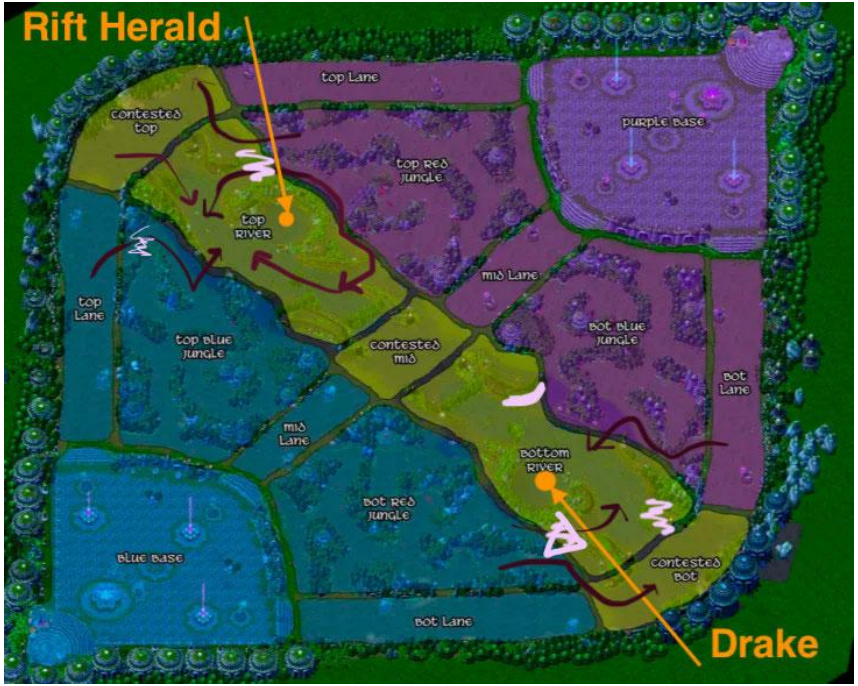
League of Legends: Blue Side vs Red Side

Cheng Su • Spring 2019
Alfonso Berumen

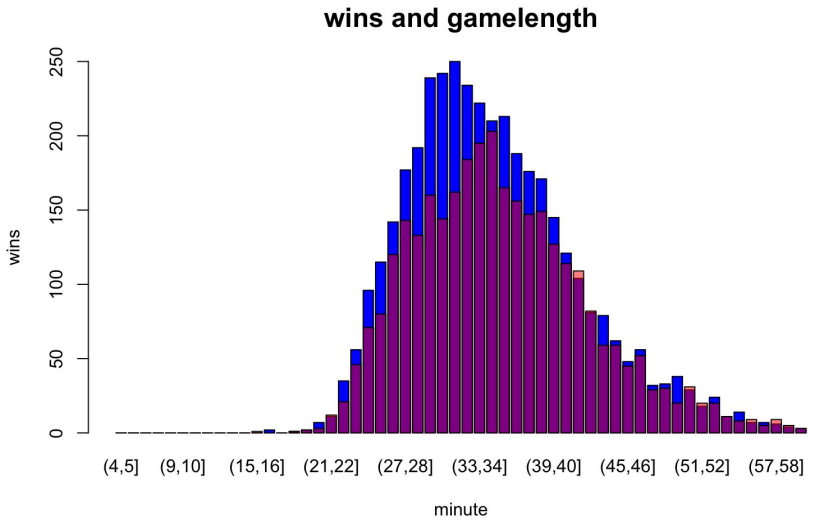
Map



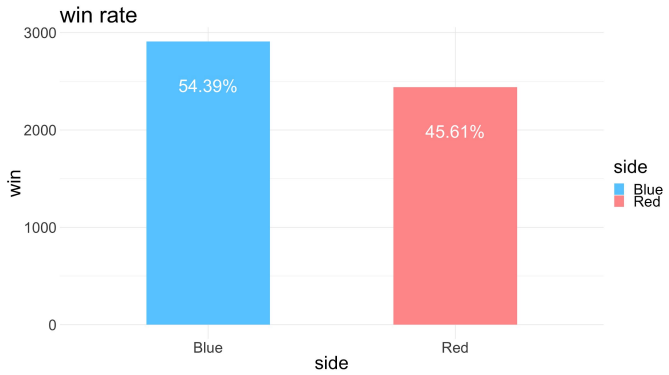
Summoner's Rift

- One of the most popular map in League of Legends
- Blue side and red side, each with 5 players
- Goal is to destroy enemy's base
- Guarded by turrets
- Minions and monster as resources

