

SYNERGY BUILDER

A League of Legends Companion Tool

Project by Griffin Barnard, Simon Browning, and Kaden Vasquez



Background



What is League of Legends?



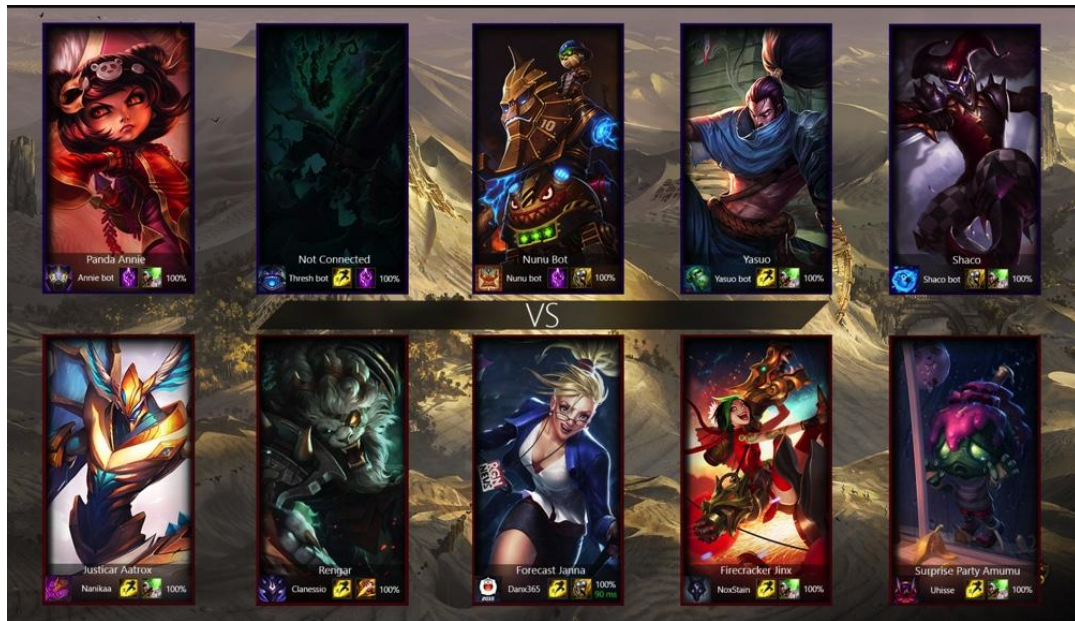
League of Legends is an online team based strategy game, where the objective is to take down the opposing team's base.

As of April, 2023, LoL has a player base of over 150 million worldwide, with many fans and players being heavily invested in the competitive eSports scene.

In 2023, the world championship LoL broadcast peaked at over 6.4 million viewers.

What Is Synergy?

Before a match begins, each player selects one character, called a “Champion”, to play during a match. With teams made up of five players, the combination of champions selected plays a vital role in the game’s strategy. The interaction of two or more champions to produce a more effective team than the sum of their parts is commonly referred to as “Synergy”.



Goals



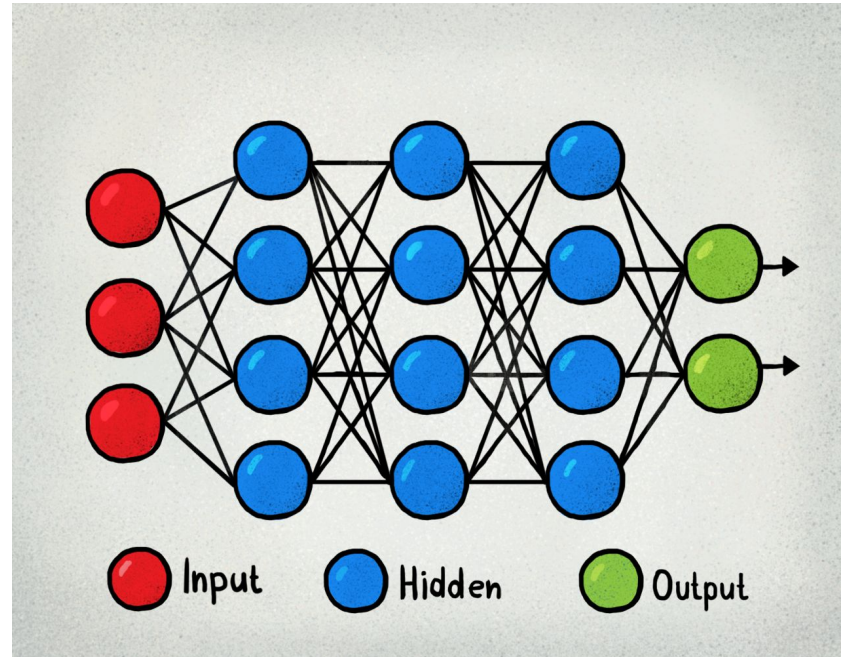
Project Goals

We seek to predict League of Legends game outcomes based on input champion selection. For our initial, most basic version, we are simply looking for which team wins and which team loses. However, as our projects gets more advances, we hope to also display the winning team's odds of winning, as well as which character stats are most influential in determining the victory.



Key Questions:

- Can we accurately predict which team wins a League of Legends game based on both team's champions and the match rank?
- How big of a role do character stats, including rank, play in determining a victory?
- Which machine learning technique/classifier will produce the most accurate results?



