

From Data to Domination: Data-Infused Strategies for League of Legends Success

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Introduction

In this paper we will be exploring how we can use data at a high level combined with algorithmic learning to allow competitive eSports organizations, such as Evil Geniuses, to find success through detailed and accurate predictions of opposing team drafts and strategies. For the purpose of the Hackathon, we will be limiting the scope of our analysis to the competitive League of Legends teams “Golden Guardians” and “Cloud9” as well as focusing on the data provided through Riot Games API’s as well as the following [GitHub](#).

Background

To offer some background to the problem statement for this Hackathon, some key elements of our solution include algorithmic and analytical solutions to the following:

- Cloud9’s expected draft priority for the series
- Expected trends based on Cloud9’s play in LCS
- Recommended adjustments to GG’s draft priority from data analysis
- A cohesive strategic plan for GG to follow

Some insights for the algorithmic nature of the solutions are that, given League’s constantly shifting meta, the amount of data in competitive play is simply not enough to formulate a 100% algorithmic solution which would be seen as completely “optimal”. With this in mind, we argue that these algorithmic solutions still serve as an essential element to the jobs of analysts in this field and will soon be used by all high-level eSports analysts to effectively do their jobs.

Breaking down the Data

Based on the problem statements provided above we have highlighted two main points of importance for data analysis.

1. Cloud9’s Draft Priority
2. Expected trends in Cloud9’s play (and how we can exploit it)

For this first section we will be breaking down Cloud9's draft priority and how we can use an algorithmic approach along with data to define Cloud9's draft priority. Once this has been defined, we will provide human analysis on the data and formulate GG's draft plan by utilizing this data and our own knowledge. In the second section we will be analyzing trends in Cloud9's play through data we have parsed regarding data analytics such as: Champion pathing heat maps and how Cloud9 develops their vision throughout a game.

Draft Priority

For future references in this section to code please refer to the following [GitHub](#). (Accessed through the submitted GitHub link > lol-draft-predict_gg-c9 > data_parsing > draft_parser.py) In order to break down draft priority of a team we need to consider certain elements within our data. We have separated these elements into three different groups:

- Competitive History
- Solo Queue
- Live Delta

Competitive History highlights the drafting trends of Cloud9 and GG in their previous games by finding the aggregate of all their pick priorities and assigning each champion and lane with the average draft priority through this aggregate. Some expected trends we found are the tendency for top lane picks to be dropped to later in the draft (especially on red side), jungle champions having high priority despite low ban priority (this has been a historical competitive trend due to junglers often being hand shook), and high ban priority champions also having high pick priority (meaning overpowered champions are heavily prioritized).

Solo Queue is additional data which is currently unweighted in our algorithm due to the deviation in Solo Queue meta and Competitive meta, but it is still data that we have collected through Riot's API, and which can be implemented into our algorithm in the future should Solo Queue and Competitive meta align themselves more. In the case where we would implement this data into the algorithm it is important to note that we would implement an algorithmic weight to our algorithm which would lower the impact of Solo Queue data. An example of this will be highlighted later when we discuss the algorithm for Draft Priority.

Finally, we have Live Delta, this is arguably the most important data for a given series as it represents the opposing team's **deviation** from the expected draft priority of their Competitive History. An example of this from recent games can be noted in BDS versus GG in the Worlds play-in stage where BDS Adam pulled out a pocket pick of Garen which took over two separate games and led BDS to victory. This Live Delta would be weighted heavily in draft priority as it shows the opposing team's willingness to deviate from their expected strategy. This weight also allows our algorithm to grow mid-series as it accounts for new data during the series instead of being a rigid algorithm which will only ever output one thing until the database is updated.