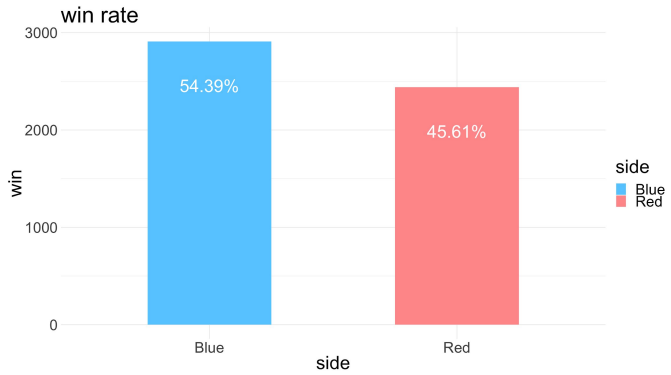
Goal

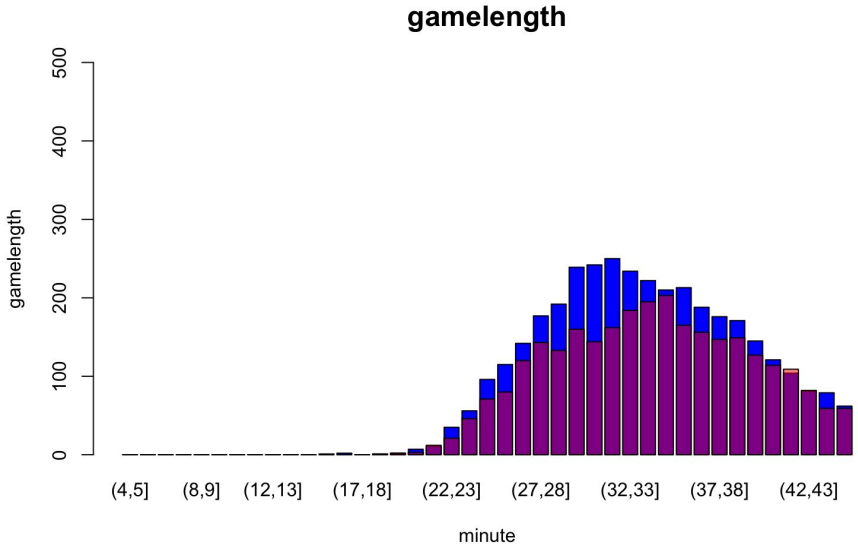


- Figure out what are affecting the win rate and are they different on sides
- If early game matters
- Help game designer evaluate current mechanism



Games


win rate
3000
2000
1000
0
win
54.39%
45.61%
Blue
Red
side
side
Blue
Red


gamelength
gamelength
0
100
200
300
400
500
(4,5]
(8,9]
(12,13]
(17,18]
(22,23]
(27,28]
(32,33]
(37,38]
(42,43]
minute

Data

Data from Oracle's Elixir: https://oracleselixir.com/match-data/ xlsx
Match Data Dictionary: https://oracleselixir.com/match-data/match-data-dictionary/

Data are downloaded from Oracle's elixir, which is based on Riot Games' API. All data sources comes from Riot Games.

Games: Esport games including regions of NA LCS, EU LCS, LCK, LMS, CBLoL, TCL. LPL not included.
Dates: Patch 6.9(dragon patch) May 16th 2016 - June 10th 2019(current)

Valid observations(cleaned):4190 games **Variables = 98**

- games under 5 minutes are dropped
- missing value are filled with -1(sometimes neither team killed the monster)
- 2016 games are dropped because of too much missing value

Factors

Dragon: 1. First dragon is killed by which team and when 2. Total dragons killed by team 3.elder dragons

Rift Herald: Which team kills the herald and when

Baron: 1. First baron 2.total baron kill

Gold

Dragon

-> first spawn at 5 minutes.if killed, another dragon will spawn after 5 minutes. Elder dragon spawns at 35 min.
-> Grant a buff. Effect double after elder dragon killed.
-> Good exp for low level player.

Rift Herald

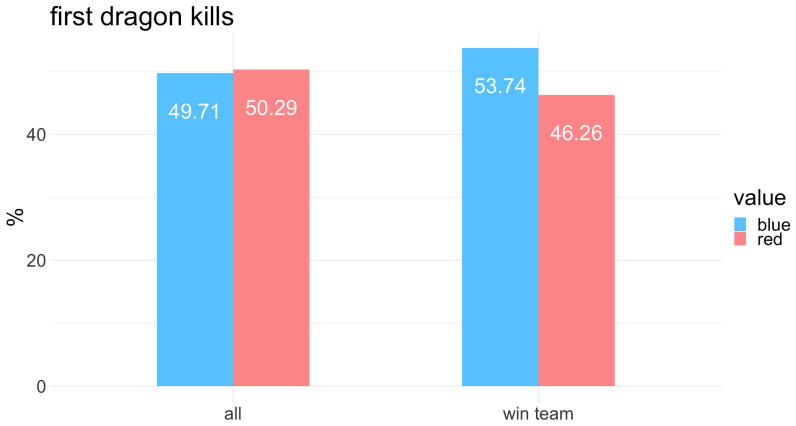
-> disappear at 19:45 min
->Faster tower takedowns

