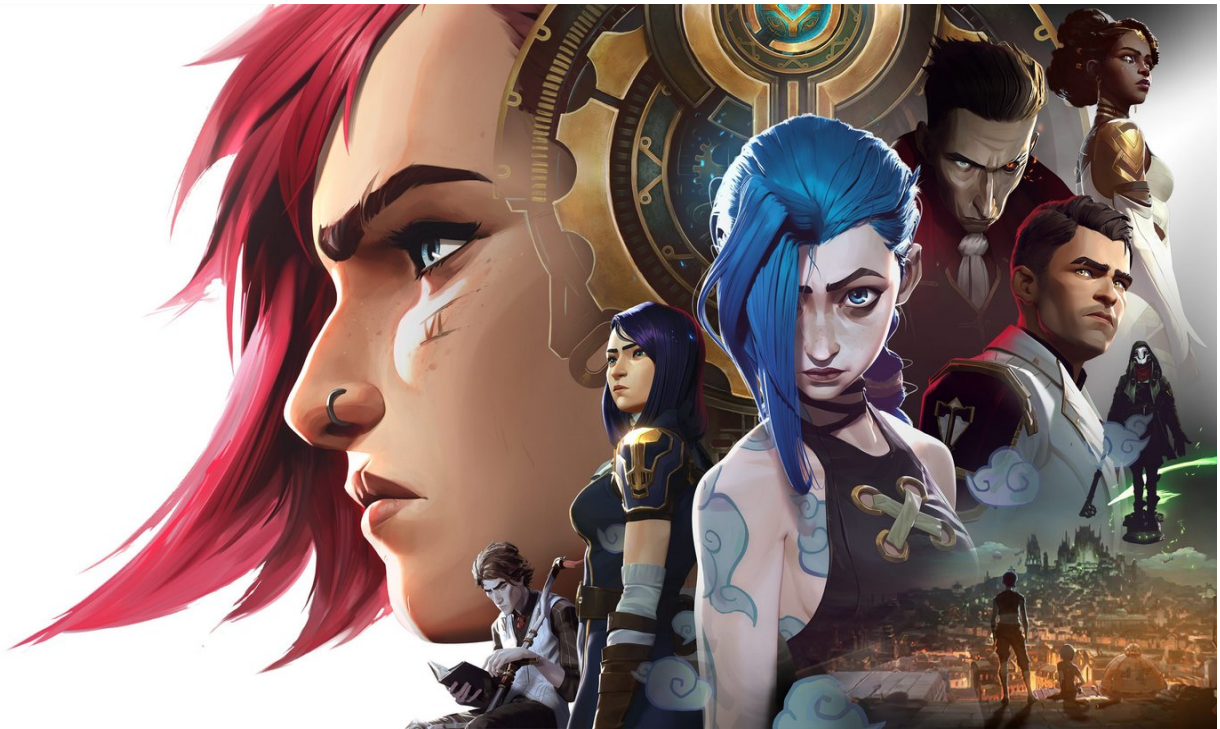


IEE 380: Probability And Statistics

League Of Legends Champions by Times Picked

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Project Objectives

The objective of this project is to gain practical experience in the real world application of statistics and to use the knowledge gained from class on a data set. This project involves The Central Limit Theorem which is an idea all across many sub fields of math. Its use will be described later. This report follows data I collected around the massively popular online battle arena game League Of Legends.

Data Description

The data was collected from *OP.GG* a website that collects player match history and curates it into a useful format usable by players in many ways. You can see stats about your own play, how often a champion is being played, what the win rate of a specific champion is, information about current builds, and much more. The data used for this project was the number of times each champion has been played in the last month (10/17/21 - 11/17/21). This information is useful to see what kinds of champions the general community is playing. This can be used to see what champions are good in the current patch as people tend to play what wins.

After the data has been collected a champion's specific times picked number can be compared to the average number to see if this champion is picked more often or less often than average. Or this same number can be used to find a percentage over the total to get this champions pick rate. Another use for this information is to see the change from month to month if there is a high variance in the amount of champions being played. Assuming around the same games are played every month, a larger average would mean fewer champions are being played and a lower average would mean more champions are being played. There are a lot of uses for this data.

