UNIVERSITY OF LEICESTER

# ANALYSING PLAYER STRATEGIES IN ESPORTS

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| **Author(s):** | **SHAMAL SALTER** |
| **Student ID(s):** | **229041599** |
| **Degree:** | **MSc Data Analysis for Business Intelligence** |
| **Academic Supervisor:** | **Andrey Morozov** |
| **Industrial Supervisor** | **Jason Boomer** |

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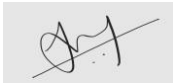
This dissertation is a testament to the collaborative efforts of many individuals, with Jason Boomer and Andrey Morozov playing pivotal roles in its realisation.

# Declaration

I hereby would like to declare that the information in this project thesis is original, all sentences or passages quoted in this document from other people's work have been specifically acknowledged by clear cross referencing to author, work and page(s).

Name: SHAMAL SALTER

Signed: 

# Abstract

In the fast-paced world of esports, where decisions may make or break a match, SideFest Ltd. has embarked on a project that is dedicated to improving player strategies through the use of data-driven insights. The creation of an interactive dashboard that gives consumers more control and gives them the ability to make better informed decisions is the primary focus of this initiative.

The envisioned dashboard aims to provide valuable insights and visualisations of the data, serving multifaceted purposes ranging from educational workshops in schools to aiding esports team managers, commentators, and enthusiasts.

One of the most important advantages of this dashboard is its easy-to-navigate user interface, which gives users the freedom to investigate and change data without difficulty. It provides a real-time response, which ensures that insights are accessible at the precise moment when they are most needed. The dashboard may be accessed online, making it suitable for use by a diverse range of users, such as esports players, coaches, analysts, and fans of the game.

Esports professionals and enthusiasts alike will benefit from the completion of this project, as it will make it easier for them to hone their strategies, improve their performance, and maintain a competitive edge in an environment that is always shifting. SideFest Ltd. hopes to provide users with a useful tool in the form of an interactive dashboard that will provide them with the information necessary to make more informed choices and reach greater levels of success in the competitive realm of esports.



**Keywords**: Esports, Dashboard, Tournament, Data, Insights, Gamming

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## List of Abbreviations

LoL - League of Legends
K/D - Kill to death ratio
KPI - key performance indicator
eSports - Electronic sports
MOBA - Multiplayer Online Battle Arena Video Games
ADC - Attack Damage Carry
B2B - Business-to-business

# 1. Introduction

In recent years, esports has experienced an exponential growth in popularity, transforming from a niche hobby to a global phenomenon. With massive prize pools, dedicated fan bases, and professional leagues, esports has become a professional and highly competitive industry. Within this realm, player strategies play a crucial role in determining success. Understanding how players strategize and make decisions during gameplay is essential for both players and researchers The project aims to analyze large quantities of esports match data to assist in the development of strategies for both teams and individual players. By analyzing historical data, insights can be gained to improve gameplay and performance (Guest, 2023).

Esports, also known as electronic sports, refers to competitive video gaming where professional players compete against each other in various multiplayer games. These games often require a high level of skill, coordination, and strategic thinking. Unlike traditional sports, where physical prowess is paramount, esports places a heavy emphasis on mental agility, quick reflexes, and strategic planning. As a result, players must develop unique strategies to outmanoeuvre their opponents and secure victory.

To analyse player strategies, this dissertation will focus on popular esports title “League of Legends” which offer a rich and diverse pool of player strategies, each with its own intricacies and nuances. By examining the esports data, we can gain valuable insights into the decision-making processes employed by professional players with the help for interactive dashboards.

The dashboard will serve as a tool for “SideFest” in delivering data analysis workshops, primarily targeted at schools. It will help introduce students to careers in mathematics and data analysis within the context of the gaming and esports industries.

## 1.1 League of Legends: A Game-Changer in Esports

League of Legends, sometimes known as LoL, is a free-to-play multiplayer online battle arena (MOBA) game developed by Riot Games and published in 2009. LoL has grown into a gaming industry juggernaut, with millions of players and a devoted fan base since its start. LoL's strategic gameplay, complicated mechanics, and focus on collaboration distinguish it as a classic esports title.

LoL's involvement in popularising the notion of competitive gaming leagues is one of the primary reasons why it has become a game-changer in esports. Riot Games created the League of Legends Championship Series (LCS), which provides an organised and professional environment for players and teams to participate in. The LCS has established a pattern for future esports leagues to follow with its franchised structure and large-scale tournaments (STAFF, 2023).

LoL esports' popularity extends beyond North America, with regional leagues and international contests attracting enormous audiences. The League of Legends globe Championship, an annual

tournament recognised for its grandeur, frequently draws millions of people from across the globe, rivalling conventional sporting events in terms of watching figures.

Furthermore, the rising relevance of esports organisations and teams demonstrates LoL's effect on the esports ecosystem. TSM, Fanatic, and G2 Esports have become household brands after acquiring top-tier players and significant sponsorships. The competitive scene has given individuals with a clear route to professional gaming employment, which has been aided by university and college scholarships.


**Figure 1: League of Legends in eSports (Isu, 2017).**

LoL's impact extends beyond the competitive arena. The game has fostered a thriving community of content makers, broadcasters, and influencers that interact with millions of viewers on sites like as Twitch and YouTube. This ecology has aided the game's durability and enduring appeal.

### 1.2 Esports and Data: A Synergy for Competitive Edge

The sector of electronic sports (or "esports"), often known as competitive video gaming, has grown rapidly in recent years to become worth billions of dollars. Esports has emerged as a key actor in the entertainment and sports sectors, attracting millions of fans and participants across the globe. The use of data analysis and analytics to obtain an advantage over the competition is a major contributor to the growth of the esports industry.

Esports athletes and gamers are no different from their counterparts in conventional sports in that they study a big number of games' worth of data in order to spot patterns and improve their skill.

Games like League of Legends provide players with a post-match dashboard that displays metrics graphically and allows for comparisons to previous games. Players may learn about successful methods and even examine the tactics of their opponents by importing game and match data into analytics programmes. (CES, 2020)


**Figure 2: Big Data Is the Future of Esports. (Allen, 2018)**

In addition, data analysis may be utilised to assess the overall efficiency of a team. Teams may monitor their win/loss records, map rankings, and other important statistics to see trends and opportunities for development. Game data analysis may help teams, for instance, zero down on winning or losing plans and tactics. This data may be utilised to fine-tune game plans and boost the team's overall effectiveness.

Opponent scouting is another important part of data analysis in esports. Just like in any other sport, teams in esports do extensive research on their opponents to learn their tendencies, methods, and potential weaknesses. Teams may learn about their opponents' patterns and create plans to counter them and take advantage of their vulnerabilities by looking at data from previous encounters.

The scope of data analysis goes much beyond simple statistics on how well a team or player does. Data is used by esports organisations for strategic decision making. Data about their viewers is analysed so that they may provide material that is more relevant to them. Data is also used by sponsors and marketers to zero in on certain demographics and gauge the success of their campaigns.

## 1.3 Project Aim and Objectives

### 1.3.1 Aim

The project aims to analyze large quantities of esports match data to assist in the development of strategies for both teams and individual players. By analyzing historical data, insights can be gained to improve gameplay and performance.

The dashboard will serve as a tool for SideFest in delivering data analysis workshops, primarily targeted at schools. It will help introduce students to careers in mathematics and data analysis within the context of the gaming and esports industries.

### 1.3.2 Objective

To design and implement a robust database and interactive dashboard solution that efficiently captures, stores, and visualizes esports data, addressing the challenges of inconsistency and complexity. This system will serve as an educational tool, facilitating data analysis workshops to inspire and prepare students for careers in mathematics-based roles within the gaming and esports sectors.

## 1.4 Problem Statement

The primary questions covered in the research is:

"How do Champion picks by the top 3 teams change over time, and what impact does this have on team performance?"

The research question is further broken down into the following:

- Which Champions are picked most by the top 3 Teams, and how does it change between Seasons?

- How do Champion choice and Role impact Gold Earned, and how does this change between Seasons

- Is there any impact in the champion usage based on patch?

In other words, with the help of the interactive dashboard we will be able to find solutions to these problems.

# 2. Literature Review

## 2.1 The Evolution of Esports: A Historical Overview

Esports, or competitive video gaming, has changed dramatically in recent decades. Electronic sports (esports) are a growing sector that has captured millions of participants and spectators worldwide. This project report examines esports' history, development, cultural effect, and economic impact. (Smith et al., 2019)

Early video gamers met in arcades and houses to compete in friendly matches, which became esports. In the late 20th century, technology, the internet, and competitive gaming titles laid the ground for a revolution in esports.

In the late 1990s, Quake and StarCraft became competitive gaming mainstays, popularising the term "esports". Early tournaments, like the 1997 Red Annihilation Quake, gave low prizes but created the groundwork for a multi-billion-dollar business.


**Figure 3: Evolution of eSports. (Buckwell, 2022)**

The 21st century saw esports grow from grassroots to worldwide. Pioneering games like Counter-Strike, League of Legends, and Dota 2 have huge player bases and loyal fanbases. Online streaming systems like Twitch allowed fans worldwide to see their favourite players and teams perform at the greatest level. Arenas filled with esports fans, surpassing sports broadcasts.

Professional leagues like the Overwatch League and League of Legends Championship Series gave players solid jobs and high salaries, changing the competitive ecology. Sponsorships, advertising,

and media rights agreements boosted industry expansion. Esports teams took on the look of sports teams, with team residences, coaches, and loyal fans.

In parallel, esports grew popular. It promoted inclusiveness and diversity across age, gender, and nationality. Aspiring gamers were inspired by "esports pros," who became famous. Esports scholarships were offered by universities and colleges to recognise competitive gaming's professional potential. (Rollings and Adams, 2003)

Esports, one of the only kinds of entertainment that could survive physical distance, grew during the COVID-19 epidemic. Esports events effortlessly transferred to internet platforms, and viewership increased while conventional sports were postponed or cancelled.

## 2.2 The Ecosystem in Esports

The ecosystem in esports refers to the interconnected web of organizations, individuals, and entities that contribute to the growth and development of the esports industry. It encompasses various stakeholders such as players, teams, event organizers, game developers, sponsors, broadcasters, and fans. The esports ecosystem has evolved significantly over the years, and its rapid expansion has led to the emergence of a thriving industry.

Esports has become a global phenomenon, with tournaments attracting millions of viewers and offering substantial prize pools. This has resulted in increased investment and support from various sectors. To understand the ecosystem, it is crucial to explore the key components and their roles in shaping the industry.

- **Players**: Professional gamers are the backbone of the esports ecosystem. They compete in tournaments, showcase their skills, and entertain the audience. Players often sign contracts with teams and receive salaries, endorsements, and prize winnings. Their dedication and talent drive the growth of the industry.

- **Teams**: Esports teams are organizations that recruit and manage professional players. They provide support, training, and infrastructure for players to compete at the highest level. Teams also secure sponsorships and generate revenue through merchandise sales, streaming, and partnerships.

- **Game Developers**: The creators of popular esports titles play a vital role in the ecosystem. They design and develop games that become the foundation for competitive play. Game developers continuously update and balance their games to ensure fair competition and engage the player base.

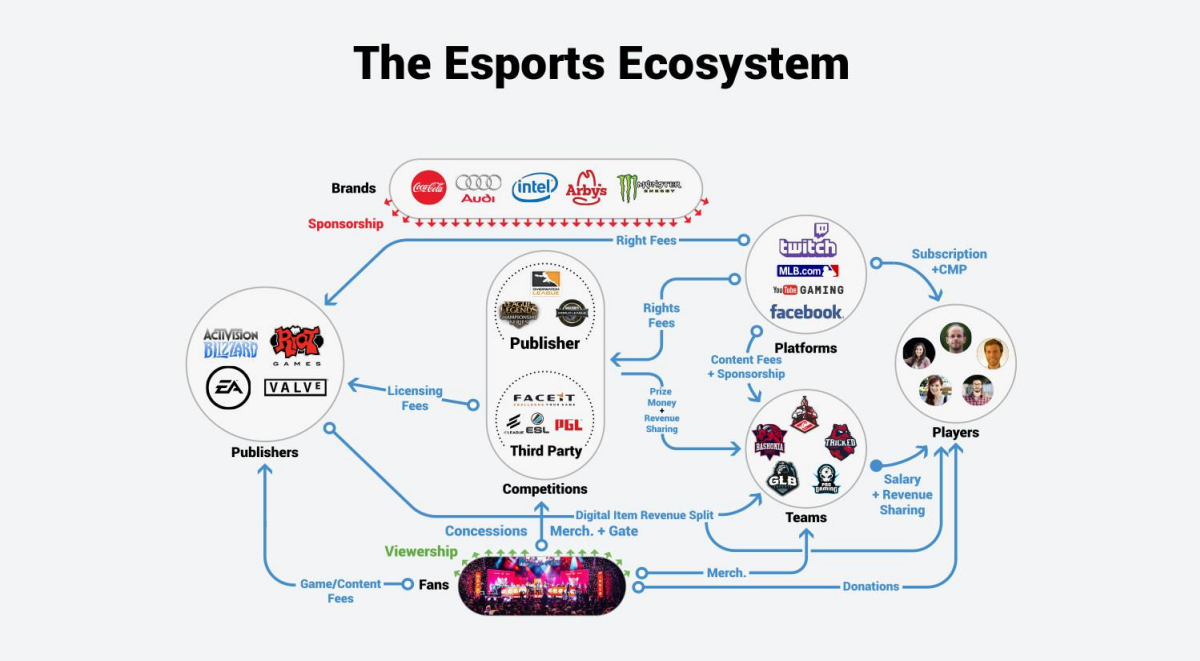



Figure 4:The Esports Ecosystem. (Corrado, 2018)

- **Event Organizers**: Esports events, such as tournaments and leagues, are organized by event organizers. These entities handle the logistics, production, and marketing of tournaments. Major events often attract large audiences both online and in-person, contributing to the growth of the esports ecosystem.