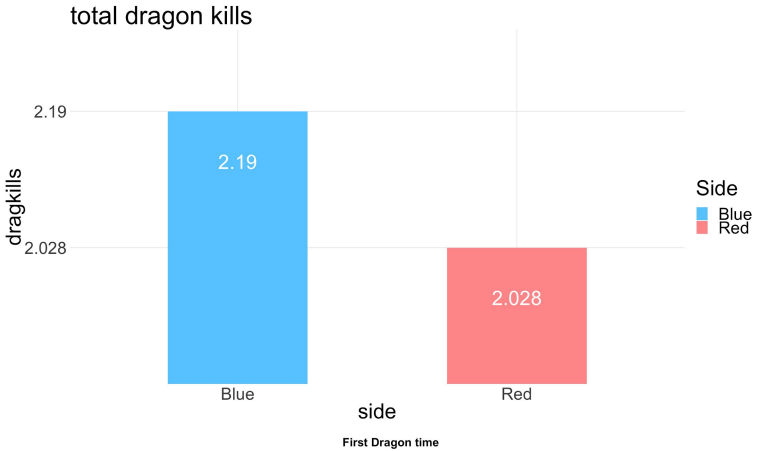
Dragon

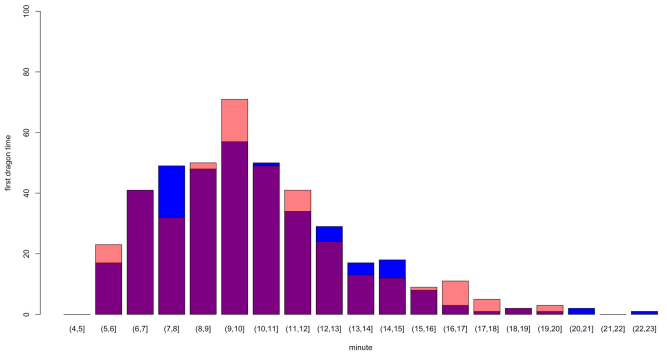
1. First dragon is killed by which team

2. Total dragons killed by team

3.Time of first dragon



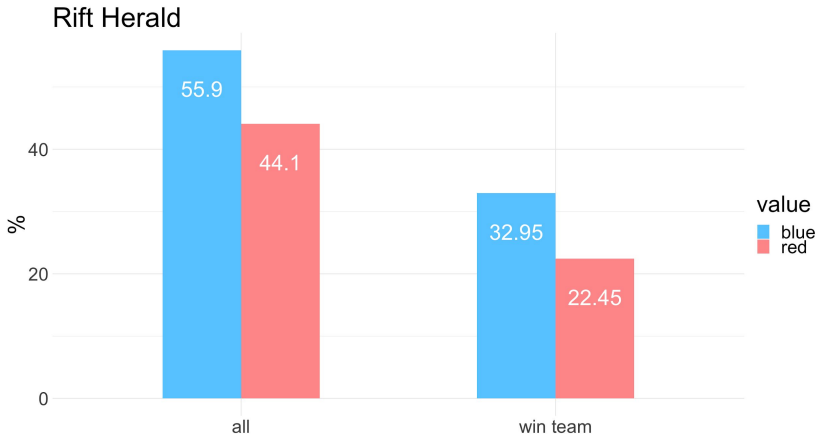


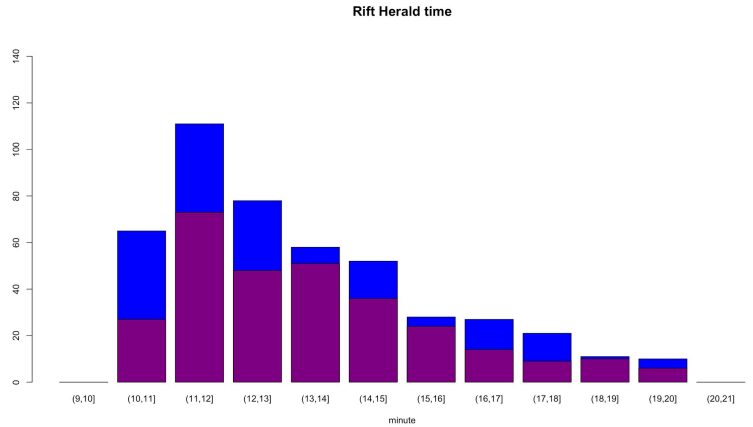


Rift Herald

1.gained by which team

2.when



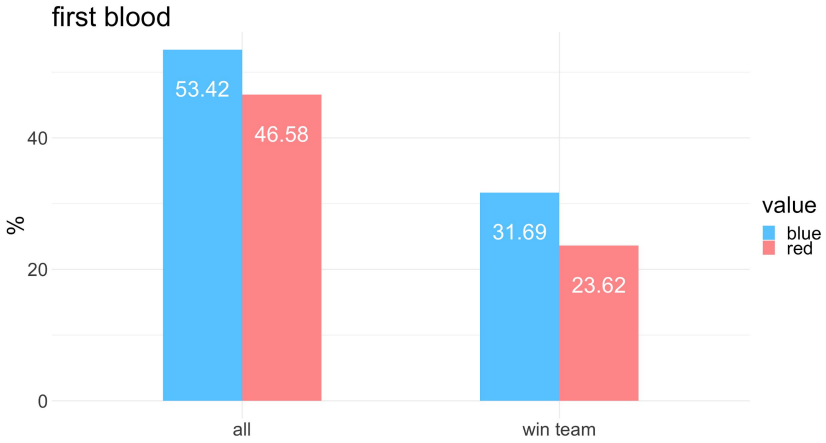


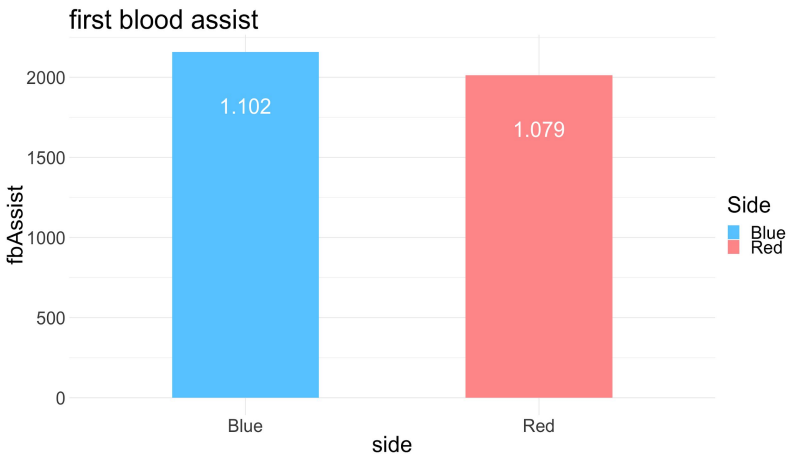
First Blood

1.gained by which team

2.if assisted

3.when(both averaged at 6 minutes)



