Player Base Analysis: League of Legends

Math 189R
Harvey Mudd College
Jason Ma 2019

Relevant Terms

Champions - Characters that players can play

Ranked - League of Legend's competitive game mode

Meta - How to play League of Legends

Project Overview

- 7.5 peak million concurrent players
- 100 million players per month
- > $8 million dollars generated in skin sales

Source: http://www.lolesports.com/en_US/articles/worlds-2016-finals-tickets

Data

- 110,000 player stats accumulated over numerous ranked games
- 37 features for every champion
    - Simplified it to ~10 statistics
- Data Processing:
    - Compiled cumulative stats per player
    - Compiled per champion stats per game

Algorithms Applied

- Feature Selection
    - Attempt to predict values for certain statistics
    - Try to find the most important indicators of a high win/loss ratio (WRR)

- K Means
    - Group both players into classes
    - Use these classes to identify what archetypal players exist

K-Means

Data: Let lst be an array of vectors of N dimenions, Cent be randomly defined vectors of N
dimenions, and C be the number of desired centroids

Result: A list of centroids

while *Cent != oldCent* **do**

    oldCent = cent

    labels = getClosestCentroids(lst, Cent) ▷ Clusters data points according to the closest centroids

    centroids = getNewCentroids(lst, labels, C)   ▷ Uses clusters to generate new centroids at their
     center

end

return *Cent*

Algorithm 1: K-Means Clustering

Results

Feature Selection:

- Kills, deaths, Minion Kills, Gold, Healing Done, Magic Damage, Physical Damage, Assists

Linear Regression

- RMSE Value of ~8% on the test and validation sets

Results

K-Means:

WRR	Kills	Assists	Deaths	Gold	Minions	Heals	Damage	Physical Damage	Magic Damage
47.88	5.499	8.964	6.000	11693	124	2551	161937	44073	63747
45.26	5.042	8.987	5.798	12194	186	1505	340556	59659	72406
40.72	4.287	8.755	6.414	10603	103	2101	162021	30965	54054
44.83	4.812	9.119	6.153	11234	119	2517	451061	39711	57483
27.7	2.694	6.75	6.111	9119	106	823	596479	33247	44953

Conclusions

Most important features for WRR

- Get gold

Types of Players from KMeans:

- Better Players win more

Future Improvements

Analyze data from all game modes

Apply LASSO feature selection to session data

Introduce more features

Questions