- **Sponsors**: Brands and companies sponsor esports to gain exposure and reach the gaming audience. Sponsors provide financial support, contribute to prize pools, and promote their products or services through various marketing channels. Sponsorship deals are crucial for the sustainability and growth of esports organizations and events.

- **Broadcasters and Streaming Platforms**: Broadcasting companies and streaming platforms play a crucial role in the ecosystem by providing coverage and distribution of esports events. They enable fans to watch tournaments and engage with the esports community through live streams, video-on-demand, and chat platforms.

- **Fans and Community**: Esports would not exist without its passionate fanbase. Fans support their favourite teams and players, attend events, purchase merchandise, and engage in online discussions. The esports community is active on social media platforms, forums, and dedicated websites, fostering a sense of belonging and camaraderie.

The esports ecosystem is constantly evolving, driven by new technological advancements, changing consumer preferences, and increased mainstream recognition. As the industry continues to grow, new opportunities and challenges will arise, shaping the future of esports. (Nomura, 2020)

### 2.3 Overview and Game Mechanics: League of Legends

Riot Games launched League of Legends in 2009 as a multiplayer online battle arena game (MOBA), also known as LoL. The objective of the game is straightforward: two teams of five players face off against one another with the intention of destroying the nexus (the core of the other team's base) of the opposing team. The game is ended when the nexus is taken out of commission. Since the game's inception, there have been a combined total of around 64 million players all over the globe who have participated in playing it, making it one of the most successful online video games in the history of the medium. (Edmondson, 2021)

#### 2.3.1 MAP


**Figure 5: League of Legends Map. (Baidya, 2020)**

- **Nexus**
  The Nexus is the most crucial component of the game, and since the first team to lose control of it always loses the match, it serves as the determining factor in every single one. The Nexus will create minions to protect itself from any damage that is dealt to it, and it will also attack any of the opponent's champions or minions who go too near to it. (Baidya, 2020)

- **Lanes**
  To reach the hostile Nexus, you must travel through one of three channels on the map:

  Baron Lane – Also known as the top lane on the map, Baron Lane is typically traversed by only one champion with the Fighter/Tank role.

Mid Lane – As its name implies, the lane in the middle of the map is known as the Mid Lane, and similar to Baron Lane, players prefer to play solitary in it. Mid Lane is for aggressive players, and we recommend picking a champion with high mobility, the ability to secure victories rapidly, and the ability to withstand high damage.

Dragon Lane – The Dragon Lane, also known as the Bottom Lane or the Bot Lane, is typically contested by a pair of ADC (Attack Damage Carrier) and Support champions.

- **Turrets**

Like the Nexus, turrets are tower-like structures that attack opposing minions and champions if they go too near to them in a certain lane. The only way to get close to the Nexus and gain control of your opponent's safe region is to destroy their turrets.

It's important to remember that turrets don't regenerate after being destroyed.

### 2.3.2 CHAMPION ROLE

• Tank - Extremely difficult to kill, excellent crowd control (stuns, etc.)

• Fighter - All-arounder, fierce and damage

• Mage - Deals Long-Range Damage

• Assassin - High burst damage at a short range

• Enchanter - Ranged Utility & Protector (These are sometimes referred to as support when players discuss them, which may be misleading)

• Marksman - A ranged damage dealer with a high sustained damage output

### 2.3.3 CHAMPION POSITION

You start the game playing on this lane. Here is the commonly acknowledged meta. We no longer use "top & Bot" since in Wild Rift the camera will swivel to constantly show you moving from bottom left to top right. Because the Baron, a late-game goal, is closest to the top lane, we refer to it as "Solo or "Baron" Lane," while the bottom lane is known as "Duo or "Dragon" Lane’


**Figure 6: Lane position map. (Bisberg and Ferrara, 2022)**

Positions and roles are complicated since many distinct Roles may play in various positions; this mostly relies on the Champion. In essence, it depends on the community's perception of where they fit best and the details of the champions' skills. (Feral, 2020)

- Solo/Baron Lane (Top) - Typically Fighters and Tanks, but also some Assassins and Marksmen.

- Jungle - primarily Fighters, Tanks, and Assassins

- Mid Lane - Predominantly Mages and Assassins

- Duo / Dragon Lane - Marksman Nearly Always

- Support - Enchants, Tanks, sometimes Mages.

### 2.4 Player Strategies in Esports: League of Legends

The act of formulating and carrying out a strategy with the intention of achieving a set of predetermined goals and objectives is referred to as "strategic planning." Whether it's in business, athletics, or your personal life, having a plan may boost your chances of success, give direction, and help you concentrate. The capacity to strategy is more vital than it has ever been in the environment we live in now because of how quickly things are changing. On the other hand, esports, which is the primary focus of the conversation that takes place throughout this presentation and In this very competitive climate, having a sound plan might be the difference between coming out on top and coming out on the losing end. (Almatari, 2023)

"Strategic thinking" refers to the process of formulating and executing a plan in order to achieve success in a match of competitive video gaming. This process is necessary in order to emerge victorious. To be successful in the cutthroat environment of esports, having a solid game plan is an imperative requirement if one want to emerge victorious. It may be easier for teams to win matches and ultimately become champions if they have a comprehensive understanding of the relevance of strategy. This encompasses everything from individual and group practise to working together as a cohesive entity. (Egenfeldt-Nielsen et al., 2019)

In this section of literature review, we will explore the various aspects of player strategies that players must follow in LoL:

- Communicate With Your Team

  Effective team communication is crucial for a successful game. Let your squad know when you're heading for a kill, need aid, or see the enemy using in-game chat and pings. You may ping the map to notify your team of an enemy jungler's whereabouts. It's crucial to lay out dragon, baron, and lane push goals. You should also listen to your team's calls and reply promptly.

- Map Awareness and Vision Control

  League of Legends requires map awareness and visual control. By seeing the opponent and their actions, wards and other vision-granting equipment may help you. This helps prevent ganks, set up ambushes, and secure dragons and Baron Nashor. Wards may help you see an opponent jungler and escape ambushing, or control wards can block opposing team vision in an area you wish to push.

- Don’t Be A One Trick Pony

Gain familiarity with a variety of Champion skills and item combinations through practise: In League of Legends, each of the playable champions have a one-of-a-kind arsenal of skills and equipment at their disposal. You will be able to comprehend the strengths and weaknesses of your champion as well as how to successfully utilise their abilities and things in a variety of various scenarios if you study and practise these skills and items.

- Farming is crucial

  Pay close attention to farming, which consists of slaying mooks and monsters for money and experience. You may get a leg start on the competition and acquire better gear and level up more quickly if you farm wisely. This may be done by learning how to clear the jungle quickly and effectively, as well as by practising to last strike the minions.

- Objectives are super important

  Always work to capture objectives, especially strategic ones like towers and dragons, which may provide your team a significant advantage. They're useful because you get money and experience, and you can take over more of the map. You may utilise your newly acquired advantage to assault the next tower in the middle lane, or you can offer your whole team a significant boost by killing the dragon.

- Sacrificing For The Team Is Often Good

  You must be ready to make personal sacrifices for the sake of the team, whether it means taking damage or giving up an objective. These kinds of concessions may often decide the outcome of a match. You should be willing to take the damage or give your life to rescue a member of your squad, for instance if they are being pursued by the enemy and you are in a position to aid.

  It is important to keep in mind that the aforementioned tactics are only some general advice, and there is no way to win every game with absolute certainty; yet, putting them into practise may significantly enhance your odds of victory and the way you play the game (Factory, 2023). Keep in mind that the most essential step is to get some practise and to learn from your errors as you go.

### 2.5 Unlocking the Competitive Edge: The Significance of Esports Analytics

Esports analytics give a lot of information on various elements of the game, ranging from player performance data to insights on team dynamics and communication. It is impossible to overestimate the value of esports analytics because of the information it delivers. This technique, which is driven by data, helps teams to determine their strengths and weaknesses, improve their plan, and maximise the performance of their players. Utilising analytics to one's advantage is crucial

to one's success in an industry where the outcome of a contest can be decided by the smallest of details.

### 2.5.1 Applications of Esports Analytics

Using esport livescore analytics may be done in a variety of ways, and these uses can be applied to a range of aspects of how a team competes and how they strategize. There are a lot of various ways that esport livescore analytics can be used (GiN, 2023).

The following are some of the more frequent applications:

- Player Performance Analysis

  By analysing the statistics of each individual player, teams are able to pinpoint specific areas in need of improvement and create personalised practise plans. It is possible to review a variety of particular in-game metrics, including kill-death ratios, accuracy, objective control, and many others, in order to assess player performance and make judgements regarding changes or adjustments to the roster that are informed by statistics. In addition, monitoring the performance of players over time enables coaches and analysts to track progress and recognise trends, which ensures the ongoing development of individual players.

- Opponent Scouting

  Esports statistics are also quite important when it comes to scouting and getting ready for competing teams. Teams are able to anticipate the manoeuvres of their opponents, capitalise on their weaknesses, and craft counterstrategies by analysing the strategies, tactics, and playstyles of their adversaries. In high-stakes matches and tournaments, having access to data about the past performances and trends of one's opponent can provide a substantial edge. This is because it enables teams to adjust their game strategies in accordance with the information obtained. (GiN, 2023)

- Game Analysis and Strategy Development

  The data gathered from previous matches can be used to help inform strategy and decision-making during the current play. Teams can obtain a deeper grasp of the strategies that are most effective for various game scenarios if they pay attention to patterns and trends in their own games as well as the gameplay of their opponents and look for similarities between the two. This knowledge can then be applied to the process of developing comprehensive strategies that take into account a wide range of potential outcomes, thereby increasing the chances of the team being successful.

- Team Dynamics and Communication

  Esports analytics can also provide insight into the ways in which team members engage with one another, identifying potential communication issues or areas where there is room for improvement in coordination. Teams are able to improve their overall performance and establish greater synergy when they address the difficulties that have been raised. In addition, analytics can assist discover patterns in team communication, which gives coaches the ability to implement techniques that streamline communication and improve decision-making while they are actually playing the game.

- Training Regimens and Scheduling

  Esports analytics can also be used to build individualised workout routines and timetables for players, which is another application of this technology. Teams are able to construct ideal training programmes that are able to maximise performance while simultaneously minimising the danger of burnout by doing an analysis of the performance data of individual players and taking into account elements such as fatigue, mental well-being, and physical health. This individualised method of training can be helpful in ensuring that players constantly perform at their highest level, which is vital in the highly competitive world of esports.

### 2.5.2 The Future of Esports Analytics

The importance of analytics will grow along with the esports business as time goes on. Artificial intelligence and machine learning are two examples of cutting-edge technologies that could dramatically improve data collection and analysis, resulting in even more useful insights. These developments could also pave the way for the creation of in-game analytics systems, giving teams the ability to make tactical changes on the fly. (GiN, 2023)

**Figure 7: Significance of Esports (GiN, 2023)**

In addition, teams may be able to better optimise training programmes and make more informed decisions on player rest and recovery if biometric data and wearables are integrated. As the business gets more professionalised, analytics will play a significant role in addressing the physical and mental well-being of players. (GiN, 2023)

As esports continue to rise in popularity, more money is being poured into the industry, and many teams now have analytics departments. Because of this, new approaches and resources will emerge, expanding the usefulness of analytics in esports. As esports analytics become more commonplace, teams, analysts, and software developers will likely work together more closely to spur innovation and raise the bar for esports competition.

Finally, we may anticipate a higher priority on data literacy within the esports community as the use of analytics grows in sophistication and breadth. The ability to effectively employ analytics to improve performance and make better-informed decisions relies on players, coaches, and support staff developing the skills to analyse and evaluate the huge volumes of data accessible to them.

## 2.6 CHALLENGES OF THE ESPORTS AND THE WHOLE GAMING INDUSTRY

The term "esports" has undoubtedly been familiar to everyone. You could also have seen it referred to as "eSports, e-sports, or ESPORTS," which are all minor misspellings but have irritated the entire business for decades. This is a fun fact. The term "esports" refers to a specialised category of competitive video gaming that encompasses a variety of subgenres. Each year, new titles are added to the list, and authorities in state governments and communities all around the world work to increase their support for virtual sports. However, it is not controlled in the same way that traditional sports instructions are, which is leading to a large number of issues and inconsistencies throughout the business. On the other hand, that is not an issue that we are working to resolve or even attempting to solve with TEN.gg. (RJpro, 2022)

Few people are aware that the commercial aspect of esports comes first, followed by the entertainment and then the actual tournaments that take place within the industry.

Marketing is the most important part of the gaming business. During streams and challenges, ads pop up, which can be a bit annoying at times. Sometimes, the players themselves will sell accessories, clothing, and other items. This is called sponsorship. The first trouble of the gaming business is getting access to affiliate programmes.

### 2.6.1 DIFFICULT ACCESS TO AFFILIATE PROGRAMS

If you're a new esports team looking to make some money, finding some sponsors is a good idea. To become an official representative of a product line, your team must do the following.

- Boost your company's name recognition.
- Gain more attention and followers.

- Make a picture that reflects your love of gaming.
- Get in touch with a brand rep who might be willing to sponsor you.
- Justify your worth to a potential sponsor.