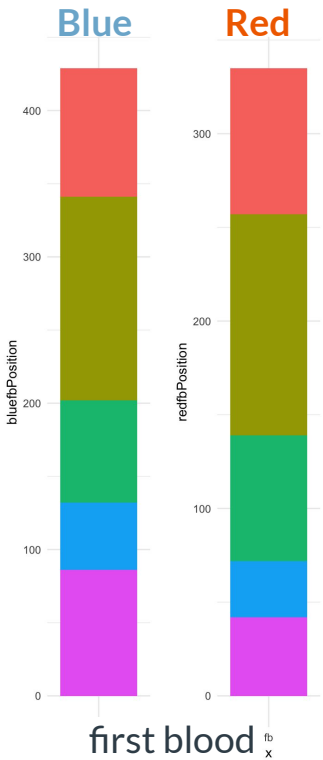


First Blood Positions

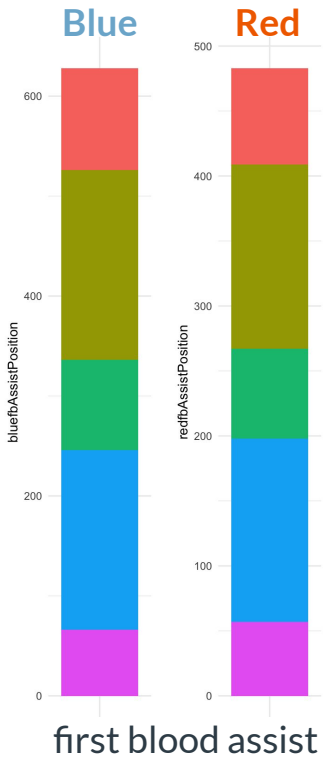
Where does first blood happen

position

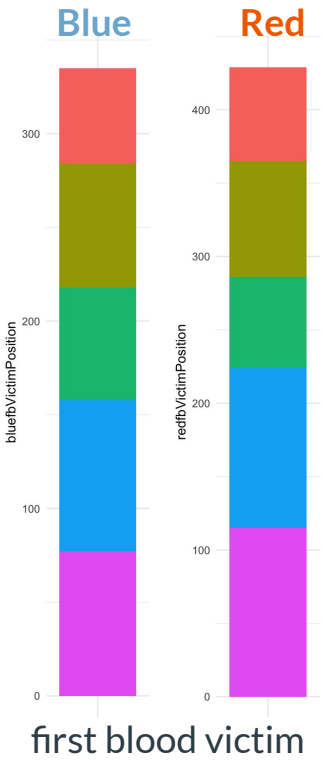
- ADC
- Jungle
- Middle
- Support
- Top



first blood $_{x}^{fb}$



first blood assist

