Neil Chadli
Jules Chabod
Mael Tournier

Introduction

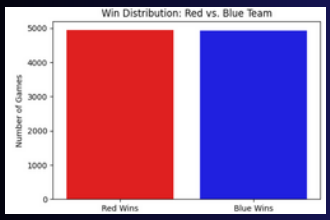
The goal of our project was to perform and present a data analysis based on a large number of high-level League of Legends matches and also a presentation of all league of legend champions. League of Legends is an extremely popular online multiplayer game developed by Riot Games, known for its competitive gameplay and strategic depth. It has played a major role in the rise of esports, with professional leagues around the world and international tournaments watched by millions of fans. As passionate League of Legends players ourselves, we found this subject especially engaging and relevant, making it a natural choice for our data analysis project.

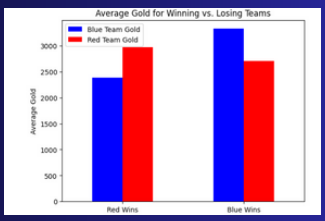
Datasets

The first one, "League of Legends Diamond Ranked Games (10 min)" from Kaggle, includes around 10,000 high-level matches. It provides stats from the first 10 minutes of each game, such as kills, gold, wards, damage, and jungle control all useful to understand early-game impact.
The second dataset, from kaggle also, “League of Legends champions 2024"gives detailed info about each champion, including their nickname, role, type ect .

Exploratory Data analysis

We began our work by performing an Exploratory Data Analysis (EDA) using Python. This initial step allowed us to extract some basic but essential insights from the dataset, helping us better understand its structure and the distribution of key variables.





Website

We chose a dark theme for our site to reflect the kind of atmosphere you often find in video games especially in League of Legends. The dark background combined with glowing cyan highlights helps recreate that feeling of being immersed in a match, often played in a dimly lit room with only the screen lighting things up.
Our goal was to make the experience more engaging and familiar for players like us, by creating a visual style that echoes the game's own aesthetic. The strong contrast between the dark environment and the bright data elements doesn't just look good it also makes the content easier to read and more immersive overall.

What's league of legend ?

Since not everyone plays League of Legends (and honestly, who could blame them, it's a very hard game to start playing!), we decided to include a short video directly embedded from the official YouTube channel of the game's developer, Riot Games. This video offers a quick and clear introduction to the game, helping viewers better understand the context and therefore better interpret the visualizations that follow.

Path to obtain the final result

We first thought about the type of website we wanted to create. A presentation-style scrolling format seemed well suited to the idea of storytelling.

We then designed four original visualizations to enrich the experience:

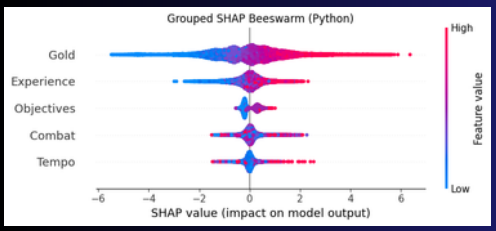
- one representing all the matches,
- another showing average stats for winning and losing teams,
- and two more interactive ones, incorporating game elements to enhance immersion.

Finally, we structured the GitHub so that we could work independently on each visualization, which helped us work more efficiently.

To bring these visualizations to life, we primarily used D3.js, which gave us flexibility and control over the visual style and interactivity.

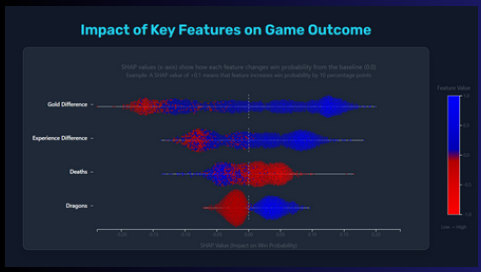
SHAP Beeswarm

Inspiration



In this project, SHAP (SHapley Additive exPlanations) values are used to interpret the predictions of a machine learning model trained on League of Legends match data. After training the model, SHAP values are computed for key features such as gold difference, experience difference, deaths, and dragons. These values quantify how much each feature contributes to the probability of winning a game. The results are visualized using a beeswarm plot, where each point represents a match and its position along the x-axis shows the SHAP value (impact on win probability). The color of each point reflects the underlying feature value, allowing users to see both the distribution and the influence of each feature on game outcomes. This visualization helps users understand which factors most strongly affect the chances of winning.