### 2.6.2 UNSTRUCTURED MARKET AND LIMITED LIST OF BUSINESS CATEGORIES UNDER RANDOM LABELS

One "Entertainment" tag is all you need to find a company that caters to your gaming needs. Typically, it encompasses not just iGaming but also TV, streaming services, movie theatres, shopping centres, and malls. The issue is that everything is lumped into the same category. And it's never organised well, either! (RJpro, 2022)

Our network's ultimate goal is to centralise and democratise the commercial opportunities available in the gaming sector. The resource includes searchable catalogues that can narrow down thousands of jobs to the one you need. Profiles, business websites, and independent professionals of various stripes are included on the list. In a matter of minutes, you may locate a reliable expert, service, or business associate.

### 2.6.3 LACK OF DIRECT CONTACTS IN B2B

The video game industry is so vast that it might be difficult to get in touch with the correct people. This is true for promotion, creation, and even esports. The founder of a digital gaming firm may have trouble attracting investors since he or she cannot accurately gauge the size of the market for such a product.

Exemplary-case: If you are an independent game creator looking to get your game distributed through major channels, you should approach publishers. However, you seem to be having trouble with:

- Inaccessibility to key personnel at game publishers and a general lack of transparency
- Publishers' Ignorance and Ghosting
- Contractual terms and conditions that are unfair and unfavourable.

### 2.6.4 PROBLEMS WITH FINDING COOPERATION PARTNERS

Businesses in the esports industry frequently struggle with networking. It's not easy to find reliable freelancers, business associates, or influential people online. To be more precise, it's not hard to track down but rather challenging to get in touch with. By centralising all of our administrative interactions in one place, we can do away with the need for middlemen.

Anyone looking for employment or recruiting, to sell temporary services, or to advertise B2B deals should only register for an account on our site to get started.

An empirical illustration: an acquaintance of mine harboured aspirations of developing a little independent video game. In his search for collaborators, he extensively explored many freelance websites and subject forums, although his efforts yielded no fruitful outcomes. Subsequently, following a period of time, the individual's project garnered the interest of individuals who possessed a fervent enthusiasm for the subject matter. Consequently, the individual was able to assemble a group of individuals who shared similar perspectives and collectively materialise the concept.

Our platform aims to enhance the efficiency of partner discovery by incorporating a thematic directory encompassing organisations, services, and offers.

### 2.6.5 OVERPRICED SERVICES AND LACK OF A PROPER COMPETITION

There is a lot of competition among businesses to become project contractors. Their numbers are increasing every day, but the prices that they charge and the quality of the services they provide are extremely variable. In addition, making a direct comparison between the two is not always practicable. We are intending to create a user-friendly service marketplace on the TEN platform, where we will be looking for esports experts, game developers, designers, artists, streamers, server architects, project managers, and any other IT professionals working in the gaming sector.

This way, we give everyone a fantastic opportunity to hire relevant specialists on a project or full-time basis, and we do so by making this possibility available to them. or you might just make money by providing services that are useful to businesses. (RJpro, 2022)

## 3. Methodology

The objective of this project is to conduct an analysis of extensive datasets from esports matches, with the purpose of facilitating the formulation of strategies for both teams and individual players. Through the examination of historical data, valuable insights can be obtained with the aim of enhancing gaming and optimising performance.

The dashboard will function as a tool for SideFest in facilitating data analysis workshops, with a primary focus on schools. This programme aims to familiarise students with potential employment opportunities in the fields of mathematics and data analysis, specifically within the gaming and esports sectors.

### 3.1 STEPS INVOLVED IN PROCESS


Figure 8: Methodology flow Process

### 3.2 TOOLS USED FOR ANALYSIS

The analysis of extensive data sets becomes more complex when there is a continuous inflow of information from various sources. Data analytics technologies facilitate the interpretation of extensive volumes of data pertaining to wide-ranging subjects, such as prevailing market trends or the preferences exhibited by distinct client segments.

These are the 3 main tools that's has been used in my research for creating interactive dashboard:

- **Power BI**

  With the help of this tool, I was able to clean and transform the eSports data, for creating stunning interactive dashboards for my topic.

- **Microsoft Excel**

  Excel was mainly in transforming and merging of data so that I can compare the data based on year.

- **Python**

  For implementing the correlation matrix, I used the python programming in Jupiter Notebook with the help of seaborn framework.

### 3.3 DATA COLLECTION

The process of collecting raw data from a variety of sources so that it can be utilised for analysis and visualisation is referred to as "data collection." (Stedman, 2022)

common methods include:

- Web Scraping: Extracting data from websites and online sources.
- APIs: Accessing data through Application Programming Interfaces provided by online platforms or data providers.
- Manual Entry: Manually inputting data from physical records or documents.
- Sensor Data: Collecting data from sensors or IoT devices.
- Surveys: Creating and distributing surveys or questionnaires to gather information from respondents.
- Data Loggers: Automatically recording data over time, such as server logs or temperature sensors.

**DATA SOURCE AND FORMATS**

The dataset utilized in this research was collected under the supervision of our industrial supervisor, Jason Boomer, through his company, Sidefest. It is a company providing services to the games industry and Games-as-Edutech provider to schools.

The dataset that I worked on focused on the competitive esports scene of the popular video game "League of Legends." consisting of tournament and player stats ranging from year 2014-2022.

The dataset is obtained in the form of ".xlsx" format consisting of 8 excel sheets. Main attributes that are utilised for the analysis are as follows:

Table 1: Important attributes used for analysis.

| ATTRIBUTES | DATA TYPE | DESCRIPTION |
|---|---|---|
| **league** | string | The esports league in which the game was played. |
| **split** | string | The specific split or season of the league. |
| **year** | float | Year at which the game occurred. |
| **patch** | float | Update brought to the game. |
| **side** | string | Players and opponents |
| **position** | string | Lane through which champion moves |
| **playername** | string | Name of the player |
| **teamname** | string | Name of the team |
| **champion** | string | Champions used in match |
| **ban** | string | Champions those are not able to take in match |
| **result** | float | The outcome of the game (e.g., win or loss). |
| **kills** | float | The number of kills by the player. |
| **deaths** | float | The number of deaths by the player. |
| **teamkills** | float | Total number of kills by the player's team. |
| **damagetochampions** | float | Damage dealt to enemy champion |
| **earnedgold** | float | Gold Earned my individual champion |
| **xpat10** | float | Level of champion at 10 min margin in the match |
| **team kpm** | float | Team kill per minute |

**Primary attributes**: champion, position, teamname, split, league, damagetochampion, earnedgold, year, result, kills, deaths, assists, team kpm, patch

### 3.3 DATA CLEANING

The process of correcting or deleting inaccurate, corrupted, poorly formatted, duplicate, or incomplete data from within a dataset is referred to as "data cleaning." When numerous data sources are combined, there is a greater likelihood that some of the data will be duplicated or incorrectly labelled. Even though the results and algorithms appear to be correct on the surface, their reliability is compromised by inaccurate data. Because the processes differ from dataset to dataset, there is no one way to prescribe the exact steps in the process of data cleaning. This is because there is no one absolute technique to do so. However, it is essential to develop a pattern for your data cleaning procedure in order to ensure that you are always performing the task in the appropriate manner (HILLIER, 2021).

**Steps followed in cleaning data:**

- After importing the data to the power query in Power Bi, we were able to see that the dataset contains a significant number of garbage values, missing values, and meaningless data values. In order to carry out any operations, we needed to make sure that there was only a minimal amount of meaningless or garbage values in the dataset. This ensured that the results were accurate. The first step in data analytics is the cleaning of the data, which is an essential process.

| 1.2 team kpm | | 1.2 ckpm | | ABC 123 inhibitors | | ABC 123 opp_inhibitors | | 1²3 damagetochampions | |
|---|---|---|---|---|---|---|---|---|---|
| Valid | 100% | Valid | 100% | Valid | 75% | Valid | 75% | Valid | 100% |
| Error | 0% | Error | 0% | Error | 0% | Error | 0% | Error | 0% |
| Empty | 0% | Empty | 0% | Empty | 25% | Empty | 25% | Empty | 0% |
| 0.4528 | | 0.6038 | | null | | null | | 9631 | |
| 0.4528 | | 0.6038 | | null | | null | | 6924 | |
| 0.4528 | | 0.6038 | | null | | null | | 19985 | |
| 0.4528 | | 0.6038 | | null | | null | | 23623 | |
| 0.4528 | | 0.6038 | | null | | null | | 4035 | |
| 0.1509 | | 0.6038 | | null | | null | | 3744 | |
| 0.1509 | | 0.6038 | | null | | null | | 3443 | |
| 0.1509 | | 0.6038 | | null | | null | | 7931 | |
| 0.1509 | | 0.6038 | | null | | null | | 5597 | |
| 0.1509 | | 0.6038 | | null | | null | | 3943 | |
| 0.4637 | | 0.5707 | | null | | null | | 22689 | |
| 0.4637 | | 0.5707 | | null | | null | | 9327 | |
| 0.4637 | | 0.5707 | | null | | null | | 8265 | |
| 0.4637 | | 0.5707 | | null | | null | | 20307 | |

**Figure 9: unclean LoL dataset.**

From this figure we are able to see that, some of the attributes such as “inhibitors” and “opp_inhibitors” are having missing or null data. So, initially I cleared out some of these incomplete parameters from the dataset which are insignificant for the analysis thus making the dataset less complex and easy to handle.

For this, I used the “column quality” feature in power query to understand the validity of each attribute and remove those which are having high about of errors in the data.

If we consider these attributes, we will be getting uncertain insights while analysis which leads to wrong interpretation of ideas, which is not good for the Stakeholders.

- Secondly, looked for any duplicate values in the dataset, as the dataset will be containing multiple similar data in row.
  For this, I used the “remove duplicates” function which terminates duplicate values which are insignificant for the dataset.

  **Tool Used:** Power BI, Power Query and Excel

### 3.4 DATA TRANSFORMATION

After completing the data cleaning process, it is necessary to convert the columns containing numeric values to either integer or float data types, depending on the values present in each column. By default, these columns may be saved as object data types. In this particular instance,

the year attribute was transformed to an integer data type. However, it would not have been feasible to perform this conversion if there were any Null values present within the attribute, as they are of float type. Consequently, we proceeded to eliminate all rows that included Null values in the preceding phase.

Steps:

- Initially, merged the dataset which was differentiated based on year. For this, I use excel power query to merge the dataset consisting of 2018-2022.

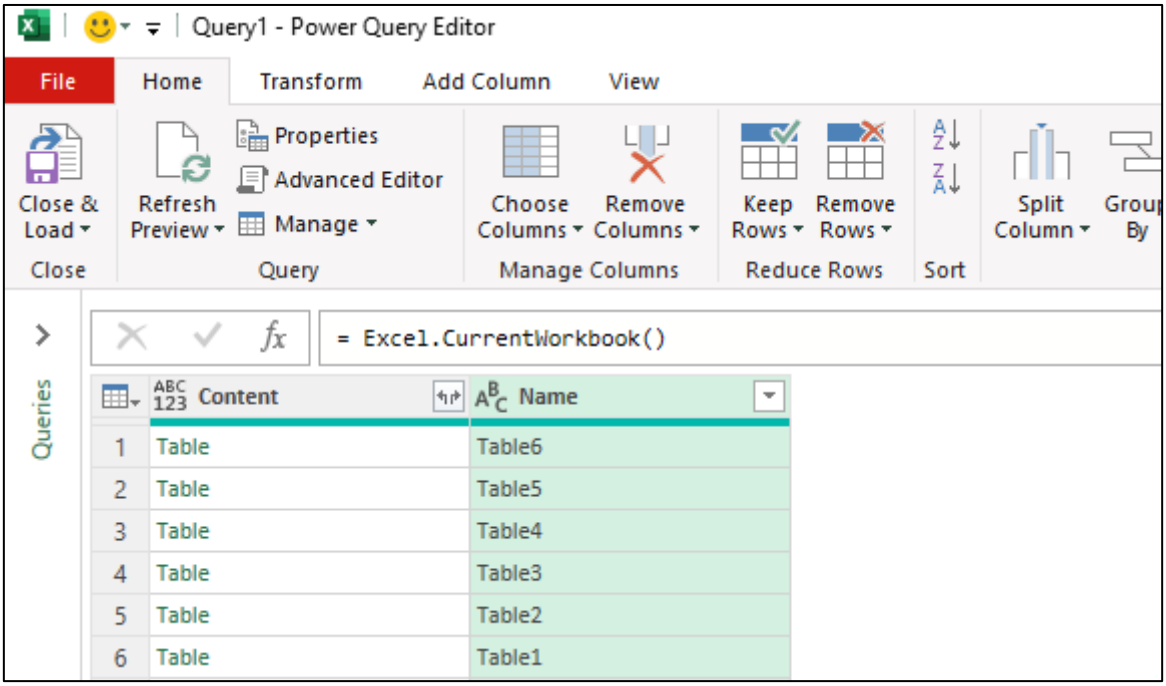



**Figure 10: Merge data based on year.**

For this I use the “blank query” function and “= Excel.CurrentWorkbook()” formula in excel to concatenate the year dataset consisting of 2018-2022.

By doing this, I was able to compare that variation based on year in my interactive dashboard using year slicer. Slicer is a tool used in power bi to filter the attributes based on our needs.

- Formulated a new column in data called “Team K/D”. This parameter is very useful in analysing the team performance.

- Added some KPIs, and slicers into the visualization to make my dashboard interactive and user friendly. And, also imported 1 external module called “heatmap” into the power bi visuals to plot the highest damage hitting campions.

After data cleaning and transformation, now the data is ready for data analysis which is discussed in the next section of the report.