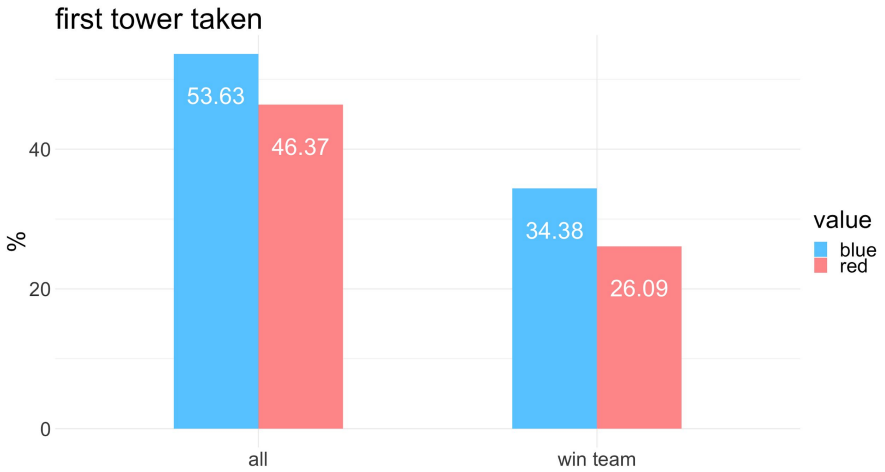


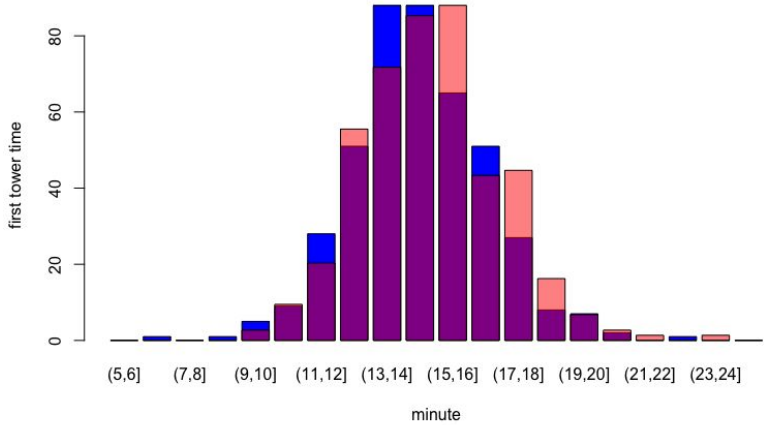
first blood victim

First Tower

1. Taken by which team

2. when

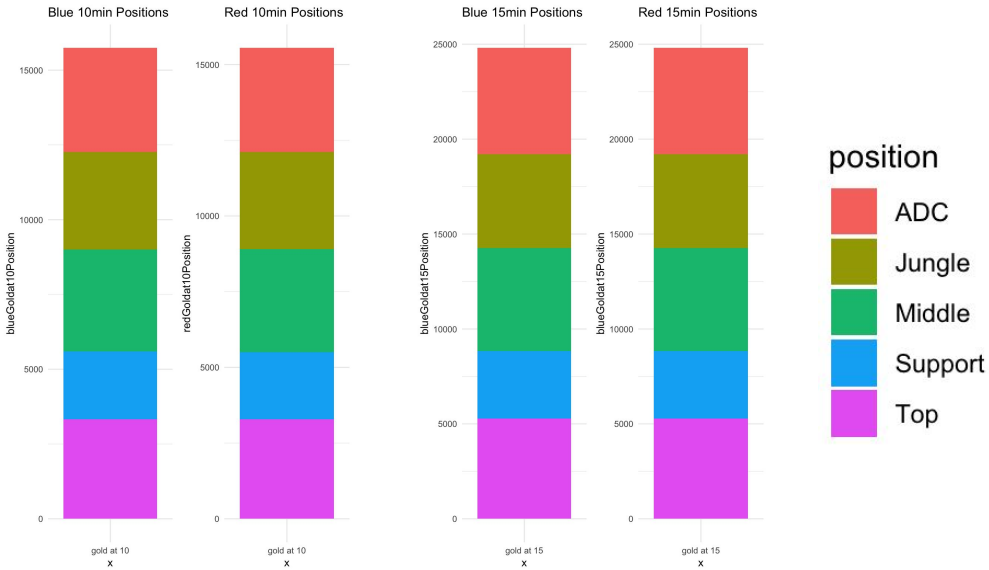


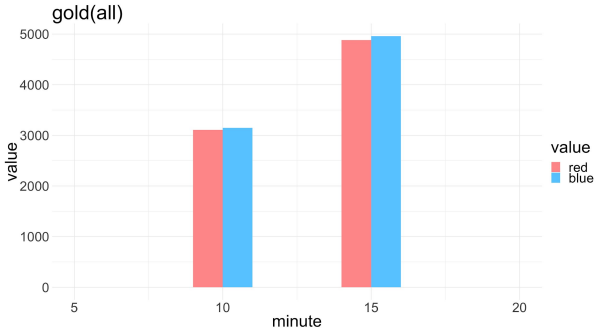


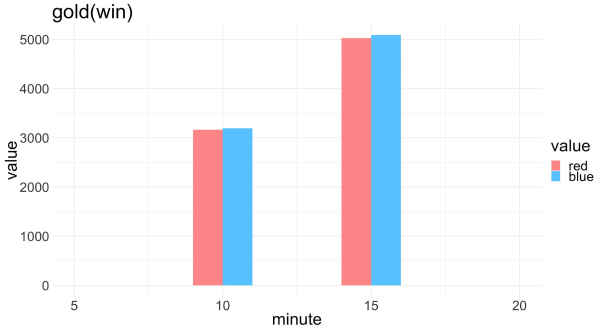
Gold(10min,15min)