Now to highlight the actual algorithm for Champion Priority which we would offer analysts in addition to their own analysis (this algorithm can be viewed without Solo Queue or Live Delta in

the GitHub): $[(\text{Competitive Weight}) * \text{Competitive History Priority} * (\text{Total \# of Games} - \text{\# of Games Banned}) / (\text{\# of Games Picked})] + [(\text{Solo Queue Weight}) * \text{Solo Queue Priority}^1] + [(\text{Live Delta Weight}) * \text{Live Delta Priority}^2]$ From this algorithm we will then get an updated priority for each Champion within their draft pool showcasing their priorities, the lower the number the higher the priority, for example a champion with a priority of 1.0 has **always** been picked first and is expected by our algorithm to be picked first again. The undefined weights above are assigned according to the following constraints:

- Competitive + Solo Queue + Live Delta = 1
- Solo Queue < Competitive, Live Delta

And are to be adjusted by the analysts in accordance with their own analysis of the importance of the deviation and how similar Solo Queue and Competitive metas are. For example, if the enemy deviates with a Yuumi pick which goes 0/12 then analysts do not need to give the Live Delta a large weight since it had a low impact on the result of the game.

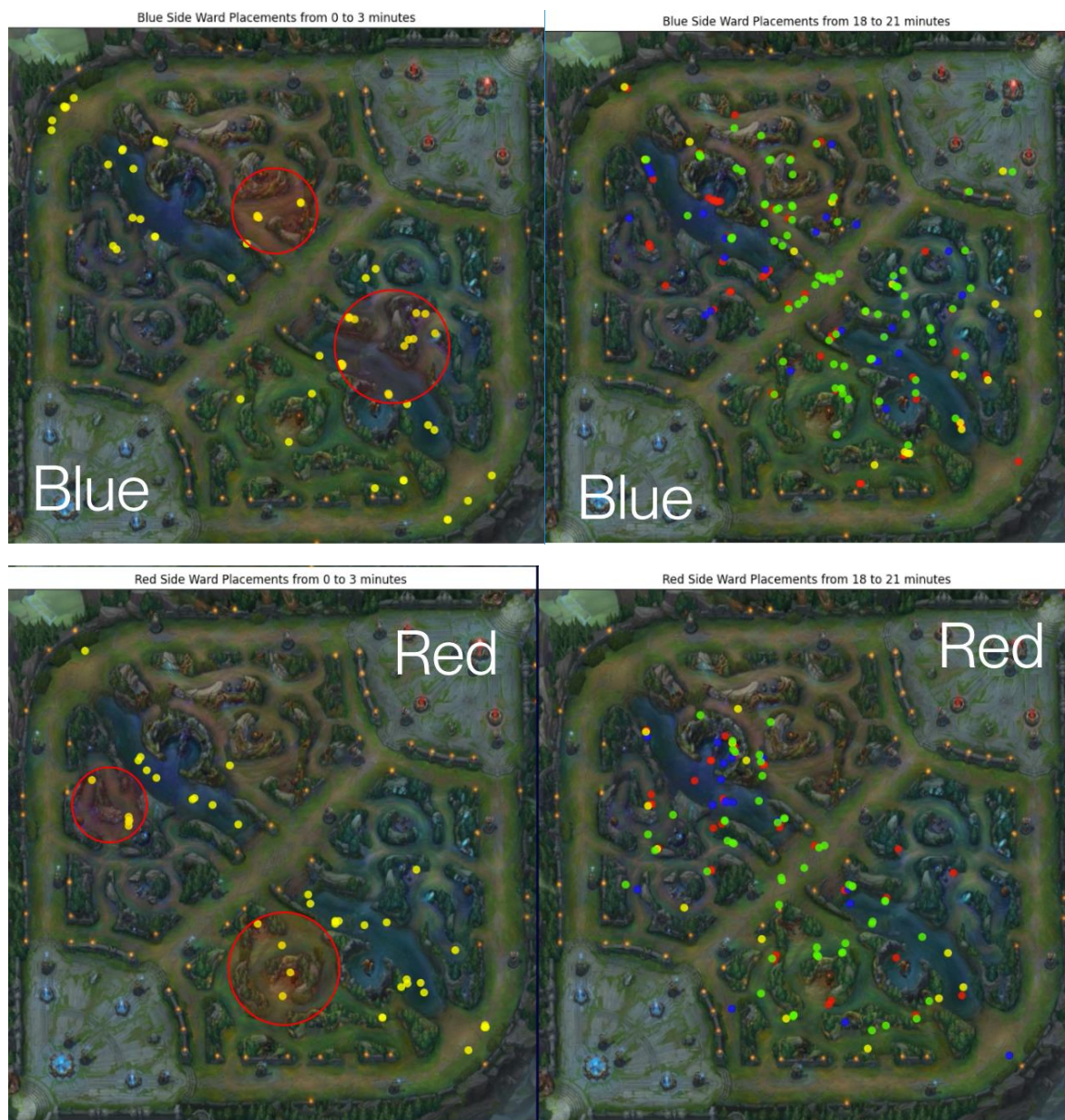