### 3.5 IMPLEMENTATION OF DASHBOARD

This is the primary purpose of my dissertation, which is to construct a user-interactive dashboard based on the League of Legends eSports statistics in order to provide assistance to the company SideFest in the delivery of esports workshops in educational institutions. This dashboard would also be helpful to team management in the process of designing new strategies; it would supply commentators with historical summaries; and it would assist esports viewers in better understanding the success of teams and individual players over time.

Now let's discuss the key elements in the dashboard:

#### 3.5.1 KEY ELEMENTS IN DASHBOARD

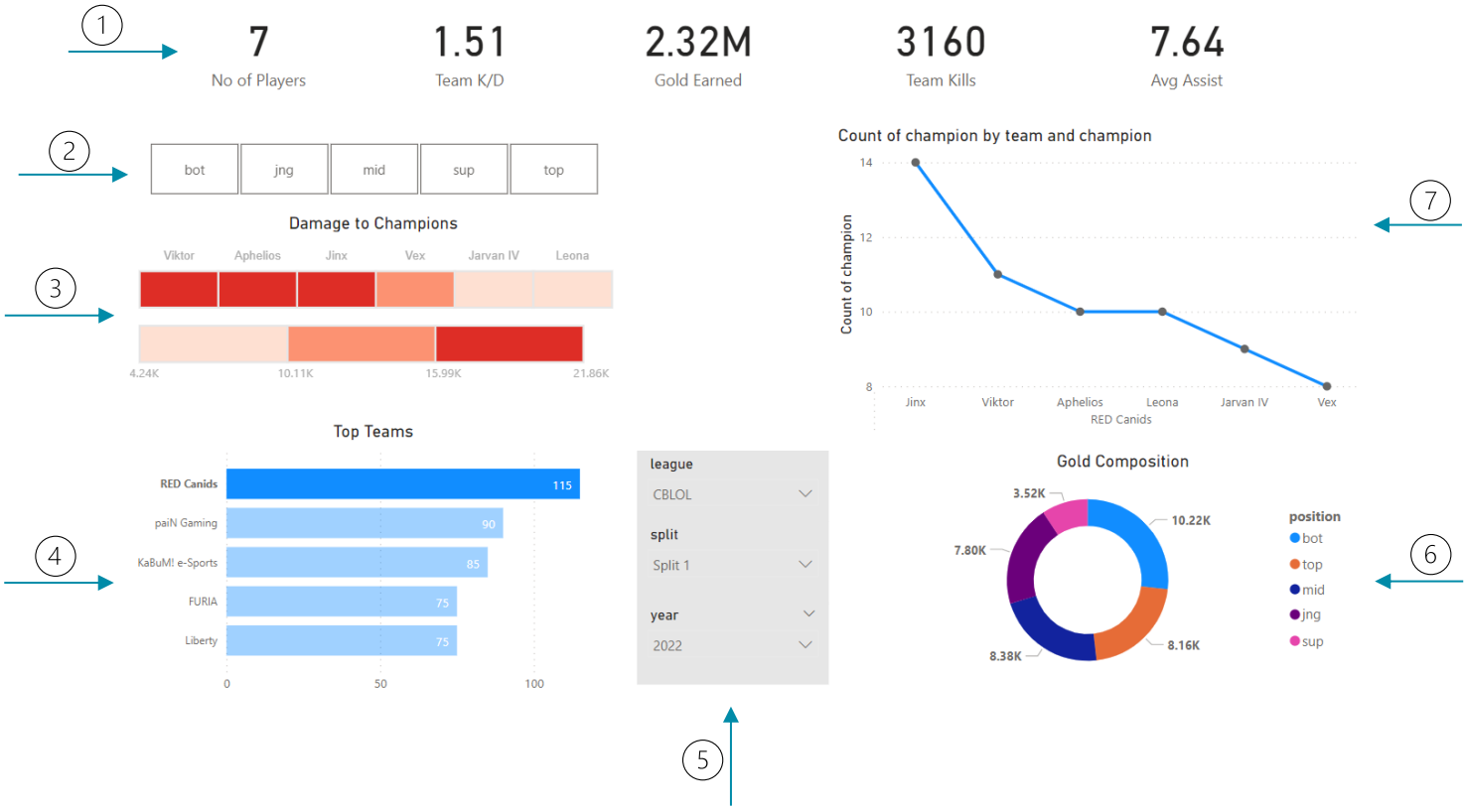



**Figure 11: Key Elements in Dashboard**

1. KPI Card: Key Performance Indicator card is one of the important indicators in dashboard which highlights the main values of the attributes such as sum, average, mean etc.
   Some of the key features to display in the dashboard are count of players, team K/D , gold earned by team and champion , total team kills and average assist.

2. Position Indicator: This is a filter for selecting various positions of the champion. For this Slicers are used in power BI.

3. Damage Indicator: This represents the highest damage hitting champion in the match. For implementing this graph, I use the heatmap module in power BI visuals.

4. Clustered Bar Chart: This is used to represent the top 5 teams in LoL esports. For this I used attributes teamname and result.

5. Filter: This is used to analyse the variation that take place in the dashboard based on some important parameters such as league, split and year.

6. Donut Chart: This chart represents the gold distribution of Champions and Individual teams based on champion position.

7. Line Chart: This graph is useful in representing, the common pick of champion my top teams and their pick rate.

Making the dashboard interactive is a crucial part and for this reason, I use slicers in order to bring multiple relationship between individual graphs.

Also, implemented two correlation matrices to understand the relationship behaviour between various attributes in the LoL esports database. For making it, python visual in power BI is used. The library which helps in the implementation process was seaborn, which helps in developing useful heatmap for analysis.

Now the further explanation and insights from the dashboard will be explained in the results and discussion part of the section.

# 4. Results and Discussions

## 4.1 Datapoints VS Correlation Matrix: Statistical Analysis

A correlation matrix is a square matrix that displays the correlation coefficients that are associated with two different variables. The correlation coefficient is a statistical tool that is used to determine the strength of an association between two variables and the particular path that this association takes. In multivariate analysis and statistics, a correlation matrix is frequently used to investigate how several variables are related to one another. (Collaborators, 2023).

For implementing the correlation matrix, we use seaborn library in python to generate correlation matrix heatmap from which we are able to understand the nature of different datapoints.

The python script for generating the visual will be provided in the appendix column.

In this topic we are going to find the relationship between various datapoints and how they impact game progression.

- **Correlation Matrix for Primary Attributes (Analysis)**

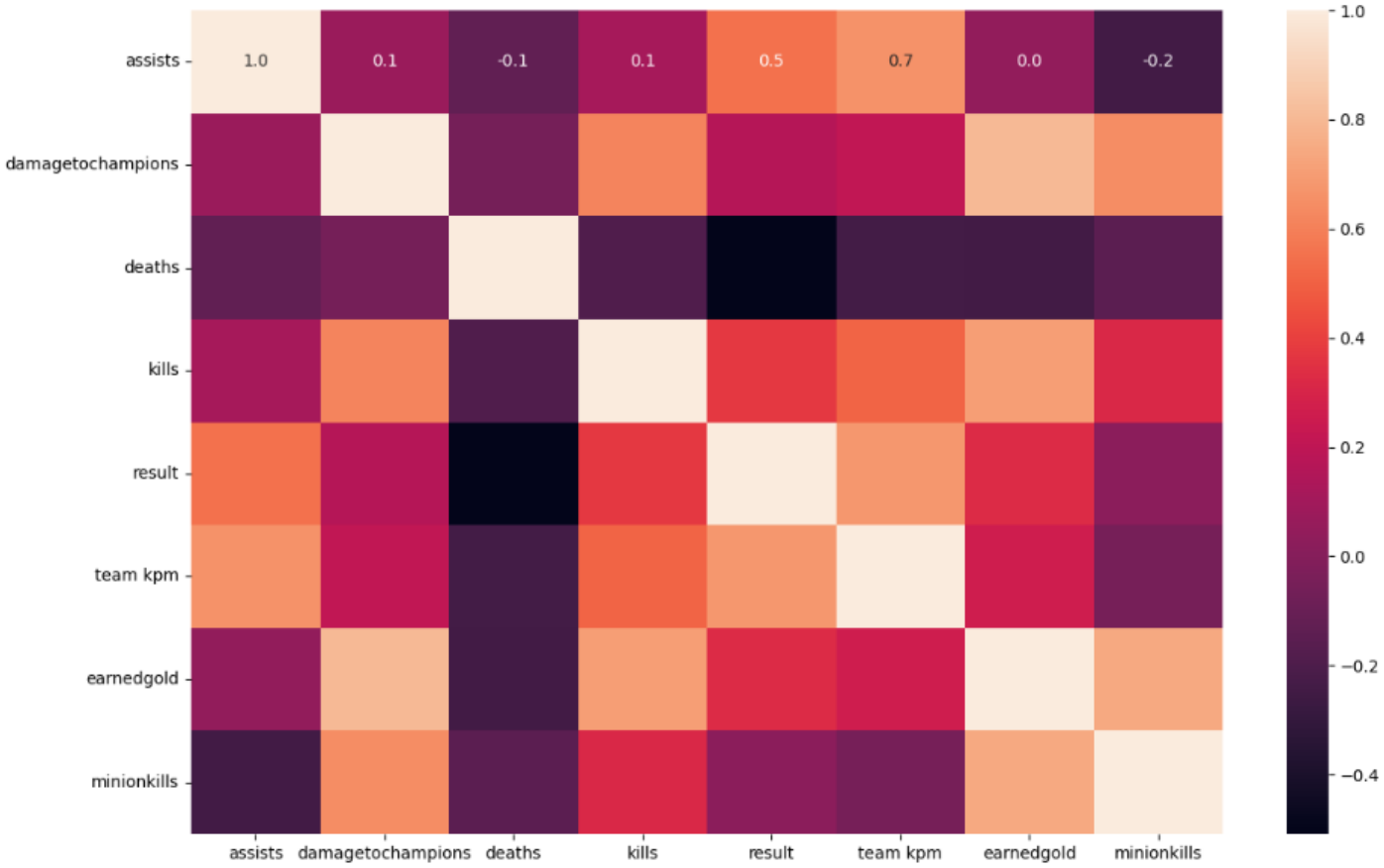



Figure 12: Primary Correlation Matrix.

From this we can see that the main primary attributes that are then intro consideration are: `assists, damagetochampions, deaths, kills, minionkills, monsterkills, result, team kpm, totalgold.`

In the above graph darker areas are having negative correlation and lighter areas is having positive correlation. And intensity of colour determines their relationship strength.

**Table 2: Correlation Matrix Table**

| Attribute 1 | Attribute 2 | Correlation Coefficient | Relation |
|---|---|---|---|
| damagetochampions | earnedgold | 0.9468 | Strong Positive |
| deaths | result | -0.3052 | Strong Negative |
| assists | damagetochampions | 0.1 | Neutral |
| team kpm | result | 0.6817 | Strong Positive |

Positive Correlation – If one attribute increases then the other attribute also increases. (Directly Proportion)

Negative Correlation – If one attribute increases then the other attribute decreases. (Inversely Proportional)

Neutral – Not much relation between two attributes. (Closer to 0)

From the above table we can see that, if team kpm has significant advantage in winning the match. That is, if the kill per minute by the team players is high then there is a chance of outplaying the enemy champions resulting in victory.

Assist and damagetochampion are not having much relation, so comparing these two attributes is irrelevant in our analysis.

If gold earned by champion increases, then they could stack up their inventory faster and gain more power thus dealing heavy damage to the enemy champions. So, gold earned in League of Legends have a crucial role in winning the match.

It is obvious that, if the deaths in a match by the team is high then the chance of winning is less as the enemy team will be able to wipeout the squad thus losing the match.

