League of Legends eSports: NA Challenger – Regular Season

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Abstract

Like fantasy football, fantasy eSports, in this case, League of Legends, people will want to figure out what team is most likely to win during the playoffs; and in order to determine that, there is some data that we have to analyze:

- How do we determine whether a team will win against another team in a match?
- What is an important factor that leads a team to win a match in the first place?
- Do the number of kills actually matter when it comes to winning the most amount of matches?

Introduction

The video game: League of Legends has been increasing in popularity in the past couple of years. And the world of eSports, where people watch professional gamers compete against each other, has started to host League of Legends competitions quite recently.

League of Legends eSports has been developing in the past couple of years. In fact, people participate in fantasy leagues of these League of Legends eSports games. These fantasy leagues are very similar to the ones people participate in for any other sport such as Basketball, American Football, and Hockey. In this research, we are looking into the NA Challenger Regular Season, which has taken place from June 7th till July 13th, with each team participating in 10 matches, where each match is won best out of three games. There are 6 teams in this league: Gold Coin United (GCU), Tempo Storm (TS), Big God Jackels (BIG), CLG Academy (CLA), Delta Fox (DFX), eUnited (EUN). (Note that all the tables provided are based on the information that I gathered from Resource 1.)

Table 1. Team vs. Team based on eliminations *PD: Point Difference

	GCU	TS	BIG	CLA	DFX	EUN	Record	PD*
GCU		52-53	86-39	65-42	93-44	62-48	8-2	132
TS	53-52		59-43	80-50	81-50	50-93	7-3	35
BIG	39-86	43-59		49-22	73-31	55-85	4-6	-24
DFX	42-65	50-80	22-49		84-46	34-74	2-8	-82
CLA	44-93	50-81	31-73	46-84		69-102	0-10	-193
EUN	48-62	93-50	55-85	74-34	102-69		9-1	90

Table 2. Team vs. Team based on games *PD: Point Difference

	GCU	TS	BIG	CLA	DFX	EUN	Record	PD*
GCU		2-3	4-1	4-1	4-1	3-2	8-2	9
TS	3-2		4-0	4-1	4-1	2-4	7-3	9
BIG	1-4	0-4		4-0	4-0	0-4	4-6	-3
DFX	1-4	1-4	0-4		4-0	0-4	-2-8	-10
CLA	1-4	1-4	0-4	0-4		1-4	0-10	-17
EUN	2-3	2-4	4-0	4-0	4-1		9-1	8

The Massey Method[2]

$$Mr = p$$

M is represented as that Massey matrix $(n \times n)$.

p is represented as the vector or point differentials $(n \times 1)$.

r is the ranking vector $(n \times 1)$. That ranks the team based on margin of victory between the two teams by a specific factor.

So if a team i plays team j m_{ij} times. Then:

$$M_ij = \begin{cases} \sum_{j=1}^{n} m_i j & \text{if } i = j \\ -m_{ij} & \text{if team } i \text{ played team } j \ m_i j \text{ times } i \neq j \\ 0 & \text{if team } i \text{ has not played against team } j \end{cases}$$

Note that the last row of M is replaced with all 1s and the last row for p, which should be equal to 0. It then guarantees that the matrix is nonsingular and that all ratings sum to 0. From that, we can determine that rankings of each team based on eliminations of number of wins within a match.

Massey Ranking Results

So for the Massey Ranking Results, there are two different sets of values that we need to look at in order to rank them for the matrix *p:* one set of values is for the eliminations made from each team, and the other is made from the games won from each team (note that winning a game does not necessarily mean winning a match and the bottom). So I have provided the matrix p_e, which is from Table 1, and matrix p_r, which is from Table 2. Matrix *M* is based on the data set under "Record" for both Tables 1 and 2.

$$M = \begin{bmatrix} 10 & -2 & -2 & -2 & -2 & -2 \\ -2 & 10 & -2 & -2 & -2 & -2 \\ -2 & -2 & 10 & -2 & -2 & -2 \\ -2 & -2 & -2 & 10 & -2 & -2 \\ -2 & -2 & -2 & -2 & 10 & -2 \\ 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix} \quad p_e = \begin{bmatrix} 132 \\ 35 \\ -24 \\ -82 \\ -193 \\ 0 \end{bmatrix} \quad p_g = \begin{bmatrix} 9 \\ 9 \\ -3 \\ -10 \\ -17 \\ 0 \end{bmatrix}$$

Table 3. Massey Ranking Results

	Massey r_e	Rank	Massey r_p	Rank
GCU	11	1st	0.75	2nd
TS	2.9167	3rd	0.75	2nd
BIG	-2	4th	-0.25	4th
DFX	-6.8333	5th	-0.8333	5th
CLA	-16.0833	6th	-1.4167	6th
EUN	11	1st	1	1st

The Colley Method[2]

$$Cr = b$$

This method allows us to find the approximate winning percentage due to matches.

C is represented as the Colley matrix $(n \times n)$ such that:

$$C_ij = \begin{cases} 2 + t_{ij} & \text{if } i = j \\ -m_{ij} & \text{if team } i \text{ played team } j \ m_i j \text{ times } i \neq j \end{cases}$$

b is represented as the vector $(n \times 1)$, $b_{ij} = 1 + \frac{1}{2}(w_j + l_j)$ where w_j represent the number of wins and l_j represent the number of losses.

r is the ranking vector $(n \times 1)$.

Colley Ranking Results

The Colley method is going to use the data only from the matches won and the number of games that are played for each team. So, the data set "Record" from Tables 1 and 2 (both Tables share the same data set for "Record") for determining the matrices *C* and *b.*

Table 4. Colley Ranking Results

	Colley *r*	Rank
GCU	0.7143	2nd
TS	0.6429	3rd
BIG	0.4286	4th
DFX	0.2857	5th
CLA	0.1429	6th
EUN	0.7857	1st

$$C = \begin{bmatrix} 12 & -2 & -2 & -2 & -2 & -2 \\ -2 & 12 & -2 & -2 & -2 & -2 \\ -2 & -2 & 12 & -2 & -2 & -2 \\ -2 & -2 & -2 & 12 & -2 & -2 \\ -2 & -2 & -2 & -2 & 12 & -2 \\ -2 & -2 & -2 & -2 & -2 & 12 \end{bmatrix} \quad b = \begin{bmatrix} 4 \\ 3 \\ 0 \\ -2 \\ -4 \\ 5 \end{bmatrix}$$

Conclusions

Between the two different ranking methods, the ranks of each team has remained relatively the same. As eUnited seems to be first for the ranking system that I provided.
However, the Massey ranking system can change the ranks depending on the information provided that relates to the matches won by each team, whether that be by eliminations or game wins.
In addition, the Colley ranking system has no correlation to the point difference for both sets of points: the number of players eliminated by each team and the number of games won by each team for every match.
Further research is needed in order to determine the best team out of the league as some ranking methods may place one team 1st or place that same team in any other position depending on how each team is ranked.

Resources

1. League of Legends eSports NA Challenger Regular Season: http://www.lolesports.com/en_US/na-cs/nacs_2017_summer/schedule/regular_season/5

2. 21-241 Lecture 4 Fall 2017 Course Project: Ranking and Rating Systems: projectslides PDF file