1.all teams

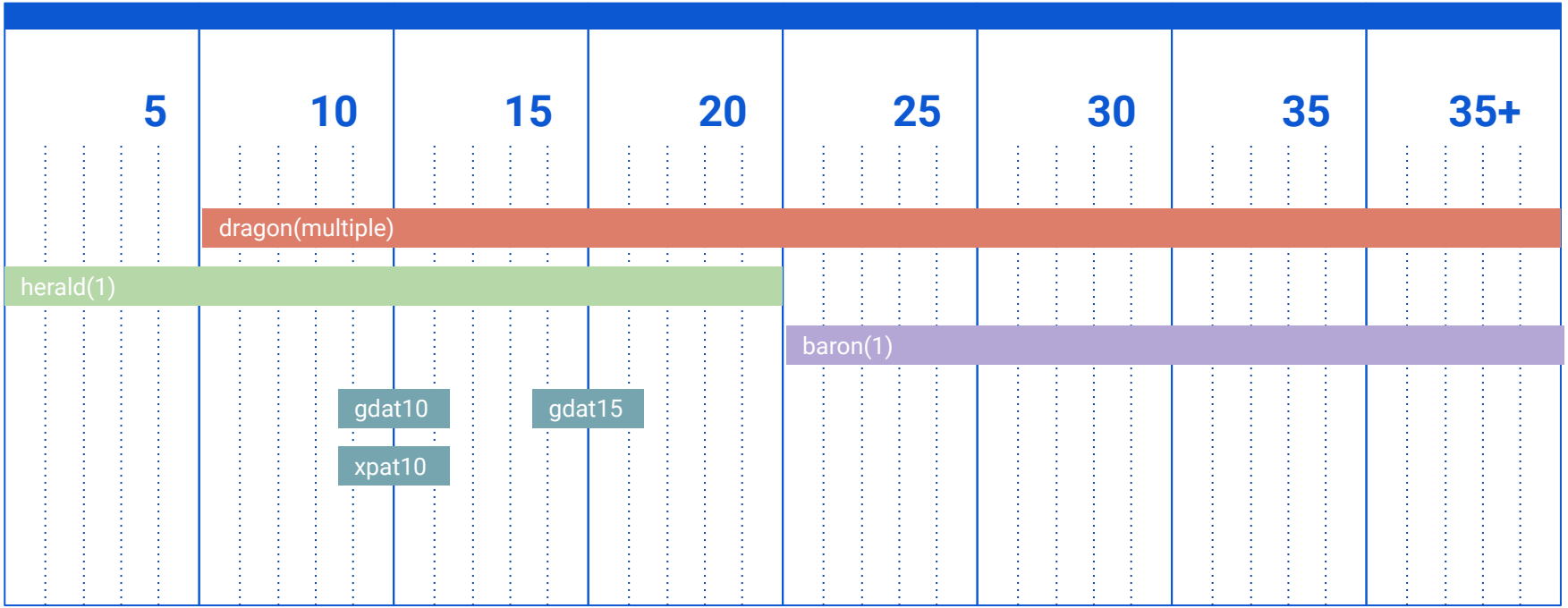
2.winning teams







Timeline


5
10
15
20
25
30
35
35+
dragon(multiple)
herald(1)
baron(1)
gdat10
gdat15
xpat10

Model - logistic regression

Blue team (train:test = 80:20, z value cutoff at 2, alpha at 0.05)

	10min	15min	20min	25min	30min	35min+
variables	**gdat10**	**gdat15** **fd**	**gdat15** **fd**	**fbaron** **gdat15** **fbarontime**	**fbaron** **fbarontime** **teamdragkills** **gdat15**	**totalgold** **gdat15** **Oppdragkill** **oppbaronkill**
	xpat10	xpat10,gdat10	xpat10,gdat10	gdat10,fd,heradtime	gdat10,fd,heraldtime,oppdragkills	fd, teamdragkill, oppdragkill, teambaronkill
	fb,fbtime,csdat10	fdtime,herald,heraldtime	ft,fttime	xpdat10	gdat10	heraldtime,fbaron,fbarontime,elders,teamdragkill

Model - logistic regression

Blue team

	10min	15min	20min	25min	30min	35min+
test	68.63%	71.51%	(same as 15)	84.66%	87.66%	91.35%
10 fold validation	78.85%	82.25%	(same as 15)	88.12%	89.87%	92.58%
specificity	0.6548	0.6957	(same as 15)	0.8301	0.8794	0.9093
sensitivity	0.6614	0.7329	(same as 15)	0.8619	0.8742	0.9172
precision	0.7249	0.7249	(same as 15)	0.8450	0.8952	0.9192
AUC	0.6625	0.7054	(same as 15)	0.8350	0.8540	0.9038

Model - logistic regression

Red team

	10min	15min	20min	25min	30min	35min+
variables	**gdat10**	**gdat15** **fd**	**gdat15** **fd**	**fbaron** **gdat15**	**fbaron** **oppdragkills** **teamdragkills** **gdat15**	**oppbaronkill** **teambaronkills** **totalgold**
	xpat10	xpat10,gdat10	gdat10,xpdat10,herald	gdat10,fd,heradtime,fbarontime,xpdat10	fd,fbarontime	fd,gdat15 teamdragkill, oppdragkill, teambaronkill
	fb,fbtime,csdat10	fdtime,herald,heraldtime	ft,fttime,herald	heraldtime	gdat10,heraldtime	heraldtime,fbaron,fbarontime,teamdragkill,elders