Design evolution



We first made a plot in python to see how readable it was, we then adapted the design as such:
The dashboard uses a modern dark theme with vibrant highlights and clear navigation. Each visualization is presented on its own page, with interactive elements and color coding to make data easy to explore and understand. The design focuses on clarity, accessibility, and a smooth user experience. We finally added explanatory pop ups on the swarms that show when the user hovers above the plot.

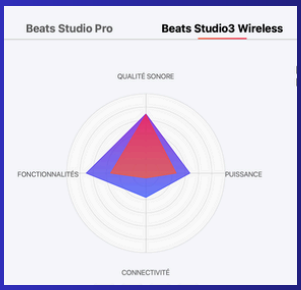
Challenge

We initially had some issues rendering the SHAP data, here is a summary on how we did it in the end:

The beeswarm plot is computed by first training an XGBoost classifier on the League of Legends dataset. SHAP values are then calculated for each feature using the Python SHAP library, quantifying each feature's impact on the model's win probability prediction. For visualization, the processed SHAP values and feature values are exported as JSON and loaded into the web app. The beeswarm plot is rendered using D3.js: each point's x-position corresponds to its SHAP value, while a force simulation algorithm in D3.js arranges points vertically to avoid overlap. The color of each point is mapped to the original feature value, providing a clear, interactive summary of feature influence.

Radar Plot

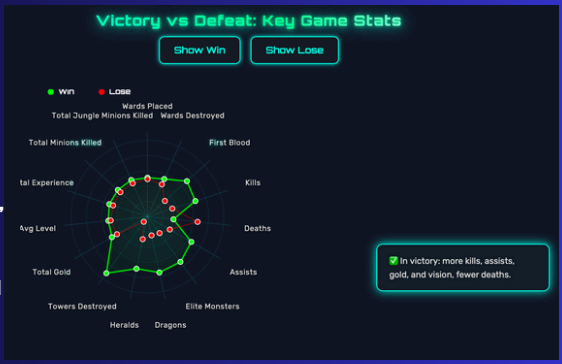
Inspiration



The inspiration for the radar plot on my League of Legends website came from this comparison page on versus.com.
We really liked how it visually compares two products across multiple features using a clean and interactive radar chart.

Design evolution

Originally, the radar plot was designed to display key characteristics of each game element in a clear and comparative way. To improve interactivity, we added a subtle trembling animation to each point on the graph, signaling that they are clickable. When clicked, the user can access more detailed information. Additionally, two buttons [Win] and [Lose] were added above the plot, allowing users to switch the data displayed based on match outcomes.



Challenge

Initially, we used a first radar chart library, but it turned out to be poorly optimized and visually limited. As a result, we had to switch to a different library mid-development, which required adapting our code and data structure.
Another challenge was to make the radar plot visually appealing, despite its inherently technical and mathematical nature. We spent time adjusting colors, spacing, and animations to ensure the chart would fit seamlessly into the overall design while remaining clear and readable.