- **Correlation Matrix for Secondary Attributes (Analysis)**

The secondary attributes that are taken into account are: `assists, kills, xpat10, killsat10, assistsat10, deaths, result, earnedgold , minionkills , monsterkills .`

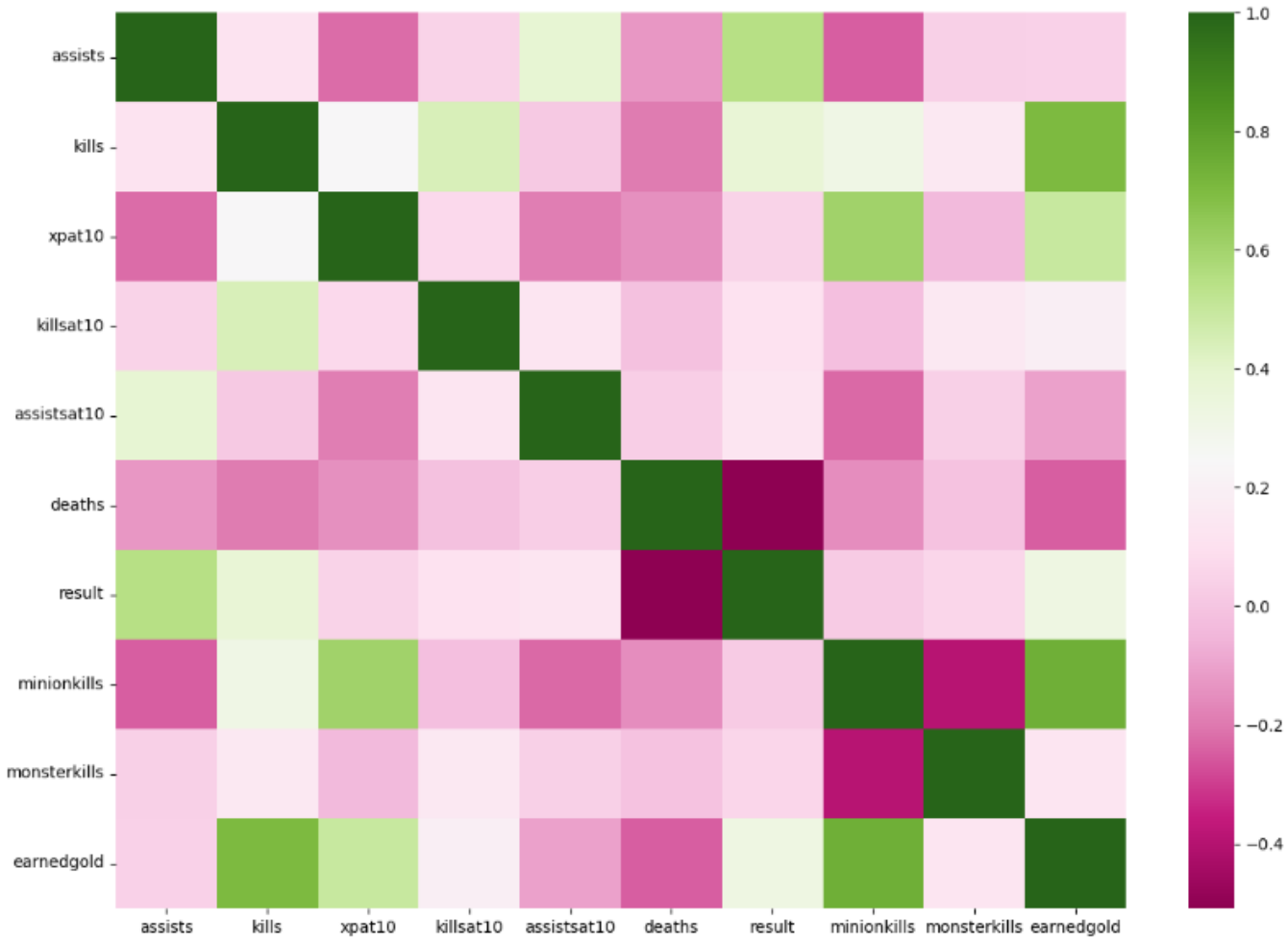



**Figure 13: Secondary Correlation Matrix.**

The green colour region represents positive correlation and pink colour region represents negative correlaton.

| Attribute 1 | Attribute 2 | Correlation Coefficient | Relation |
|---|---|---|---|
| xpat10 | minionkills | 0.657 | Positive |
| minionkills | earnedgold | 0.78 | Strong Positive |
| earnedgold | kills | 0.78 | Strong Positive |
| assistsat10 | xpat10 | 0.6817 | Negative |

**Table 3: 2nd Correlation Matrix Table.**

Killing minions in the initial stage of the game (10 minute) helps in boosting the XP or level of the champion faster, thus making the champion powerful enough to outplay the enemy champions.

From the table, it is evident that if more minions are executed in the match, then the consumption of gold earned also increases thus stack and boost the squad champions for winning the match.

Earning more gold throughout the fight helps in building up the inventory from lower tier items to top tier items faster, which in turn helps in levelling up champions to their ultimate form, which leads to higher chances of defeating enemy champions more quickly.

Assist at the 10-minute mark of the game does not result in a significant increase in the amount of XP gained by champions because these two metrics are inversely proportionate and have a mild negative association.

A correlation matrix is a table that shows the correlation between multiple variables. Each cell in the table represents the correlation between two variables. The values in the matrix can range from -1 to 1. A value of -1 indicates a perfect negative correlation, a value of 1 indicates a perfect positive correlation, and a value of 0 indicates no correlation. A simple way to understand a correlation matrix is to think of it as a map that shows how different variables are related to each other. You can use it to see which variables have a strong relationship and which have a weak relationship.

From this heatmap players or team can drill through certain attributes that they need to focus on improving the playstyle of the game.

## 4.2 TOP 3 TEAMS AND CHAMPIONS USED

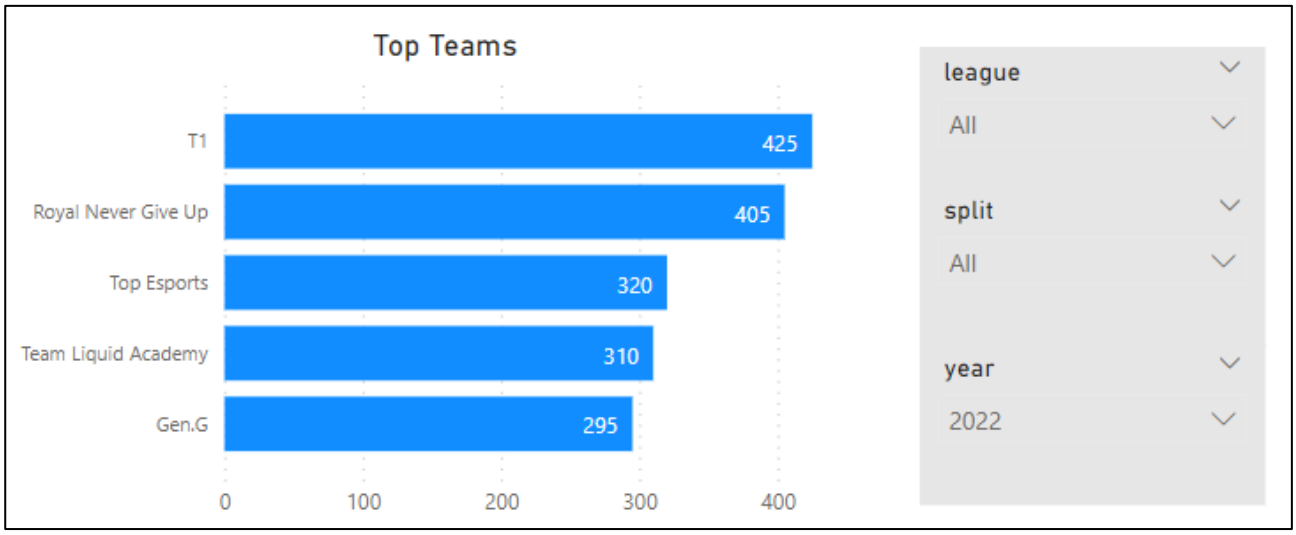



**Figure 14: Top 3 teams.**

The above line graphs help us to distinguish the top 3 teams based on result for varies attributes like year, split & league. This graph is plotted by taking attributes teamname (Y axis) and result (X axis). And also added advanced filtering on teamname with Top 3 based on sum of result. By doing this we will be able to get the desired graph for our analysis.

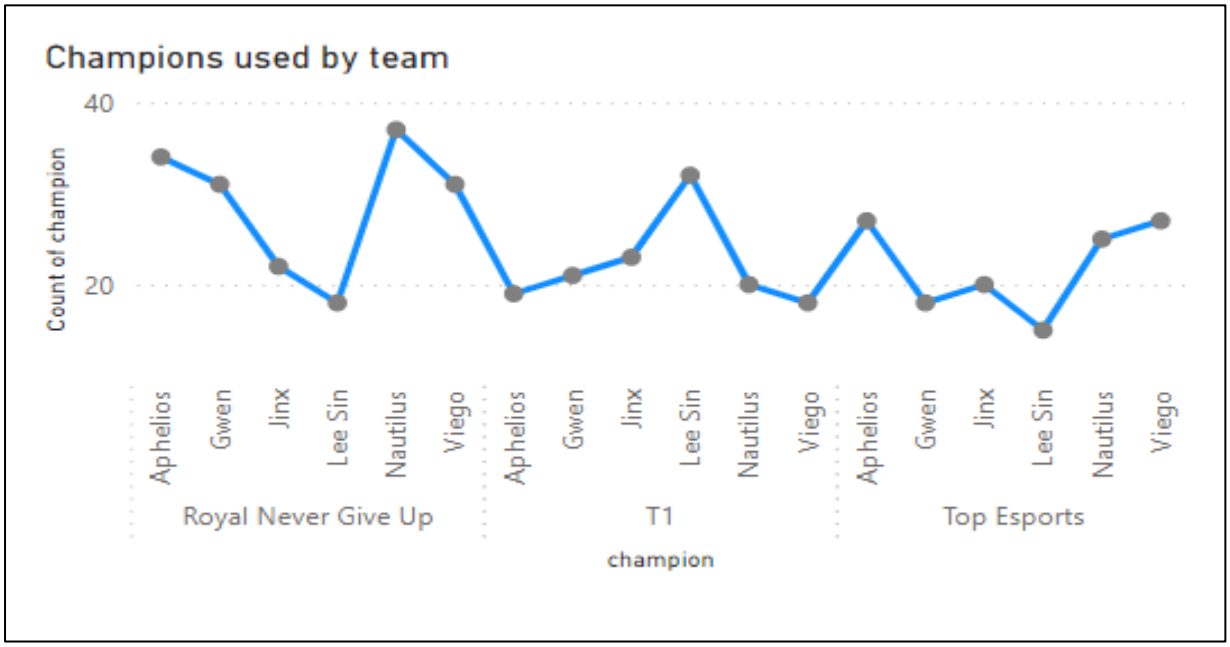



**Figure 15: Top 3 team's champion.**

The line chart illustrated above shows the top champions that the pro players in the team choose to play for their tournament.

This is an important graph as it explains the Stakeholders about the frequent champions that the players choose in order to outplay the match. For implementing this chart, we need to take attributes champion & teamname on X axis followed by count of championon Y axis. And filter top 3 champion based on sum of result.

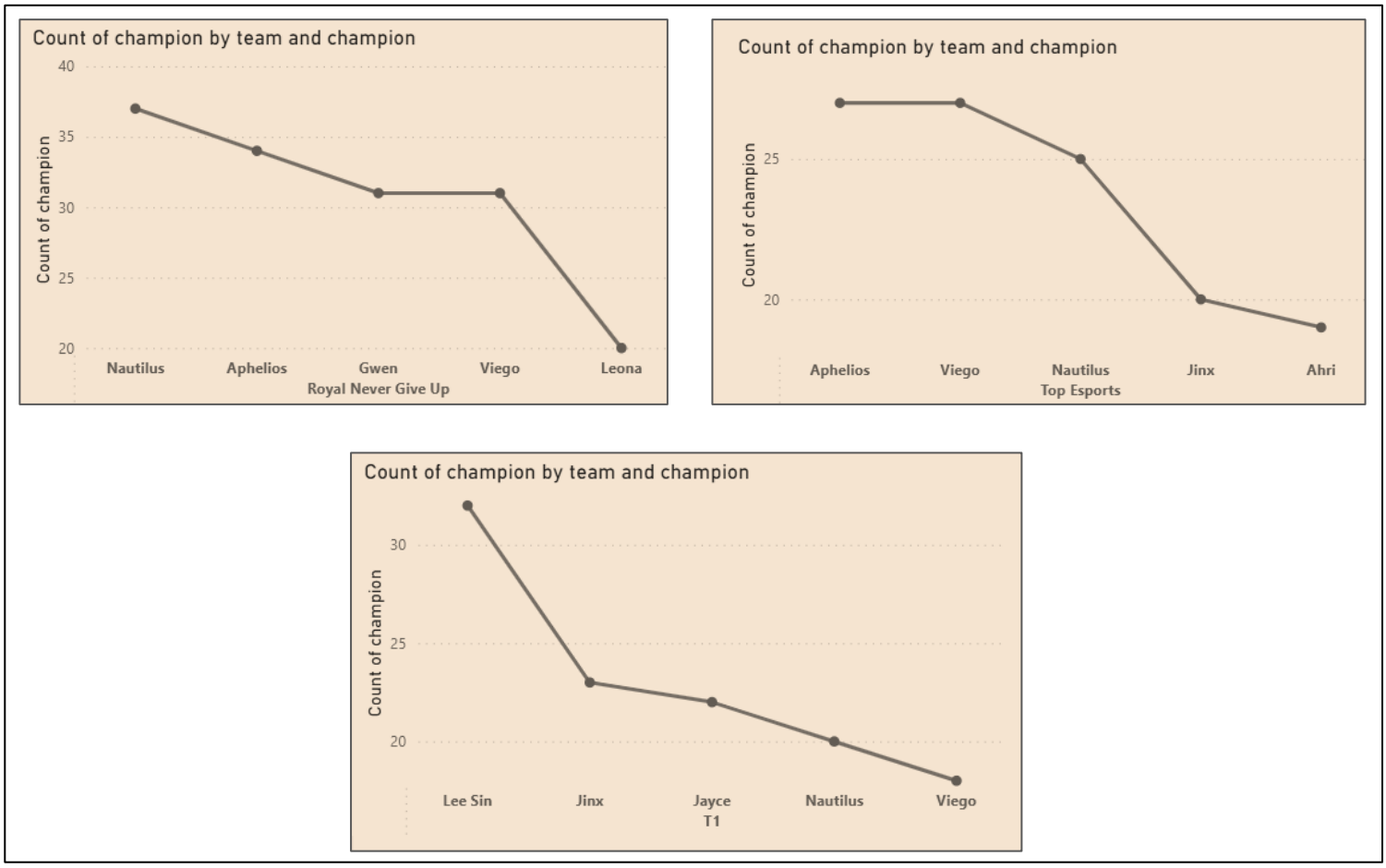



**Figure 16: variation of champion on top teams.**

It has been determined that T1 has the best overall team performance in the year 2022, followed by Royal Never Give Up and Top Esports. (Figure 14)

In the case of team T1, we can see that Lee Sin, Jinx and Jayce are the most frequenty played champions by the team. Whereas in the case of Royal Never Give Up and Top Esports we can use Nautillus and Aphelios are the mostly used champions. (Figure 16)

Overall, Apheilios, Nautilus, Jinx and Lee Sin are the champions that are considered to be the "meta" in this situation. This is because the top teams usually always play them because of the ideal synergy that exists between them based on the champion positions that they occupy.