Model - logistic regression

Red team

	10min	15min	20min	25min	30min	35min+
test	67.91%	74.69%	(same as 15)	74.69%	86.10%	90.62%
10 fold validation	79.48%	82.44%	(same as 15)	84.59%	90.23%	93.67%
specificity	0.6841	0.7664	(same as 15)	0.8561	0.8764	0.9350
sensitivity	0.6196	0.7125	(same as 15)	0.8222	0.8376	0.8673
precision	0.4426	0.6333	(same as 15)	0.7833	0.8167	0.9083
AUC	0.6321	0.7248	(same as 15)	0.8362	0.8450	0.9196

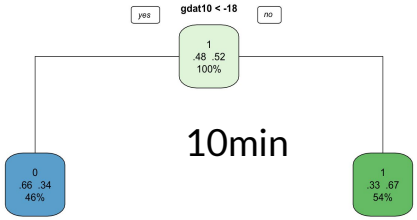
Model - tree

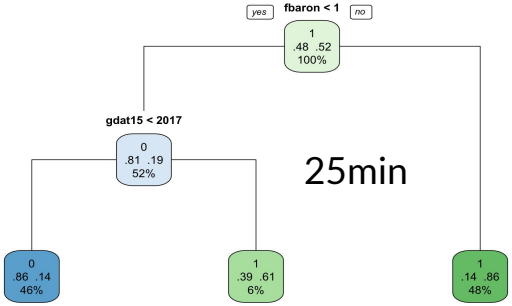
Blue team

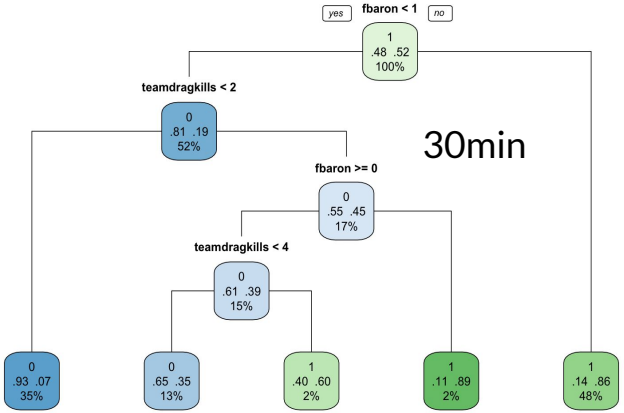
	10min	15min	20min	25min	30min	35min+
test	65.28%	72.09%	(same as 15)	82.35%	84.08%	88.81%
	gdat10	gdat15,fd	(same as 15)	fbaron,gdat15	fbaron,teamdragkills	Oppbaronkills,teambaronkills,teamdragkills

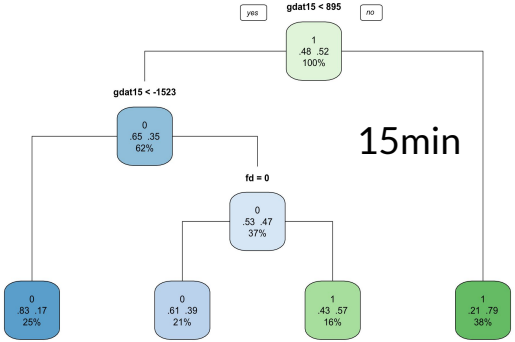
Model - tree

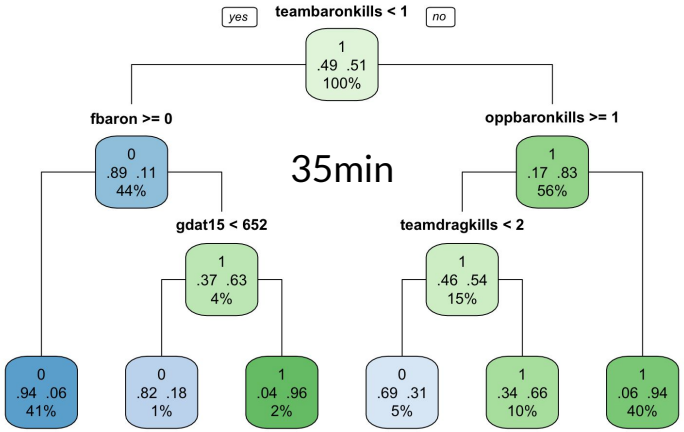
Blue team











Model - tree

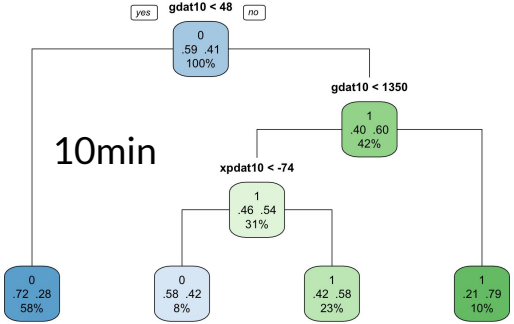
Red team

	10min	15min	20min	25min	30min	35min+
test	67.57%	72.09%	(same as 15)	86.55%	(same as 25)	90.06%
	gdat10,xpdat10	gdat15,fd	(same as 15)	fbaron	(same as 25)	Oppbaronkills,teambaronkills,teamdragkills