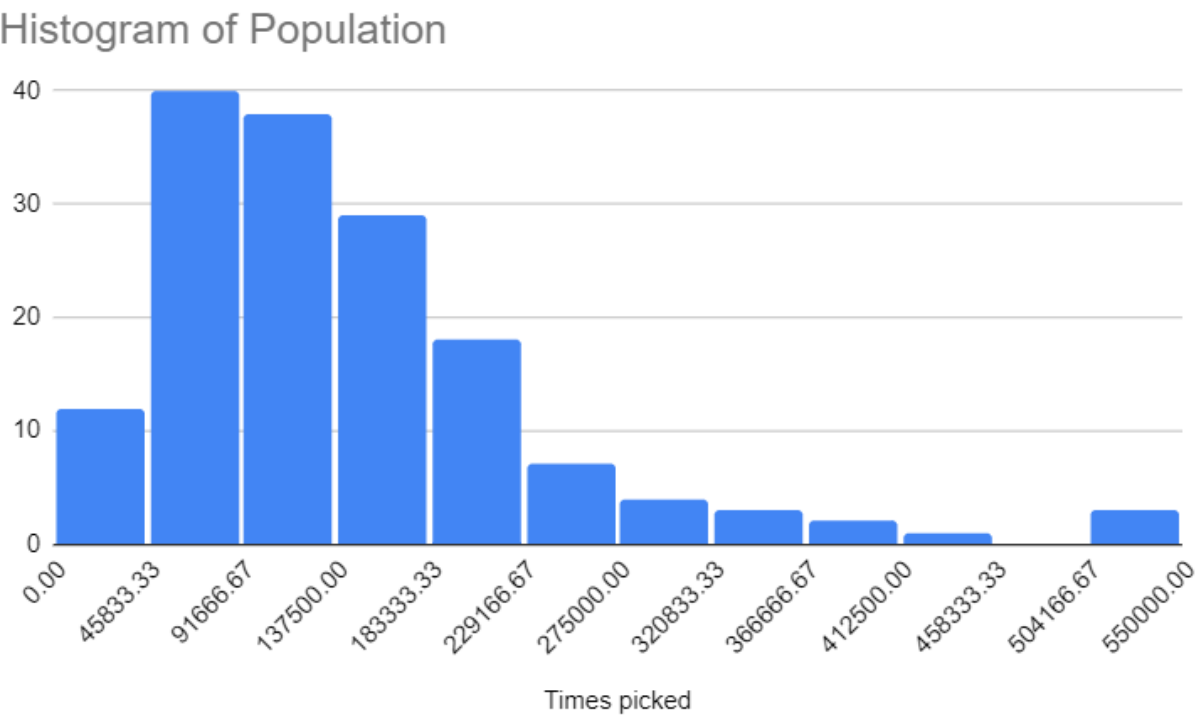
There are currently a total of 157 champions in league of legends, below is the data for the number of times each champion was picked.

Data

Champion	Number of Times Picked past month										
Aatrox	91,525	Flora	120,539	Kindred	95,787	Pyke	175,107	Taliyah	36,524	Yuumi	223,769
Ahri	120,906	Fizz	118,918	Kied	45,479	Qiyana	123,146	Talon	134,070	Zac	96,911
Akali	147,209	Galio	96,165	Kog'Maw	53,989	Quinn	46,050	Taric	31,276	Zed	206,163
Akshan	133,308	Gangplank	77,959	LeBlanc	169,227	Rakan	105,466	Teemo	329,021	Ziggs	111,401
Alistar	82,481	Garen	235,799	Lee Sin	216,692	Rammus	61,183	Thresh	213,840	Zilean	85,935
Amumu	166,842	Gnar	57,646	Leona	224,315	Rek'Sai	42,910	Tristana	188,079	Zoe	81,958
Anivia	87,912	Gragas	52,033	Lillia	143,616	Reil	48,649	Trundle	128,172	Zyra	144,223
Annie	118,975	Graves	418,312	Lissandra	61,497	Renekton	69,221	Tryndamere	144,547		
Aphelios	152,702	Gwen	73,556	Lucian	339,623	Rengar	87,422	Twisted Fate	112,480		
Ashe	232,598	Hecarim	144,863	Lulu	178,394	Riven	103,982	Twitch	176,988		
Aurelion Sol	18,477	Heimerdinger	65,946	Lux	549,923	Rumble	44,016	Udyr	64,050		
Azir	32,668	Illaoi	61,571	Malphite	162,120	Ryze	76,405	Urgot	130,825		
Bard	70,704	Irelia	190,932	Malzahar	123,701	Samira	140,262	Varus	52,626		
Blitzcrank	183,375	Ivern	33,979	Maokai	73,986	Sejuani	52,809	Wayne	304,971		
Brand	183,693	Janna	73,899	Master Yi	219,623	Senna	195,860	Veigar	158,324		
Braum	57,650	Jarvan IV	123,735	Miss Fortune	527,084	Seraphine	119,632	Vel'Koz	84,754		
Caitlyn	411,944	Jax	163,271	Mordekaiser	177,609	Sett	206,896	Vex	243,942		
Camille	182,595	Jayce	118,950	Morgana	262,336	Shaco	162,268	Vi	198,731		
Cassiopeia	49,665	Jhin	507,042	Nami	277,774	Shen	121,997	Viego	231,597		
Cho'Gath	105,617	Jinx	316,886	Nasus	201,585	Shyvana	60,877	Viktor	98,534		
Corki	39,318	Kai'Sa	205,324	Nautilus	170,458	Singed	70,817	Vladimir	108,116		
Darius	184,743	Kalista	31,304	Neeko	55,563	Sion	155,636	Volibear	184,769		
Diana	118,394	Karma	122,682	Nidalee	60,573	Sivir	98,985	Warwick	205,008		
Dr. Mundo	105,705	Karthus	48,419	Nocturne	138,759	Skarner	23,153	Wukong	94,234		
Draven	146,563	Kassadin	78,422	Nunu & Willum	110,932	Sona	117,346	Xayah	172,290		
Ekko	249,068	Katarina	139,788	Olaf	41,280	Soraka	172,122	Xerath	182,356		
Elise	52,391	Kayle	132,731	Orianna	71,465	Swain	119,078	Xin Zhao	126,340		
Evelynn	100,405	Kayn	270,590	Ornn	57,342	Sylas	162,045	Yasuo	393,581		
Ezreal	321,328	Kenren	91,600	Pantheon	108,758	Syndra	88,422	Yone	290,998		
Fiddlesticks	90,855	Kha'Zix	180,284	Poppy	107,394	Tahm Kench	140,770	Yorick	92,412		