Methodology





Data Set

We will use data from the Riot Games API. This will happen by getting many users per in game tier. Then getting a few matches per user. Then we collect all these matches and pull the relevant information from the riot API. So we will have a set of many different matches and their information, from which we can extract relevant features for our model.

```
node index.js

..angle/shaders (-zsh)  #1 node (node) #2 np

{
  tier: 'SILVER',
  participant_1_attack: 2,
  participant_1_defense: 3,
  participant_1_magic: 10,
  participant_1_difficulty: 6,
  participant_1_hp: 560,
  participant_1_hpperlevel: 102,
  participant_1_mp: 418,
  participant_1_mpperlevel: 25,
  participant_1_movespeed: 335,
  participant_1_armor: 19,
  participant_1_armorperlevel: 4.7,
  participant_1_spellblock: 30,
  participant_1_spellblockperlevel: 1.3,
  participant_1_attackrange: 625,
  participant_1_hpregen: 5.5,
  participant_1_hpregenperlevel: 0.55,
  participant_1_mpregen: 8,
  participant_1_mpregenperlevel: 0.8,
  participant_1_crit: 0,
  participant_1_critperlevel: 0,
  participant_1_attackdamage: 50,
  participant_1_attackdamageperlevel: 2.65,
  participant_1_attackspeedperlevel: 1.36,
  participant_1_attackspeed: 0.61,
  participant_1_average_frequency_TOP: 0.031088082901554404,
  participant_1_average_frequency_JUNGLE: 0.019430051813471502,
  participant_1_average_frequency_MIDDLE: 0.7435233160621761,
  participant_1_average_frequency_BOTTOM: 0.04533678756476684,
  participant_1_average_frequency_UTILITY: 0.16062176165803108,
  participant_1_average_wins_TOP: 0.375,
  participant_1_average_wins_JUNGLE: 0.4,
  participant_1_average_wins_MIDDLE: 0.5052264808362369,
  participant_1_average_wins_BOTTOM: 0.5428571428571428,
  participant_1_average_wins_UTILITY: 0.5,
  participant_1_average_assists: 7.854922797927465,
  participant_1_average_detectorWardsPlaced: 0.8024870466321243,
  participant_1_average_dragonKills: 0.05699481865284974,
  participant_1_average_goldEarned: 11011.466321243523,
  participant_1_average_kills: 6.414507772020725,
  participant_1_average_deaths: 6.291450777202073,
  participant_1_average_magicDamageDealtToChampions: 21201.344559585494,
  participant_1_average_physicalDamageDealtToChampions: 1223.3445595854923,
  participant_1_average_physicalDamageTaken: 9679.661917098445,
  participant_1_average_magicDamageTaken: 8513.54015544044,
  participant_1_average_timeCcingOthers: 27.10880829015544,
  participant_1_average_totalDamageDealtToChampions: 23633.318652849743,
  participant_1_average_totalDamageShieldedOnTeamates: 1886.6308290155441,
  participant_1_average_totalDamageTaken: 19063.567357512955,
  participant_1_average_totalHeal: 1793.062176165803,
  participant_1_average_visionScore: 20.354922779792746,
  participant_1_average_win: 0.5,
```



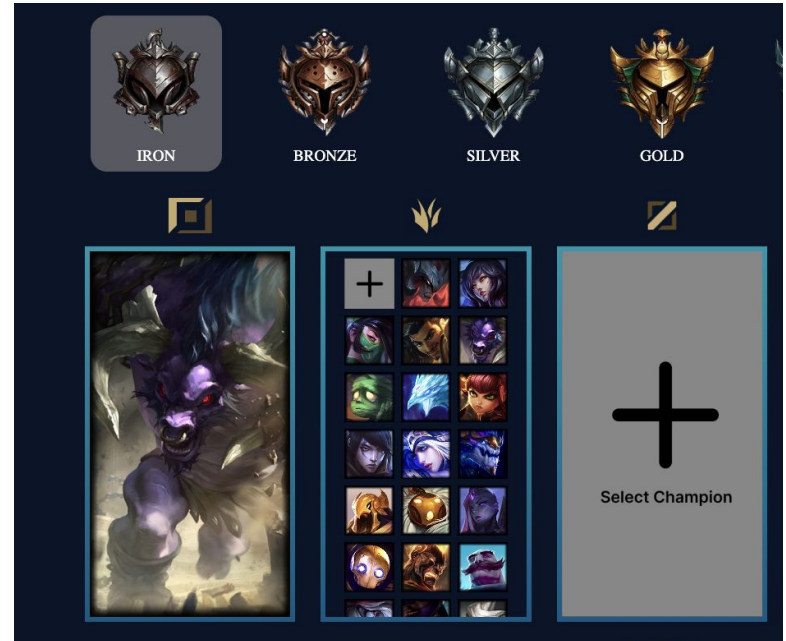
Example of Match Data

The Interactive Website

Our Final Product

Key Features

Our final product will be a website with a champion selection tool. Once the user selects the champions of both teams and the rank of the game, the website will give a prediction as to which team will become victorious. Ideally, the website will also give recommendations as to which champions would be best to select as you are finishing the team creation.



Synergy Builder

some sort of really cool tagline describing our websites wonderful capabilities



Current website design and layout

Milestone	Description	Completion Date	Griffin's Deliverable	Simon's Deliverable	Kaden's Deliverables
1	Getting and cleaning data	April 8th	Acquiring data from Riot Games website	Importing data into Python using Pandas	One-hot encoding the categorical data
2	Determine best training method	April 22nd	Begin Early Website Programming	Create model in Python using Random Forest and one using Neural Networks	Create model in Python using Random Forest and one using Neural Networks
3	Website completed	May 3rd	Finalized Website Programming	Continue investigating model to find further relevant information to be extracted	Create icon and User Interface elements for website



Milestones

Works Cited

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<https://medium.com/@datamonsters/artificial-neural-networks-for-natural-language-processing-part-1-64ca9ebfa3b2>