I also added filter to this visualization based on league, split and year was we can see from figure 14 to make the dashboard user interactive.

In conclusion, players and team managers can understand how these team perform on various seasons, year and league and the variation of champion pick taking place in different years. Also, in educational workshops students can analyse the top teams and analyse their gameplay through streaming platform such as YouTube or Twitch and improve their game style. Not only that, but they can also find which champions are the meta and use them in the advancement of their esports journey.

### 4.3 USAGE OF CHAMPION BASED ON PATCH

As the developers at Riot Games continue to make adjustments to the game's overall balance, the champions in League of Legends and the strengths they possess are subject to change after each patch. Because of this, the optimal strategy for using champions might shift considerably from one patch to the next. It is absolutely necessary to maintain an up-to-date knowledge of both the most recent patch notes and the current meta in order to discern which champions are currently powerful and viable in the game.

The meta can shift frequently, and what's strong in one patch may not be as strong in the next. Staying informed and adapting your champion pool accordingly is essential for success in League of Legends.

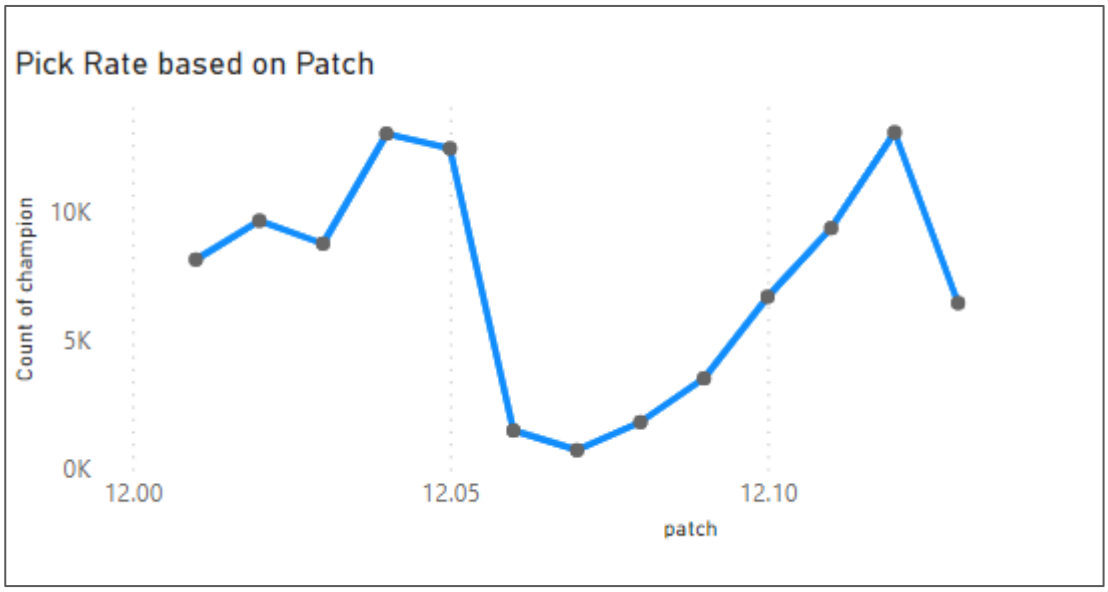



**Figure 17: champion usage based on patch.**

Periodically the usage of campions varies depending upon update of games followed as patch.

This is introduced to balance the game style of the match, mainly as Buff/Nerf to the campions based on overall pick rate.

Champions can receive buffs to their base stats, such as health, mana, attack damage, or attack speed. These buffs make them more durable or increase their damage output. Whereas they receive

Nerfs in the form of decrease the damage, increase cooldowns, or reduce the utility of a champion's abilities to make them less effective.

Figure 17 illustrates the pick rate of individual champion based on the patch(parameter). For implementing this chart, we take the attributes champion(count) in the Y axis and patch on the X axis.

Now we can observe the variation of champion pick based on patch as follows:

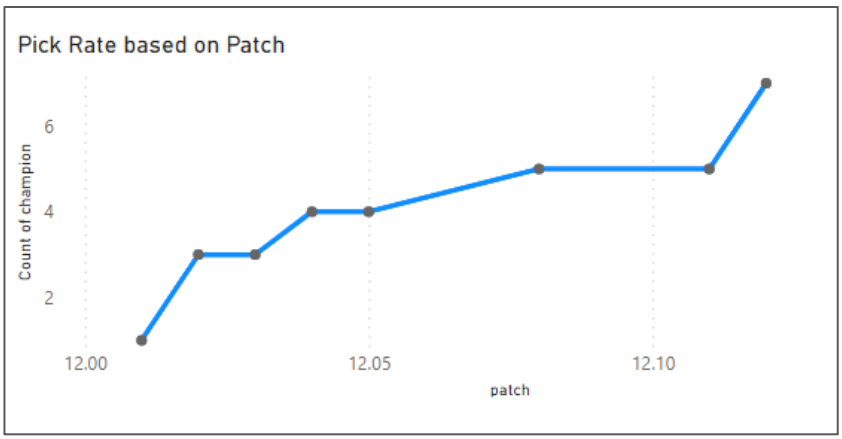
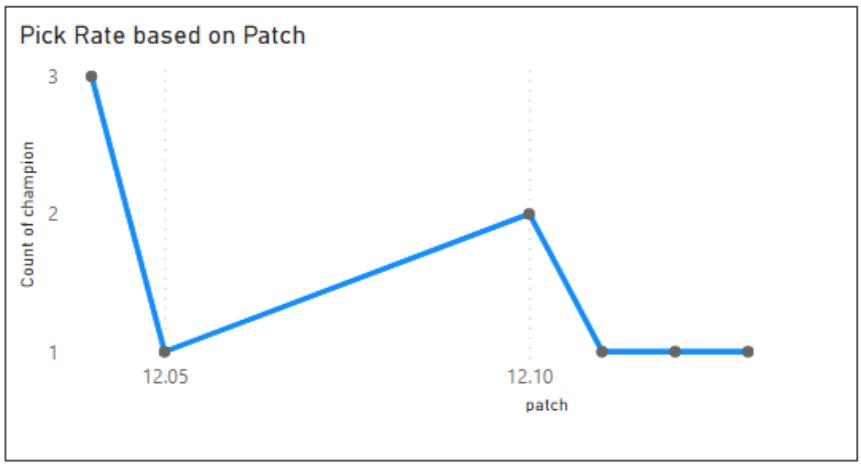



**Figure 18: Lee Sin usage based on patch.**

From this graph we can determine that, pick rate of “Lee Sin” increased drastically upon patch. Which means the campion is been buffed to balance the meta.

It might be the reason why, most of the pro players in eSports choose this character as their main pick as it is meta and easy to play.

**Figure 19: Brand usage based on patch.**




From this above graph, we can see that champion “Brand” is been played less by the pro players as the champion is underrated and needs a major Buff in order for a come back like changing the champion mechanics.

Players and team managers can analyse this graph in order to see the variation in champion pick based on patch and take suitable champions which are having better pick rates based on the latest update for their eSports match.

### 4.4 GOLD EARNED VS CHAMPION POSITION

Gold distribution in League of Legends is crucial for a team's success and power. It is earned through in-game activities like killing minions, monsters, champions, and objectives. Minions in the three lanes provide gold when last hit by a champion, and the amount depends on the minion type. Jungle monsters earn gold by killing neutral ones, and champions earn gold when they secure a kill on an enemy champion. Killing a champion on a killing spree or dominating streak provides extra gold to the team that scores the kill. The first champion kill of the game also provides extra gold to the killer and assists. Destroying enemy turrets and inhibitors provides global gold to the entire team, and killing dragons and Baron Nashor provides global gold to the team that secures the objective. (Lucklepto, 2020)

As we have viewed in topic correlation matrix, we encounter that gold earned is having strong correlation in winning the match.

Earning Gold is a vital part in league of legends to stack up the campion inventory with top tier items to counterplay enemy campions. In this topic we are going to see the gold distribution of champion based on champion position.

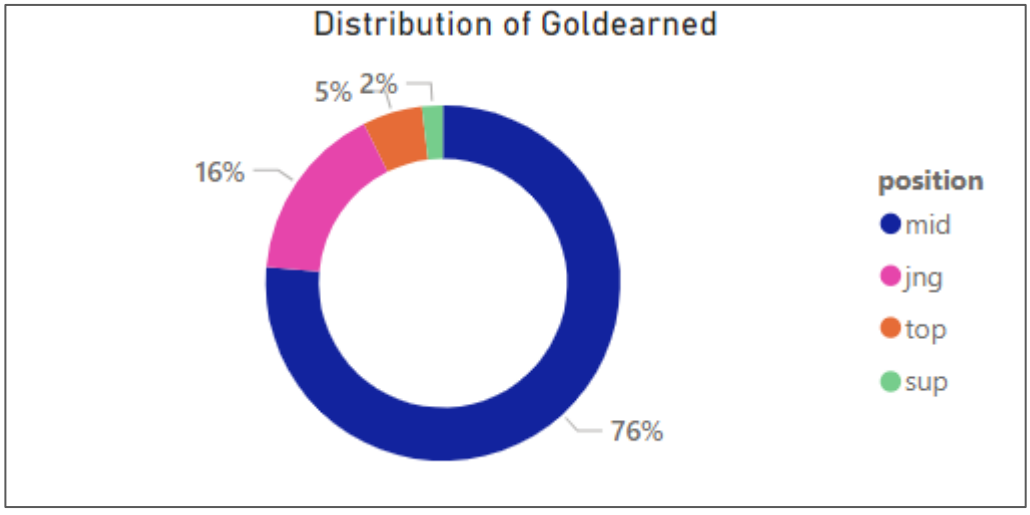



**Figure 20: Gold distribution of Ekko based on position.**

This is a donut chart representing the gold distribution of champions based on corresponding position in the map. For implementing this chart, I took the average percentage of gold earned with position as legend.

This is gold distribution chart of the champion “Ekko”, as we can see that majority of the gold is being earned from the mid position by this champion. So champion Ekko must be placed on the mid/mage position in order to harvest more gold thus chance of winning the match increases.

Overall, from this donut chart, players or students can focus on which champions to be played on the specific position of the map (top, jungle, mid, sup, bot) to harvest maximum gold by killing minions and other monsters. As gold earned is having positive correlation with result.

### 4.5 HEATMAP FOR HIGHEST DAMAGE HITTERS

In League of Legends, dealing the highest damage is a significant aspect of the game, but it's essential to understand that damage alone doesn't guarantee victory. The highest damage-dealing champions often play distinct roles on a team, and their importance varies depending on the context of the match. Here's a breakdown of the highest damage-dealing champions and their importance:

- Marksmen (ADC - Attack Damage Carry):

Champions in the ADC role, such as Jinx, Kai'Sa, and Aphelios, are known for consistently dealing high physical damage with auto-attacks.ADCs are essential for sustained damage output in team fights and taking down objectives like turrets and dragons. Protecting and enabling the ADC is a priority for the team.

In this topic we are going to discuss the highest damage hitting champion in the team:

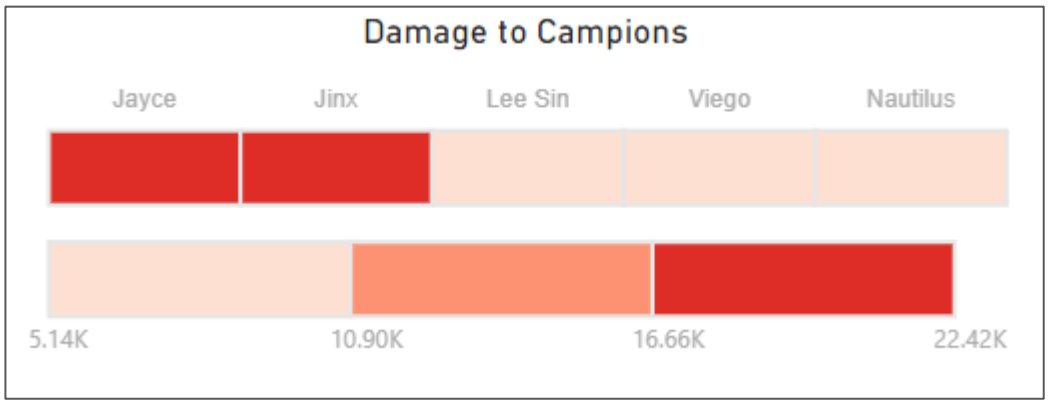



**Figure 21: damage hitter heatmap.**

From this heatmap, users can classify which campion to be selected to eliminate other enemy champions with fraction of time leading to victory. For implementing this map, I downloaded the heatmap package module from the Power Bi library and selected the attributes damagetochampion (average) and champion as the categories.

In this case, “Jayce” and “Jinx” are the heavy hitters also known as ADC (attack damage carry) to deal higher damage in that particular team. As we can see darker red in the heatmap stating the highest amount of damage.

“Jinx” can be played as marksman to snipe out enemy campions within range. Mainly used to take off campions when our team is in a collision with enemy team.Dealing damage to objectives like turrets, dragons, and Baron Nashor is essential for map control and overall team success.

Ultimately, winning in League of Legends requires a combination of factors, including teamwork, strategy, vision control, and objective control, in addition to dealing damage. The highest damage-dealing champions are just one piece of the puzzle, and their importance varies throughout the course of a match.

