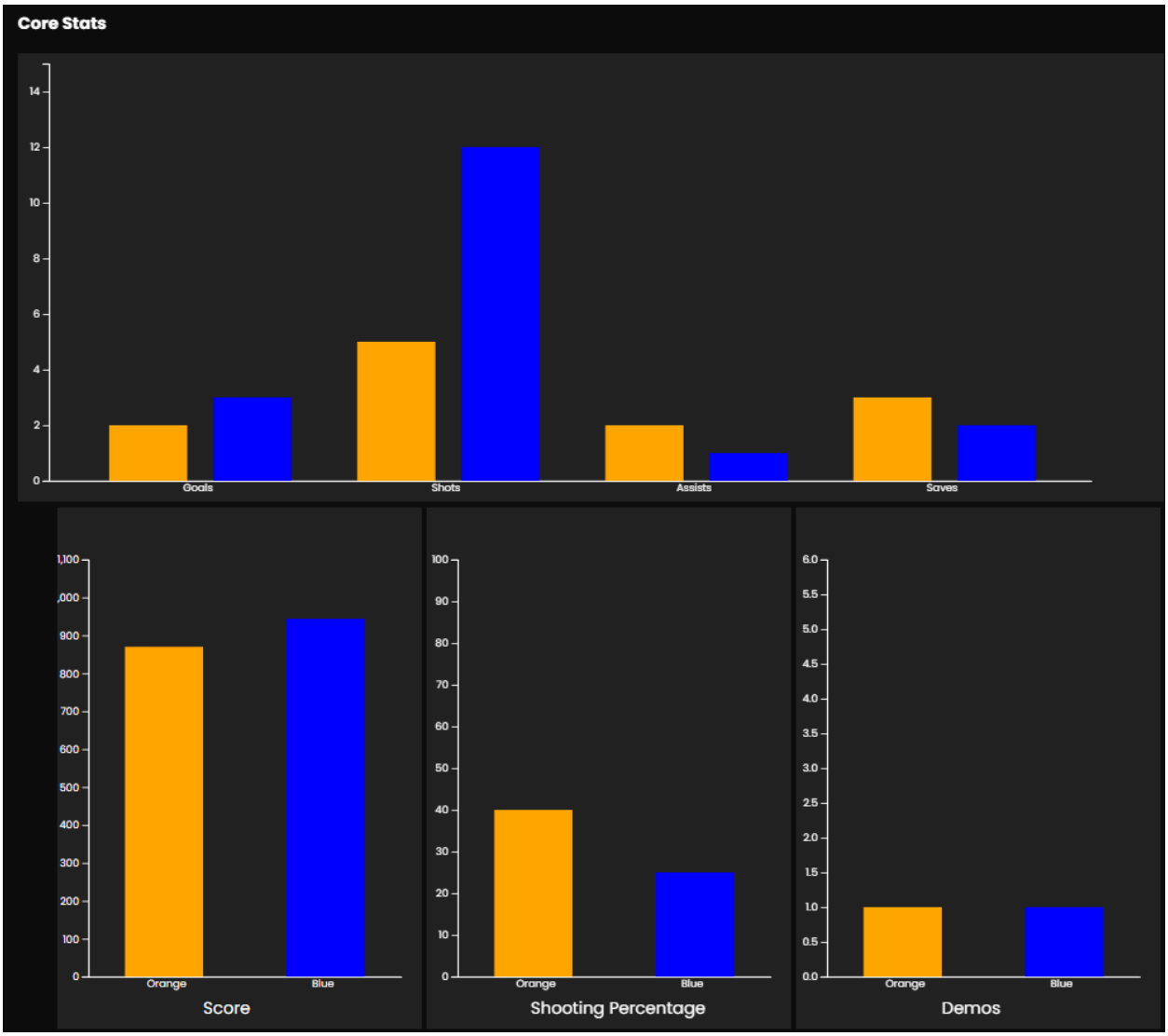
Scoreboard

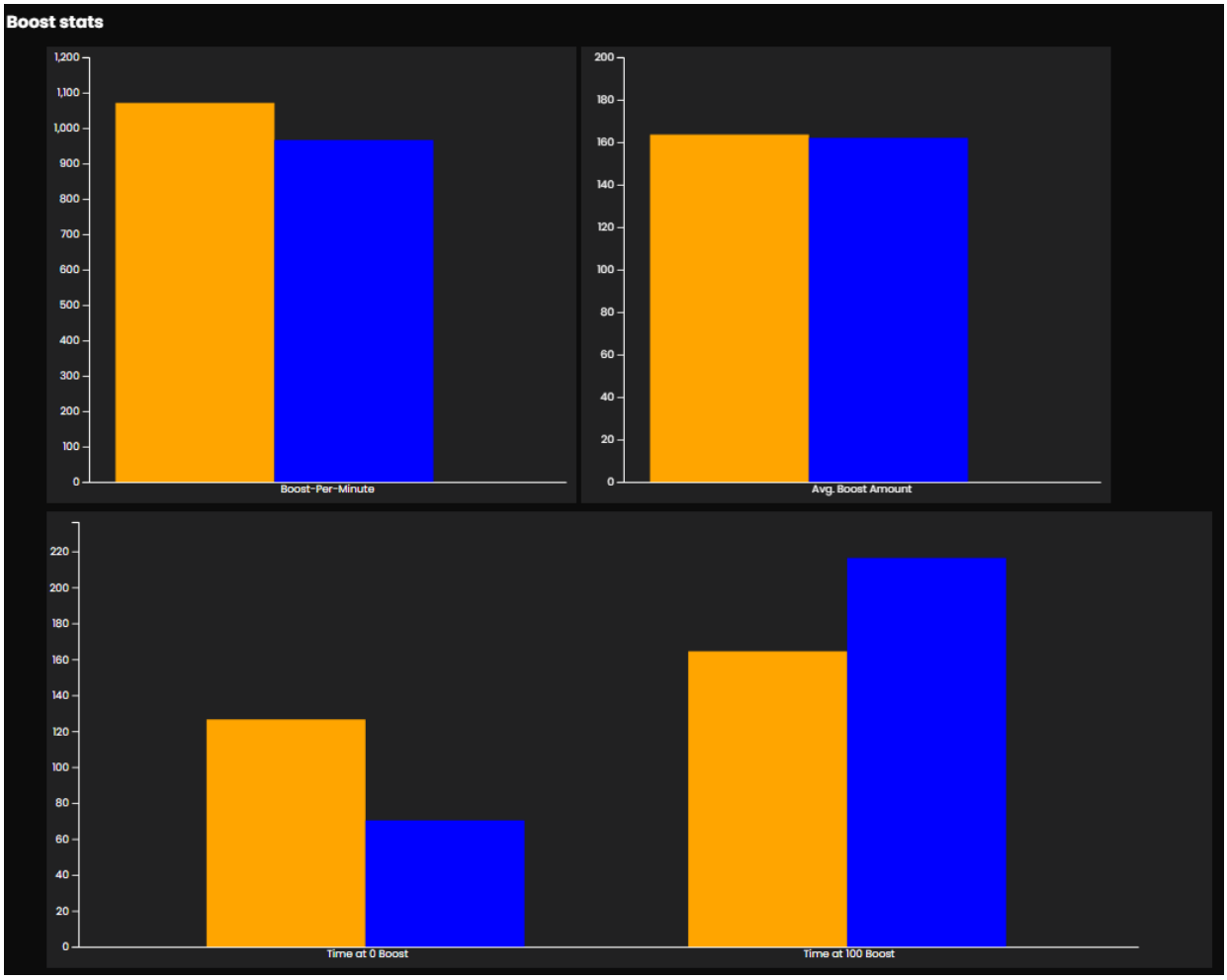
Player	Score	Goals	Assists	Saves	Shots	Demos
RainbowPineapple d'	492	2	0	2	2	0
riskybiscuitz99	154	0	1	0	2	0
Liam_cl	142	0	1	1	0	0

Player	Score	Goals	Assists	Saves	Shots	Demos
Grexl223	394	1	2	1	3	0
AngryBanana05	373	2	0	1	4	0
Carry Me	174	0	1	0	2	0

The game scoreboard shows quick statistics that a game of Rocket League displays at the end of every game: the players on each team, their score/goals/assists/saves/shots, as well as another important stat, each player's demos. This gives a fast and easy way to see more specific stats on a game.

Core Statistics Charts





The above bar/line charts display in-depth game statistics in two main categories: core, and boost stats. Each of these groups display the main statistics of Rocket League, the main stats shown in the scoreboard, along with shooting percentage, demos, boost used per minute, average boost amount, and the time at 0 and 100 (full) boost. Each of these statistics are some of the main and most important statistics in Rocket League. For example, knowing how long you are at 0 boost is important because being at low boost means not being able to reach the ball as quickly as your opponents, which could lead to a goal scored on you. Knowing your own statistics is important, but it is also important to compare each of these statistics with your opponents to see how well you managed your boost amount compared to your opponents, and how your strengths/weaknesses shaped the outcome of the match.

Evaluation

Through each of the visualizations we made using the data, we learned that a lot of the data we have are unable to be combined into a single chart. This is because a lot of the data we collected are on very different scales, making it difficult to chart many of the types of data we collected as we did not want to fill the page with large amounts of simple charts. One thing we did learn directly about the data, however, was some comparisons between Tyler's and Dallon's statistics. For example, it was hard to gauge win/loss ratio with just the text data, but with our visualization we can clearly see that Tyler's ratio is 0.2 higher than Dallon's, which is shown in our bee swarm chart. We think our visualization works quite well for what it wants to achieve. We chose to focus on individual game statistics for a small player base so we could give more detailed information. If we were to improve our project with more time, however, we would include more general population statistics as a way to compare an individual player to averages of any given rank. This would help give more context to what the statistics mean for any given player at their rank.