Expected Trends

In order to analyze the expected gameplay trends in Cloud9s gameplay we utilized the parquet files provided and focused on the most accessible and easy to analyze data points. These being wards and vision placements throughout their past games in LCS, using this data to find pockets of vision which can be abused, as well as developing a heat map for jungle pathing, allowing us to determine aggression factors based on laner priorities as well as how often Cloud9 strong / weak sides a certain lane and how this compares to the current meta that we have seen throughout Worlds 2023 so far.

For wards and Cloud9's vision development, we utilized the parquet files containing ward placement positions, utilizing Python to plot them onto a graph with Summoners Rift in order to visualize how Cloud9 was placing their early vision and to see how we can use this data to create unique gank angles and catch laners off guard (The code for this can be found in `data_parsing/ward_parser.ipynb`). Below are some of the visualizations we have generated from this data for both Blue and Red side games:

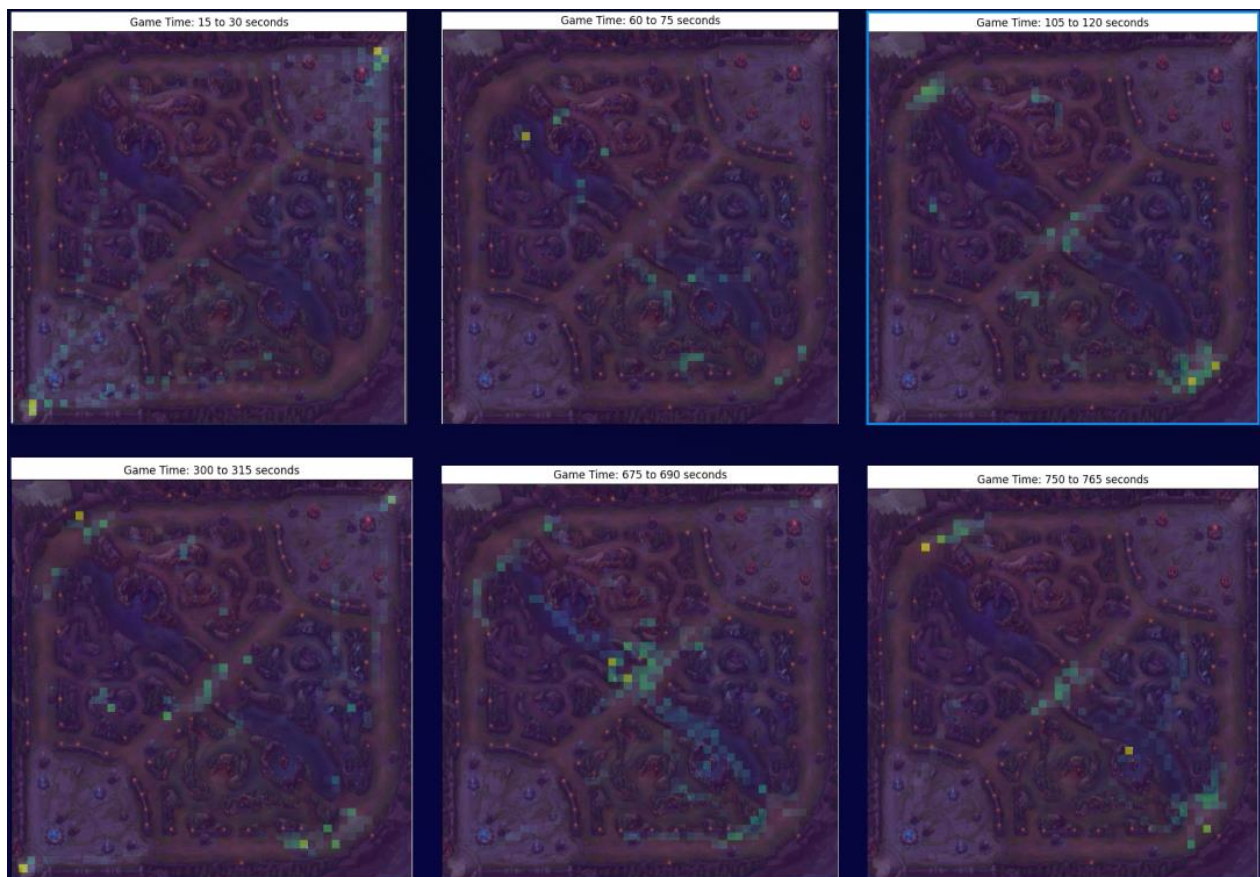
¹ Solo Queue Priority is calculated as $(\text{\# of Total Games} - \text{\# of Champion Games}) * (1 - \text{Winrate})$ - The higher the priority the lower the number