From this map, team members can list out which damage hitting champion that the players much use in order to excel in the tourney.

### 4.6 OVERALL CHAMPION COUNT BASED ON YEAR

Champion count is very crucial for team managers and strategy analyst to study which all champions are frequently played in the tourney and its importance. From this, they can also coach players in using the champion with highest number of picks as there is a reason for majority of esports player using that particular champion.

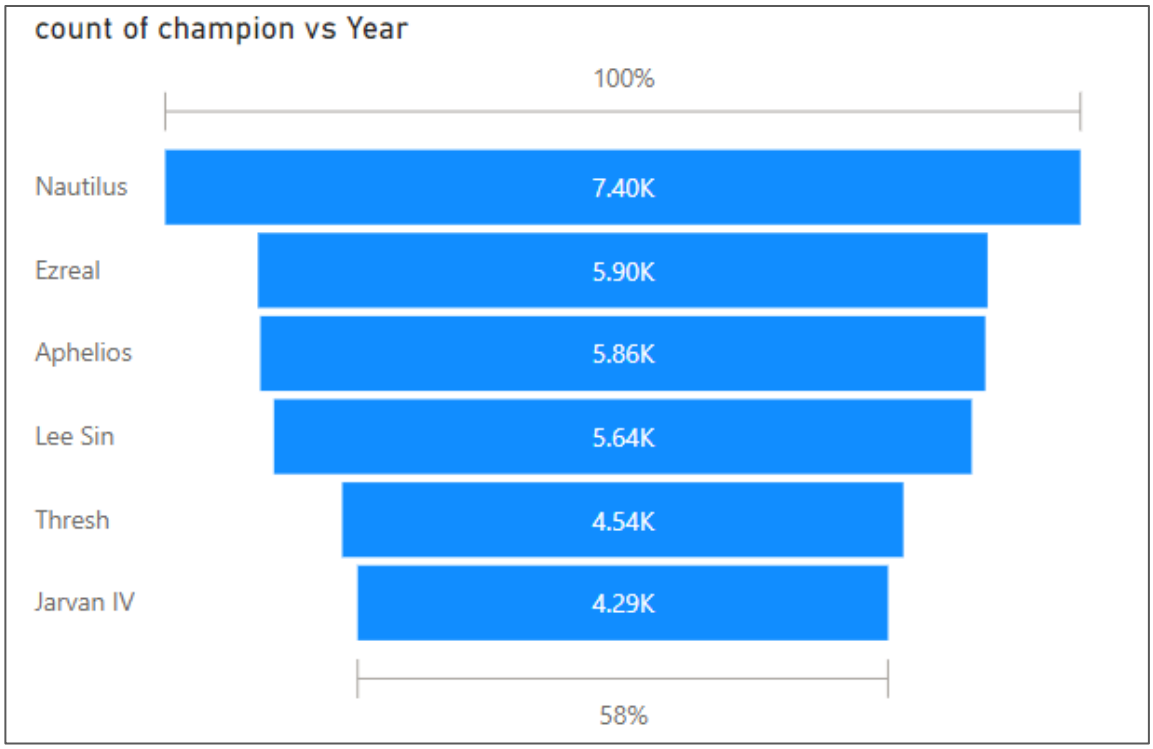



**Figure 22: Champion count based on year.**

With the help of this funnel chart, users can distinguish which champions are frequently used by majority of pro players in different years.

For making this graph, initially I merged the yearly dataset having similar attributes combined using the power query editor in Power BI. Merging was important step then only I can compare the usage of champion based on different years. After that I ploted the attributes champion(count) and champion into the funnel chart and also provided a year slicer in order to understand the variation happening to the champion during certain interval of time.

From the above funnel chart, we can see “Nautilus” is being played heigest by the esports player with total count of 7400 times in the year 2022. Followed by “Jinx” and “Aphelios”.

It's possible that this is because of the advantages and synergy that this champion brings to the game.

### 4.7 CHAMPION POSITION VS WIN RATE

In League of Legends, a champion's position and win rate are closely linked. Different positions, such as Top Lane, Jungle, Mid Lane, ADC, Bottom Lane Marksman, and Support, have unique impacts on the game. The win rate of a champion can vary significantly based on their position, with some being more effective in specific roles. Meta and balance, synergy and counters, skill and player experience also play a role in win rates.

Adaptation and meta shifts can lead to shifts in win rates, as players and teams adjust their champion choices and positions based on prevailing strategies and trends. Patch changes can impact a champion's viability in specific roles, with some becoming stronger or weaker due to these adjustments.

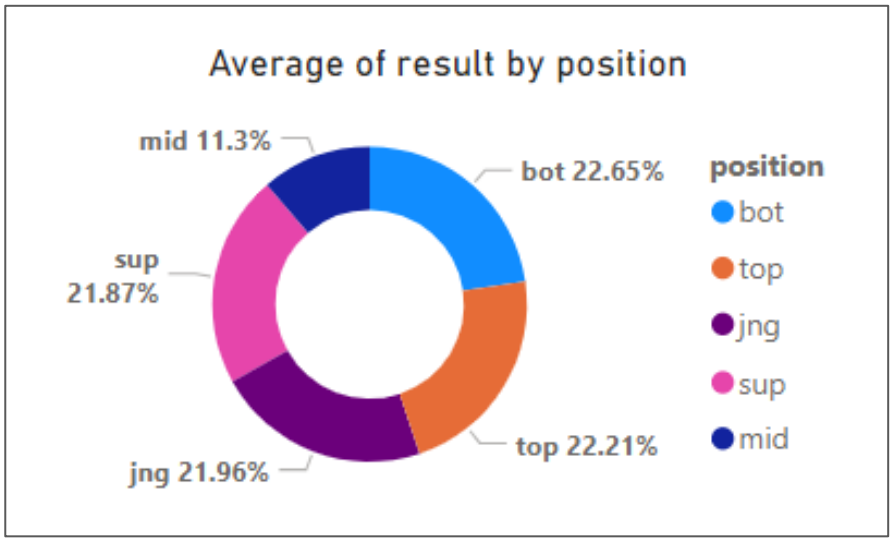



**Figure 23: Lee Sin Win Percentage based on position.**

From this donut chart, players can utilize their prior champion based on win percentage. For implementing this chart, I took the parameters: position and result (average).

Displayed the position as category and added filter on champion to distinguish different champions and their win percentage based on position.

In this graph, we can see that Lee Sin is an allrounder character, but it's been mainly played in top and sup position to unleash its maximum result.

So, players can understand the analyse which campion to be selected in the specific position for better results.

### 4.8 CHAMPION STATS BASED ON PRIMARY ATTRIBUTES

Understanding champion statistics in League of Legends is essential for a number of reasons. These metrics provide significant insights into a player's or team's performance and can drive strategic decision-making. Some of these statistics include average gold, damage, and the K/D (kill/death) ratio.

Teams can choose champions that align with their strengths and exploit the weaknesses of their opponents. It is possible to evaluate how a champion fits into a team's composition by using statistics like as the amount of damage dealt and the kills-to-death (K/D) ratio. If a champion has a low kill-to-death ratio but consistently provides significant damage, picking them could be a high-risk move with a potentially lucrative payoff.

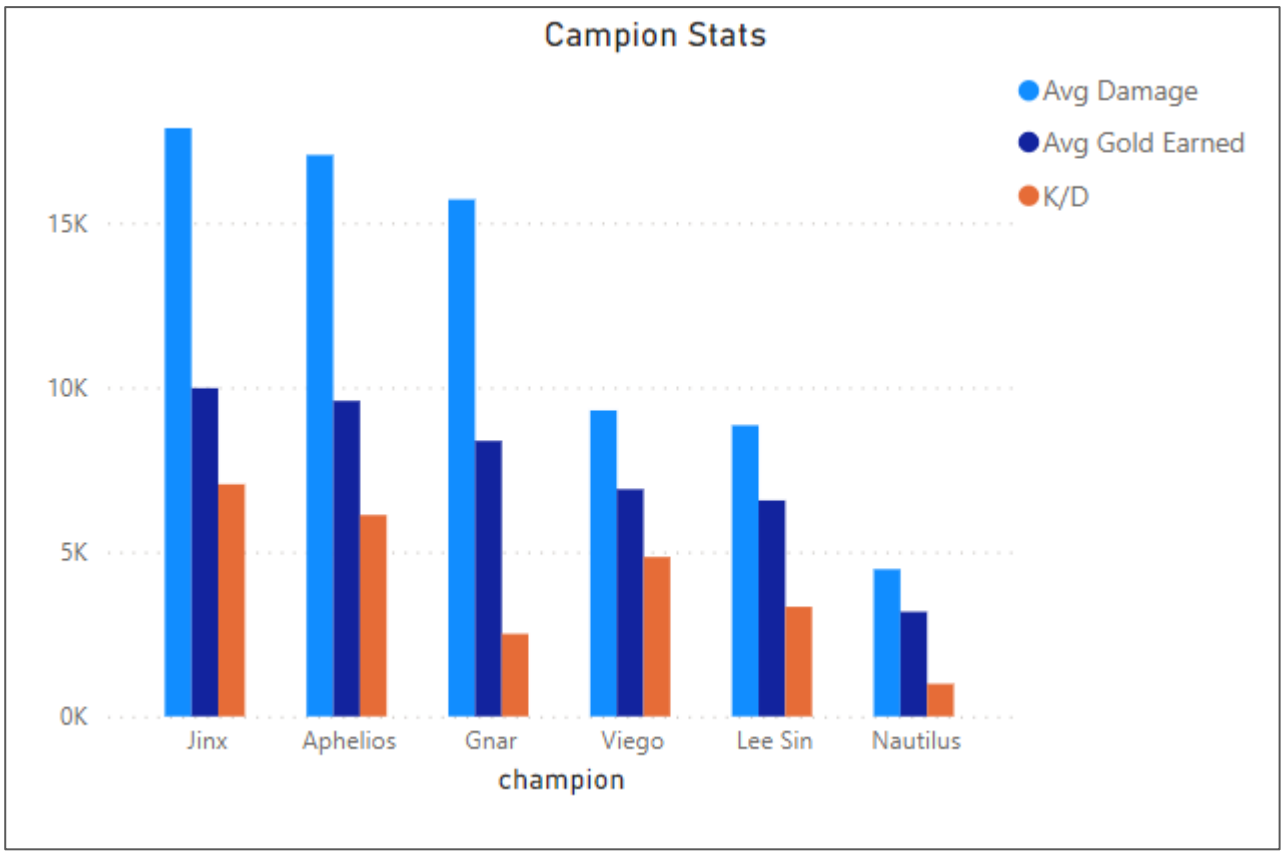



**Figure 24: Champion stats based on major parameters.**

From this cluster chart we can say that Jinx is having the highest composition of values based on average damage, average gold earned & K/D. Followed by Aphelios and Gnar.

For making this, a new parameter called K/D is introduced into the dataset which is nothing but the ratio of champion kills and deaths. Then the average of the parameters: damagetochampion , earnedGold and K/D is added into the chart.

The reason Jinx is at the highest is as follows:

- Her high damage output suggests that she can carry team fights and secure objectives effectively in the late game.

- The gold earned statistic may indicate that Jinx is good at farming minions and securing kills or assists, which contributes to her late-game strength.

In summary, the graph indicating that Jinx has the highest stats, followed by Aphelios and Gnar, suggests that these champions are currently performing well in the dataset or context being analyzed. Understanding this information can inform strategic decisions, champion prioritization, and playstyle adaptation in the future games.

# 5. CONCLUSION AND RECOMMENDATIONS

This research has been a significant step forward in addressing the challenges posed by the frequent updates and inconsistency of data in online games, with a specific focus on the esports industry. The primary objective was to develop an interactive dashboard that can effectively visualize and analyse large volumes of LoL esports data. In League of Legends, it's not just about being fast; it's about smart strategies, precise moves, and working together as a team.

The primary question covered in the research is:

- Which Champions are picked most by the top 3 Teams, and how does it change between Seasons?

- How do Champion choice and Role impact Gold Earned, and how does this change between Seasons.

- Is there any impact in the champion usage based on patch?

With the help of analytical tool, I was able to solve problems based on my results obtained.

Moreover, this project has demonstrated the potential for data-driven analysis to enhance the understanding of player strategies in esports. By leveraging advanced analytics, we have been able to dissect large esports data and draw meaningful conclusions. This data-driven approach has the potential to revolutionize coaching, training, and strategic development in the esports industry.

## 5.1 Future Scope

There are certain areas in my work where further development is to be held in future. These are some of the areas needed further analysis as follows:

- We have discussed in results about patching a champion mainly buff which will increases champion usage. So next is to find whether if buffing a champion, increases the rate of banning that champion in future.

- Developing predictive models to forecast match outcomes, player performance, or in-game events based on historical data can be a fascinating area. These predictions can be used for betting markets, fantasy esports, or strategic planning by teams.

- Analyse the performance of individual champions over multiple patches and seasons. Identify trends in win rates and pick rate based on position.

