



Figure 1: Summoner's Rift

LoL eSports: Clustering Team Roles Milestone Report

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Introduction

To all types of players who play League of Legends (LoL), and to those who watch professionals compete at the game throughout various eSports leagues around the world, it's easy to visually identify the five roles of each competing team in a match.

First of all, by observing each of the players' locations on the map at the beginning of a match one can identify their roles. Figure 1 shows an image of the Summoner's Rift map for reference:

The **Top Laners** traverse along dirt path that travels along the west and north perimeters of the map. Near the start of the match they usually combat enemy minions and each other at the northwest corner of the map. This type of combat at the beginning of the match is called the Laning Phase.

The **Middle (aka Mid) Laners** traverse along the dirt path that cuts straight across the diagonal of the

map connecting the two opposing bases. They, too, combat enemy minions and each other during the Laning Phase, where they typically compete right at the center of the map.

The *Bottom Lane (aka Botlane) Carries* and *Supports* traverse along the dirt path that travels along the south and east perimeters of the map. Their laning phase typically occurs at the southeast corner of the map. The *Botlane Carries* deliver damage to their opponents and enemy minions, while the *Supports* play an auxiliary role by providing protection to their botlane teammates.

Finally, the *Junglers* traverse in the forest-like areas between the three lanes. One team’s jungle is in the west and south “triangles”, while the other team’s is in the north and east triangular areas. During the Laning Phase the *Junglers* are combating the monsters that inhabit these areas. They may occasionally encounter each other, especially if one Jungler “invades” their opponents’ jungle areas.

Therefore, it’s nearly as easy to identify team roles in a League of Legends match as it is to identify the nine positions of the defensive players in a baseball game. The botlane is a little trickier, since both *Carries* and *Supports* are there, but by observing their behaviors during the laning phase the two roles are fairly simple to distinguish.

The Question

Sure, it’s easy to identify team roles when observing a single match at a time, but it’s not humanly possible to identify team roles for the hundreds, thousands, and millions of matches that have run through Riot Games’ servers through eyeballs alone.

Fortunately, Riot Games provides post-match data of teams and individual players for virtually all matches that go through their servers. Is it possible for a machine to take a sample of data from these matches and be able to distinguish all five team roles from each other?

Why the Answering the Question Matters

In the Summoner’s Rift game modes for Classic 5v5 matches, Draft Pick and Ranked, because the players’ selection of champions are done and revealed in a structured order, team roles are always assigned the same Participant IDs according to which side of the map the players are on:

Table 1: Assumed Team Role Participant IDs – Draft Pick, Ranked, eSports

TeamRole	BlueTeam	RedTeam
Top	1	6
Jungle	2	7
Mid	3	8
BotCarry	4	9
Support	5	10

While nothing is preventing teammates from swapping team roles before a match or even during a match (e.g., a Top Laner picks Smite as a summoner spell or has the Unsealed Spellbook keystone rune and swaps their current summoner spell for Smite and becomes a de facto Jungler), it’s safe to assume that the assignment of these team roles are cemented in place.

However, in the other Summoner’s Rift game mode, Blind Pick, the selection of all ten champions are done and revealed simultaneously, and, therefore, team roles cannot be assumed to be in the same Participant ID order, nor can it be assumed that the five distinct team roles exist on each side as a match proceeds. For instance, one team may have two Junglers, while the other team has no Junglers.

Furthermore, while Riot Games appears to have a classification system in place for labeling a player in a certain lane and role, it has shown to be flawed, even in a game mode with an ordered champion selection as is the case in professional eSports matches. Below is a table representing the NA LCS 2018 Spring Split team roles. The column names are team roles that I programatically entered according to Participant ID, while the row names represent a concatenation of the `role` and `lane` variables that Riot Games assigned and were obtained from the data set:

```
library(dplyr)
nalcs_season_match_data <- read.csv(
  "../datasets/nalcs/nalcs_spring2018_match_player_stats.csv") %>%
  mutate(roleLane = paste(role, lane, sep = ", "))
table_roles <- table(nalcs_season_match_data$roleLane, nalcs_season_match_data$teamRole)
kable(table_roles, caption = "NA LCS Spring Split 2018 Team Role Assignments")
```

Table 2: NA LCS Spring Split 2018 Team Role Assignments

	BOTCARRY	JUNGLE	MID	SUPPORT	TOP
DUO, BOTTOM	77	0	57	77	0
DUO, MIDDLE	0	55	0	0	55
DUO_CARRY, BOTTOM	111	0	0	0	0
DUO_CARRY, MIDDLE	0	0	4	0	0
DUO_SUPPORT, BOTTOM	0	0	0	111	0
DUO_SUPPORT, MIDDLE	0	4	0	0	0
NONE, JUNGLE	9	173	58	8	57
SOLO, BOTTOM	5	0	0	38	0
SOLO, MIDDLE	0	2	115	0	0
SOLO, TOP	32	0	0	0	122

Not only are there ten different combinations of Role and Lane variables in this data set, but there are a large number of manually-classified roles being auto-classified into different roles.

For instance, there are a significant number of Mid and Top Laners being assigned the `NONE, JUNGLE role-lane` combination. This can be theorized in one way: Riot Games has a classification system in place that assigns players to a `role-lane` according to where they are located on the map at a certain point in time in a match, particularly early.

The reason I make this theory, is because, since Junglers can play a pivotal role early in a match due to their ability to roam the map and “gank” (an amalgamation of “flank”, “gang”, and “kill”) opposing Laners, a pre-laning phase tactic called counter-jungling, or invading the enemy Jungler, is used to hinder the enemy Jungler’s ganking effectiveness during the laning phase. In this tactic, multiple teammates are often used in an attempt to ensure their team’s Jungler early advantage, and therefore, when the time comes for the system to assign the `role-lane`, those non-Jungler teammates who are still in the jungle may inadvertently be assigned the `NONE, JUNGLE role-lane` combination.

While the auto-classification system has shown to be flawed, at least it’s safe to assume team roles for Draft Pick, Ranked, and eSports matches due to the structure cited in Figure 1, and many third-party League of Legends analytics websites, such as op.gg, champion.gg, and mobalytics.gg, appear to make that assumption. However, these sites miss out on analyzing data from Blind Pick matches, in which team role assumptions cannot be made. If the auto-classification system can be improved upon, then both Riot Games and these third-party websites can utilize this improved system for their future analytics.

Diving into the Data

The dataset we'll be using to answer this question was obtained and wrangled from the match data of the 2018 Spring Split seasons of four different professional LoL eSports leagues: the North America LoL Championship Series (NALCS), the Europe LoL Championship Series (EULCS), LoL Champions Korea (LCK), and LoL Master Series (LMS), plus the 2018 Mid-Season Invitational (MSI), an international tournament similar to the UEFA Champions League in Football/Soccer.

Obtaining and Cleaning/Wrangling the data:

In-depth details about how the data was obtained and wrangled can be found [here](#).