Histogram, Population Mean, Population Standard Deviation of X

Mean: 143159.184713376, Standard Deviation: 95564.8770788739



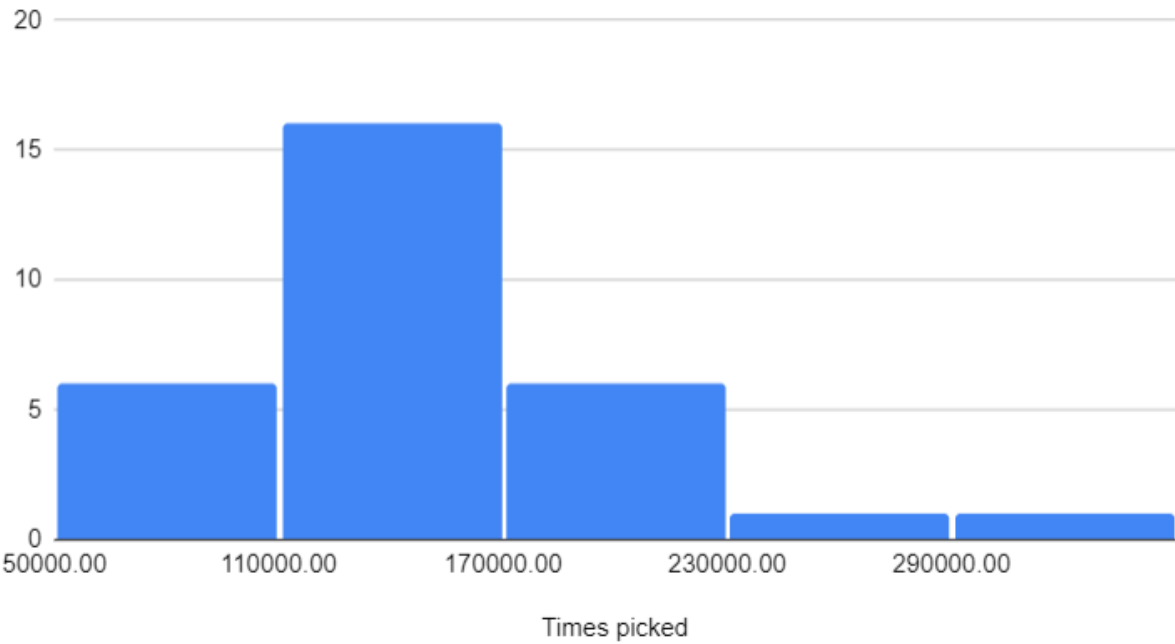
Histogram, Population Mean, Population Standard Deviation of \bar{x}

30 samples 4 each

Mean: 149513.9, Standard Deviation: 51908.7521445582

93964.5	69500	157263	119851.5
106188.25	94416.5	168962.25	128508
127199.5	152021.25	176563.25	131102
122726	153641	143078	310351.25
110689	193620.5	171271.25	141812.75
162203.25	83663.25	138415.75	171730.5
212371.5	225171.75	258062	
136817.75	101014.5	123237	

Histogram of Means



Explanation of the Central Limit Theorem

The Central Limit Theorem is a theory in statistics that has to do with sampling distribution of populations. In practice smaller samples are taken from a population of a size n and then a statistic of these new samples the more and more samples taken will end up having a distribution that is very normal. The larger this n value is the tighter the distribution will be. The main reason this is done is to be able to draw conclusions from a large amount of data that might not be normally distributed. After this sampling distribution is made conclusions can be drawn like for any normally distributed dataset. For example, this could be furthered in another month to see if the average and distribution changed for the picks of champions. Looking at these distributions for another month and comparing could yield information about the variety of champions being played. Overall the Central Limit Theorem is a very powerful tool for statistics and data science.

References

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