² Live Delta Priority is calculated as 1 divided by the Delta of $(\text{Competitive History Priority} | \text{Current Series Priority})$ therefore the more that the current series draft deviates from their drafting history the smaller Live Delta is and the higher the pick priority is.



Some common trends we can note from these visualizations are that at game start Cloud9 heavily prioritizes warding the river, prioritizing vision near enemy camps instead of their own showcasing the teams dynamic jungling playstyle which adjusts according to new information on the opposing junglers starting location. Consistently wards more on enemy side of the map, until late game where wards begin showing up all over the map as more team fights break out throughout the map. Junglers should thus look to steal camps during mid game. From 0-10 minutes, if Cloud9 is red side, they tend to heavily focus their vision towards bot side. If they play blue side, then their vision is more evenly distributed. Using some of these elementary trends gathered with data we can suggest GG begins the game with a sweeper on their jungler, prioritizing the denial of Cloud9's early camp vision, leaving Blaber in a position where he must make uncertain calls (He might even overcommit for a Scuttle Crab 😊).

In addition to Cloud9's development of vision we can specifically track Blaber's movements on a heatmap, this will allow us to track his tendencies in games and to see which side Cloud9 will typically strongside, combined with our vision analysis we can use these heatmaps to find times where Blaber is vulnerable to an invade and shut down Cloud9's gameplans from an early point in the game. Visualizations of this heatmap can be seen below at certain timers and highlights Blaber's movements as the game develops into first objectives (Dragons / Herald's) and second clears. Using this information, we can plan to draft and play around denying Blaber the opportunity to do anything impactful. This can be accomplished by drafting a strong skirmishing jungler and having him match Blaber's pathing through both information that is collected in the game (through vision and camp timers) as well as through the information which is gathered through the data analysis of the heatmap below.



Conclusion and Adjustments

While we are not the most knowledgeable analysts, we hope that through this paper, presentation, and code we have highlighted the importance and key role that data plays in modern eSports analysis and how we need to evolve the job of analysts with the growing technologies of the modern day. As such, we would like to present our solution for GG in their series versus Cloud9. In accordance with the Draft Priority algorithm we have found C9's ability and focus on the competitive meta, meaning high Ban Priority champions are also very high Pick priority for Cloud9, additionally by referencing their Competitive History with their games provided, we can

note that their Live Delta is typically very low and as such we can expect CCloud9 to draft standard, we believe this is due to their confidence in themselves as the best North American team and their ability to win standard drafts. As such we suggest Golden Guardians to take a high Live Delta approach and throw off Cloud9's gameplan by abusing the previously mentioned pockets of vision which can be retrieved through the ward analysis as well as by permanently following Blaber around with a strong skirmishing jungler, diminishing his effect and his ability to carry a game effectively and scale Cloud9's draft into a strong late game.

Link to Figma Slide Deck: <https://www.figma.com/file/BmqLpoH9nYAkqnmoljh4iv/Genius-Hacks-Deck?type=design&node-id=0-1&mode=design>