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# 7. APPENDIX

## 7.1 INTERACTIVE DASHBOARD

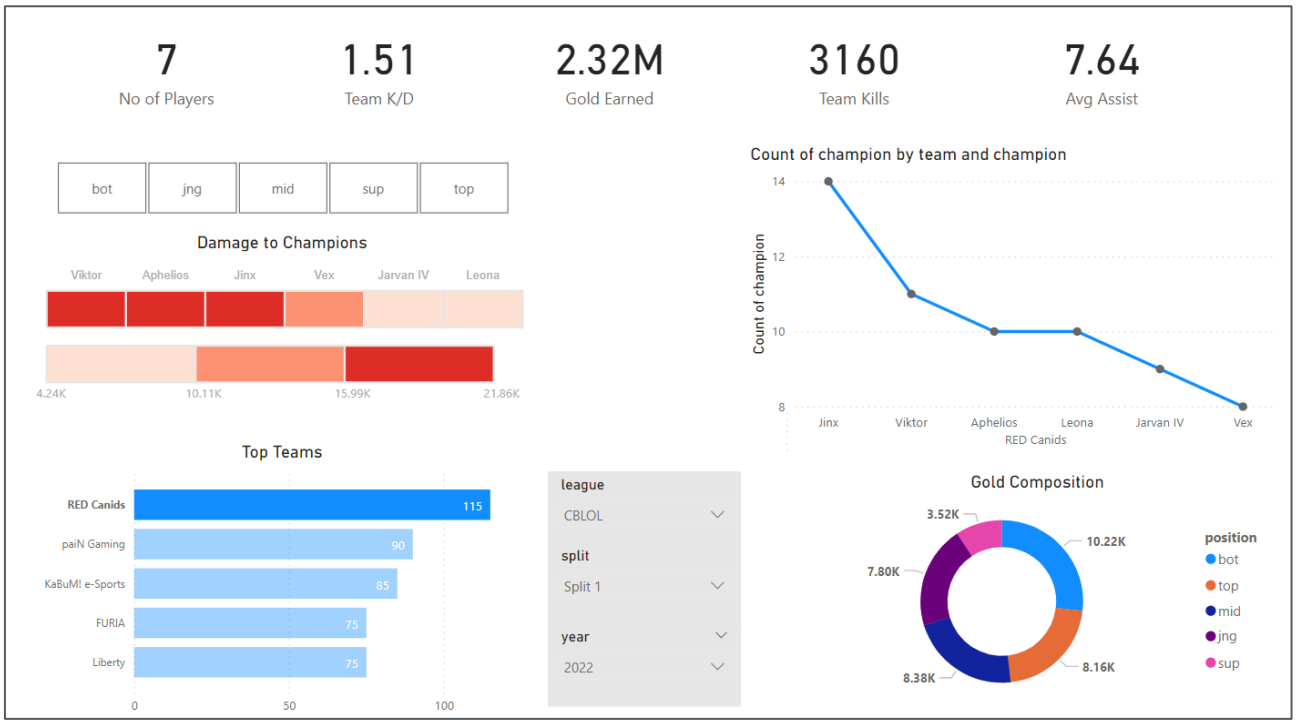



Figure 25: Team Stats

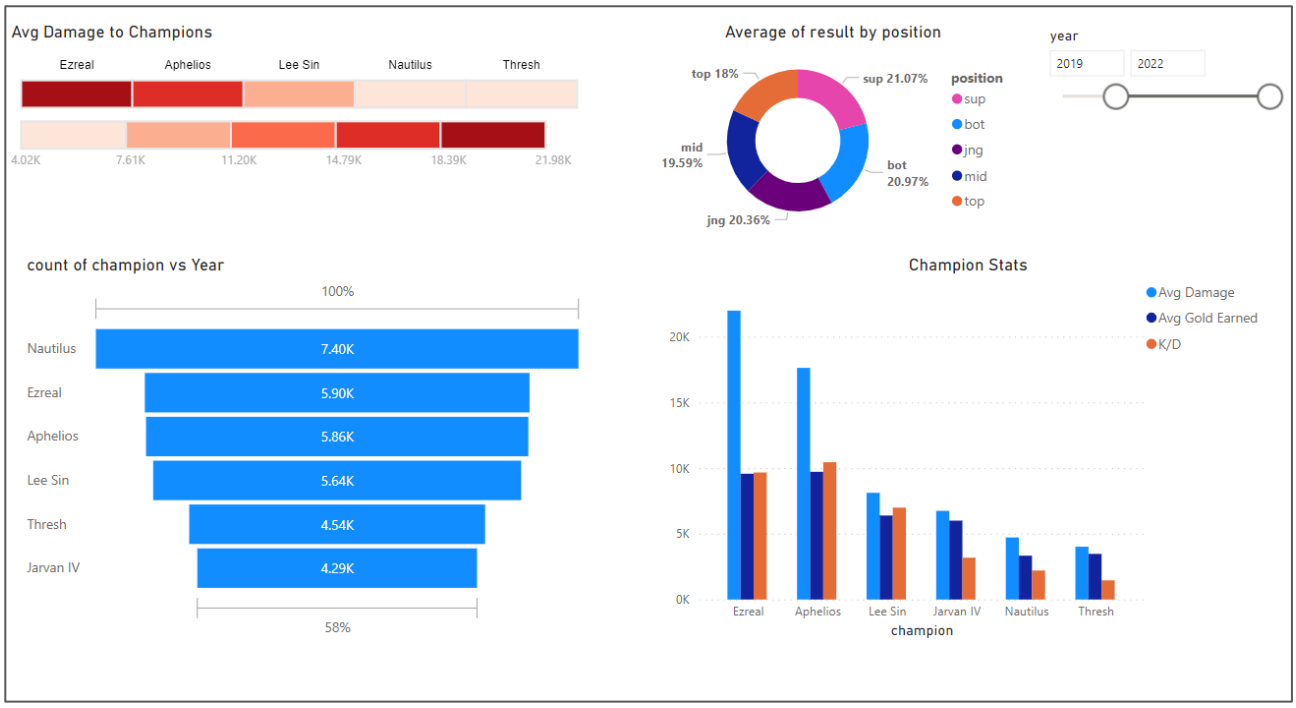



Figure 26: Champion Stats

### 7.2 CODE FOR CREATING CORRELATION MATRIX (Primary attributes)

```
# dataset = pandas.DataFrame(assists, damagetochampions, deaths, kills,
minionkills, monsterkills, result, team kpm, totalgold)

# dataset = dataset.drop_duplicates()

 # Paste or type your script code here:
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

f,ax = plt.subplots(figsize=(14,9))
sns.heatmap(dataset.corr(), annot=True, fmt =".1f", ax=ax)
plt.show()
```

### CODE FOR CREATING CORRELATION MATRIX (Secondary attributes)

```
# dataset = pandas.DataFrame(assists, barons, kills, xpat10, killsat10,
assistsat10, deaths, deathsat10, result, totalgold)
# dataset = dataset.drop_duplicates()

# Paste or type your script code here:
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

f,ax = plt.subplots(figsize=(14,10))
sns.heatmap(dataset.corr(), cmap="PiYG")
plt.show()
```

## 7.3 LinkedIn Post


**Figure 27:LinkedIn Post 1**

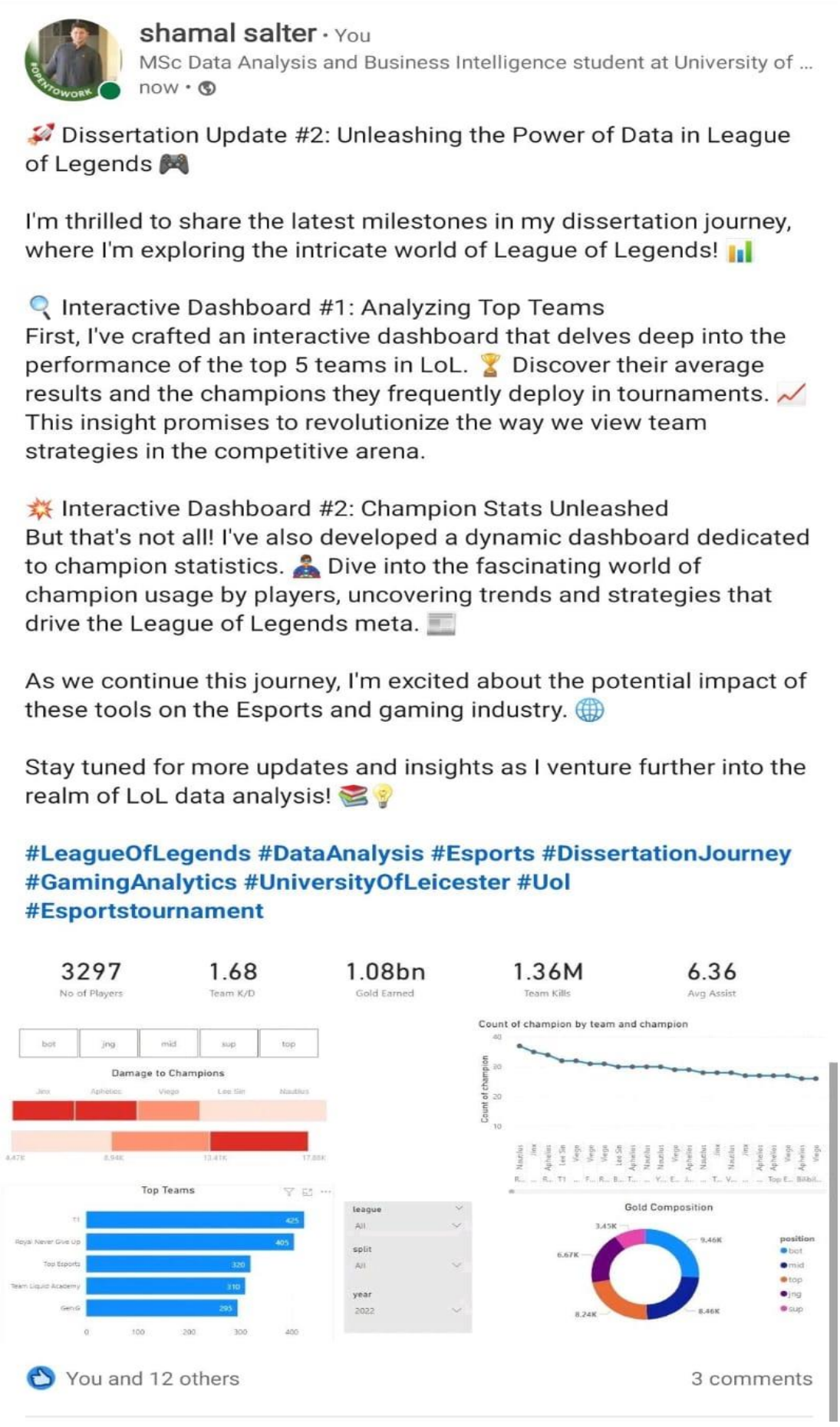



**Figure 28: LinkedIn Post 2**

**shamal salter** · You
MSc Data Analysis and Business Intelligence student at University of ...
now · 🌐

📚 Dissertation Journey Completed: Unleashing the Power of Data in Esports! 🚀

Today marks the culmination of an incredible journey into the heart of Esports and data analysis. 🎮 I'm excited to share the final update on my dissertation project!

🌐 Two User-Friendly Interactive Dashboards
I'm thrilled to present the result of countless hours of hard work - two user-friendly interactive dashboards. One dedicated to team stats and another to champion stats in the world of League of Legends. These dashboards are the gateway to understanding the strategies and dynamics that shape this dynamic Esport. 🏆

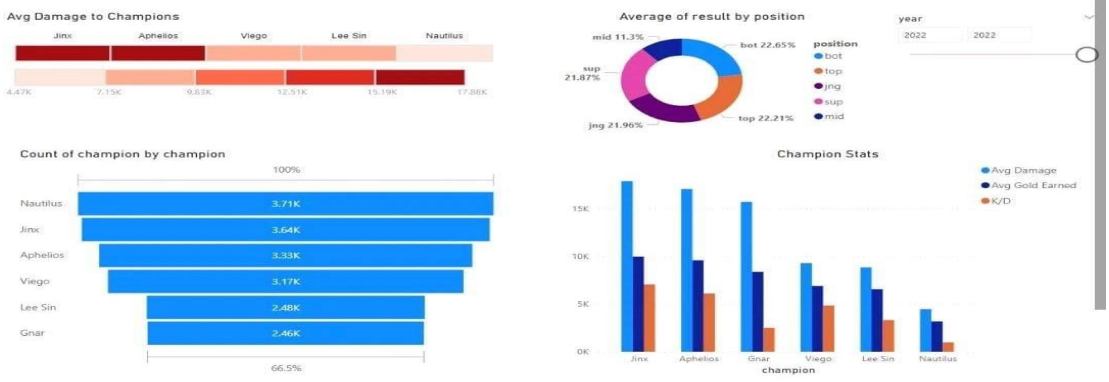
🔍 Correlation Matrices - Insights Unveiled
In addition to the dashboards, I've incorporated correlation matrices that reveal the intricate relationships between attributes, unlocking deeper insights into the game. 💡

🙏 Gratitude to Our Supervisors
None of this would have been possible without the invaluable guidance of our supervisors. A heartfelt thank you to Jason Boomer, our industrial supervisor, and **Andrew Morozov**, our academic supervisor, for their unwavering support and expertise. Your mentorship has been instrumental in this journey. 🤝

📊 Impact Beyond Academia
But the impact of this work extends far beyond academia. These tools will empower SideFest in delivering esports workshops in schools, guide team managers in crafting winning strategies, provide commentators with historical context, and offer esports fans a deeper understanding of team and player performance over time. 📰

As I close this chapter, I'm excited about the future of data analysis in Esports and the potential of these tools to shape the industry. Stay tuned for what's next! 🌟

**#Esports #DataAnalysis #DissertationCompleted #LeagueOfLegends #GamingAnalytics #SideFest #Uol #UniversityofLeicester #Python #Powerbi #Excel**




You and 8 others

**Figure 29: LinkedIn Post 3**