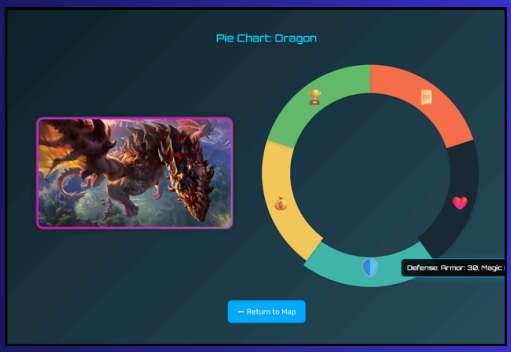
Interactive map

Inspiration

The idea behind this interactive map was to allow users to view the League of Legends map as it appears in-game, while also being able to highlight and explore important monsters and key features

Design evolution

Initially, the concept behind the map was to allow users to hover over each monster with the mouse to obtain relevant information. However, to enhance the immersive experience, we added the functionality to click on a monster, which opens a new page displaying its main characteristics using a donut-shaped graph.



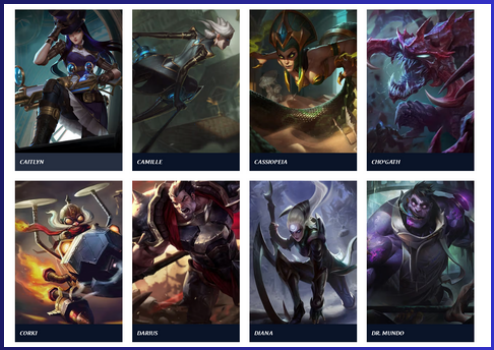
Challenge

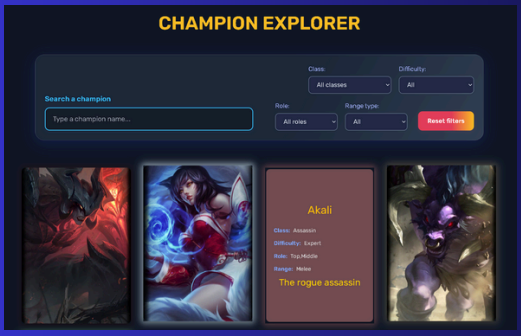
Overall, this visualization did not present any major difficulties. Positioning the monsters on the map took some time but was relatively straightforward. We mainly needed to find an interface that would be pleasant for the user. The donut chart was a bit more challenging to design. We had to configure a suitable speed and a zoom level that would offer a smooth and coherent user experience.

Champion explorer

Inspiration

This visualization replaced the predictive model we initially planned to implement, as we felt it wouldn't be useful for people who don't play League of Legends.
We took inspiration from the official League of Legends website for the champion scrolling design, in order to create a more visual and intuitive experience.





Design evolution

Initially, the images were static. We later added a small motion effects and a light halo to make the visual presentation more dynamic.
Instead of just displaying the images, we designed an interactive card that flips when you hover over a champion, revealing their key attributes.
Finally, we added a search engine that lets users find a champion by name, in addition to the existing filters.

Challenge

To build this visualization, we started by retrieving a CSV file containing all the champions and their characteristics. We also had a folder filled with images of all champions, including their different skins. To prepare them, we wrote a bash script that automatically formatted the images: it kept only the original skin, converted them to PNG, and renamed each file to match the desired naming convention.
We then developed a Python script to analyze the dominant color of each image and add it to the CSV. This allowed us to personalize both the card halo and the card back with visual coherence. One of the hardest parts was combining two animations: getting the cards to flip on hovering, while also making them oscillate smoothly up and down for a more lively effect.

Contribution

All group members contributed equally to the project. Below, we highlight each person's main contributions, although everyone took part in refining the details and improving the website as a whole. In reality, it was often difficult to draw clear lines between individual tasks, as everyone contributed across different parts of the project and supported each other throughout.

Neil chadli

Conducted the exploratory data analysis in Python for Milestone 1. Developed the Beeswarm Plot. Also contributed to the Process Book

Jules chabod

Responsible for the development of the Radar Plot. Also contributed to the creation of the Champion Explorer. Additionally handled the editing of the screencast video.

Mael Tournier

Oversaw the design and implementation of the Interactive Map. Managed the overall website style structure and story telling. Also contributed to the Process Book