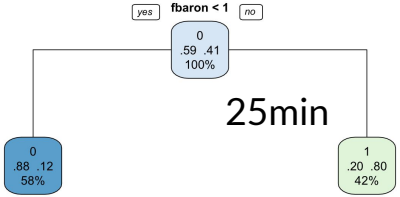
Model - tree

Red team

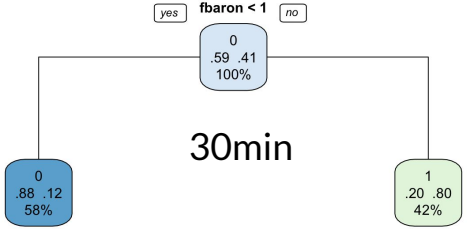
10min



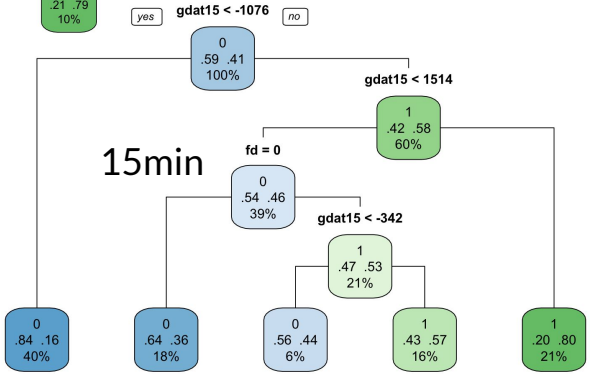
25min



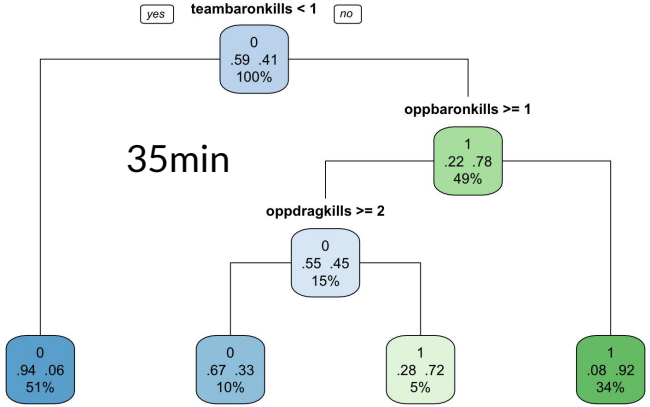
30min



15min

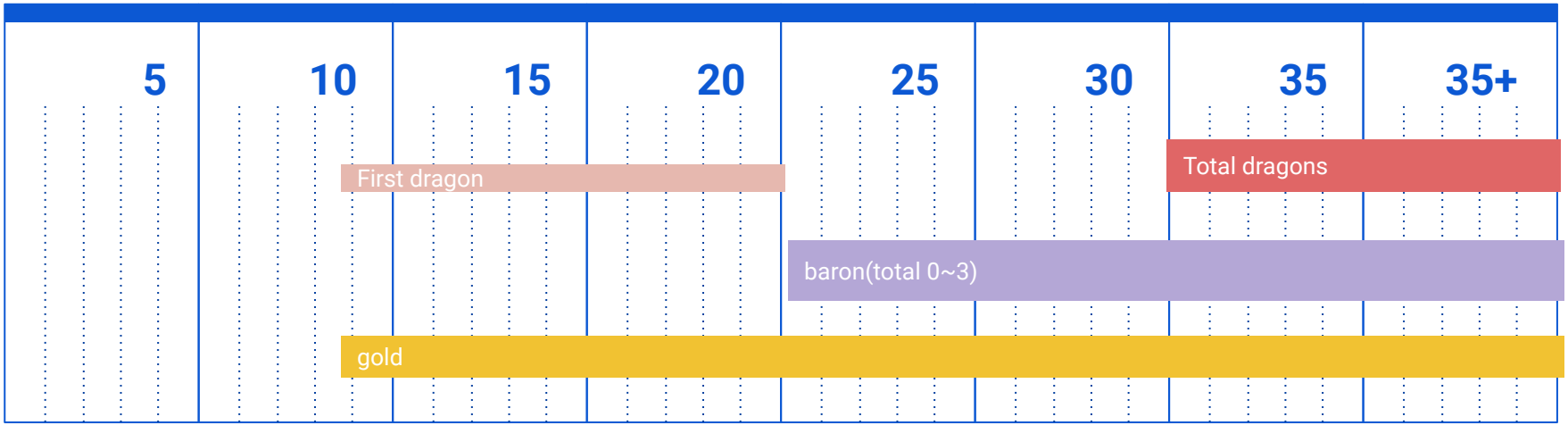


35min



Conclusions

What to do Gain more resource, getting more dragons, prevent opponent from getting baron
Assumptions dragon(located near blue) matters more earlier to mid game, blue side has advantage of getting one in mid to late game, dragon have less effects compare to baron(located near red)that contributes more to red team winning



Future improvement

1. Other variables can be considered including champion related and gear. For example the win rate of a champion in a certain update of the game, champion ban pick, gear selection in a certain update, etc.

2.more data after 15 minute for example gold and experience would help

End