

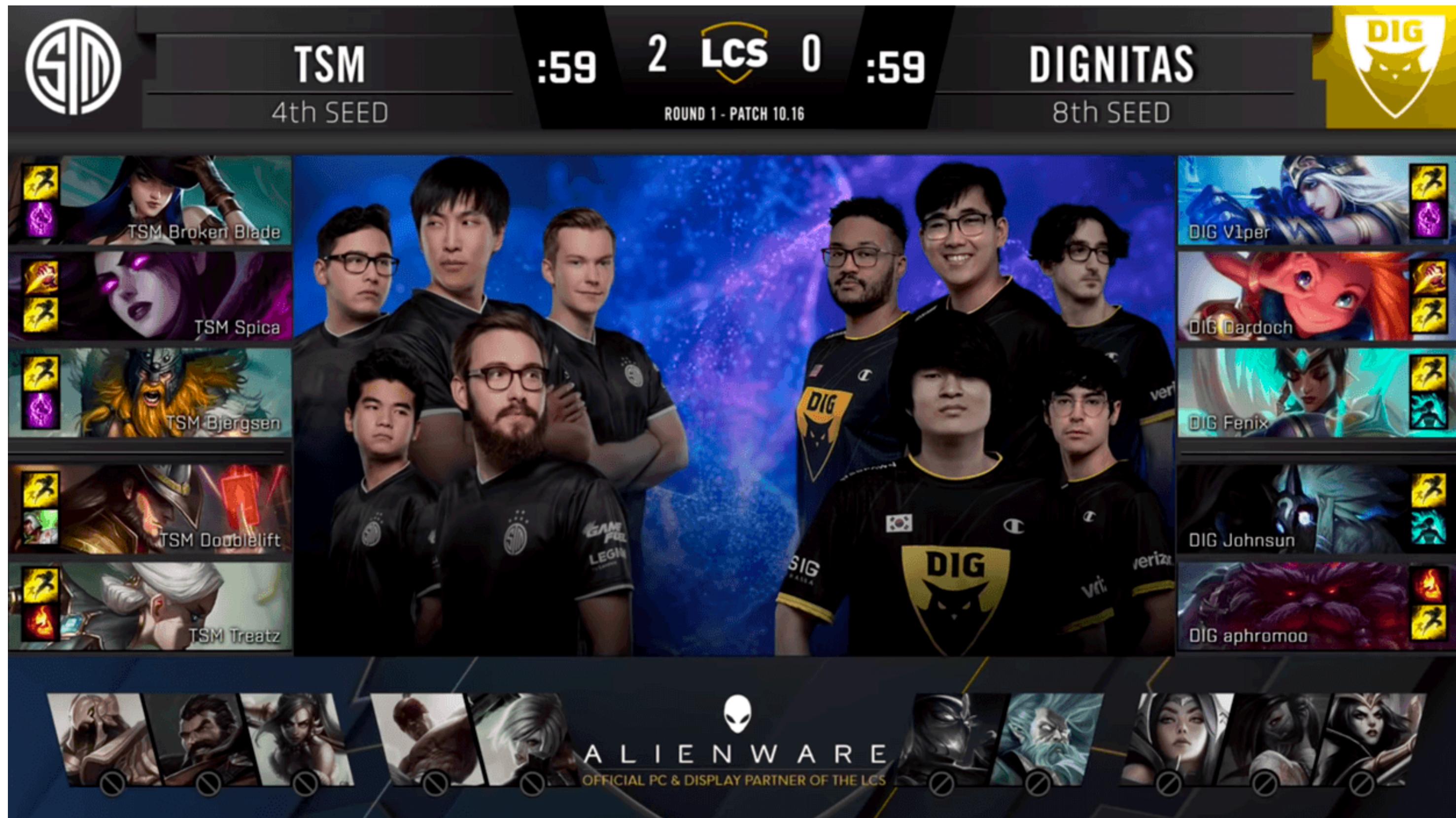
liam.gg

League of Legends (LoL) win interpreter web app

<http://liamisaacs.com/league>

10-Feb-2021 (Revised: 20-Mar-2021)

5v5, each player picks a “champion” (1 of ~150)



Online “ranked” system with **divisions** (IRON/SILVER) and **tiers** (IV, III, II, I)

division	IV	III	II	I
IRON	IRON IV	IRON III	IRON II	IRON I
SILVER	SILVER IV	SILVER III	SILVER II	SILVER I
GOLD	GOLD IV	GOLD III	GOLD II	GOLD I
PLATINUM	PLATINUM IV	PLATINUM III	PLATINUM II	PLATINUM I
DIAMOND	DIAMOND IV	DIAMOND III	DIAMOND II	DIAMOND I
MASTER	MASTER I	—	—	—
GRANDMASTER	GRANDMASTER I	—	—	—
CHALLENGER	CHALLENGER I	—	—	—

Roadmap

- Data collection using RiotWatcher Riot API
- Study design (filter for user rank, champion, role)
- Model interpretation using SHAP values
- WebApp hosted on AWS

=



Credit @schlieffenplan

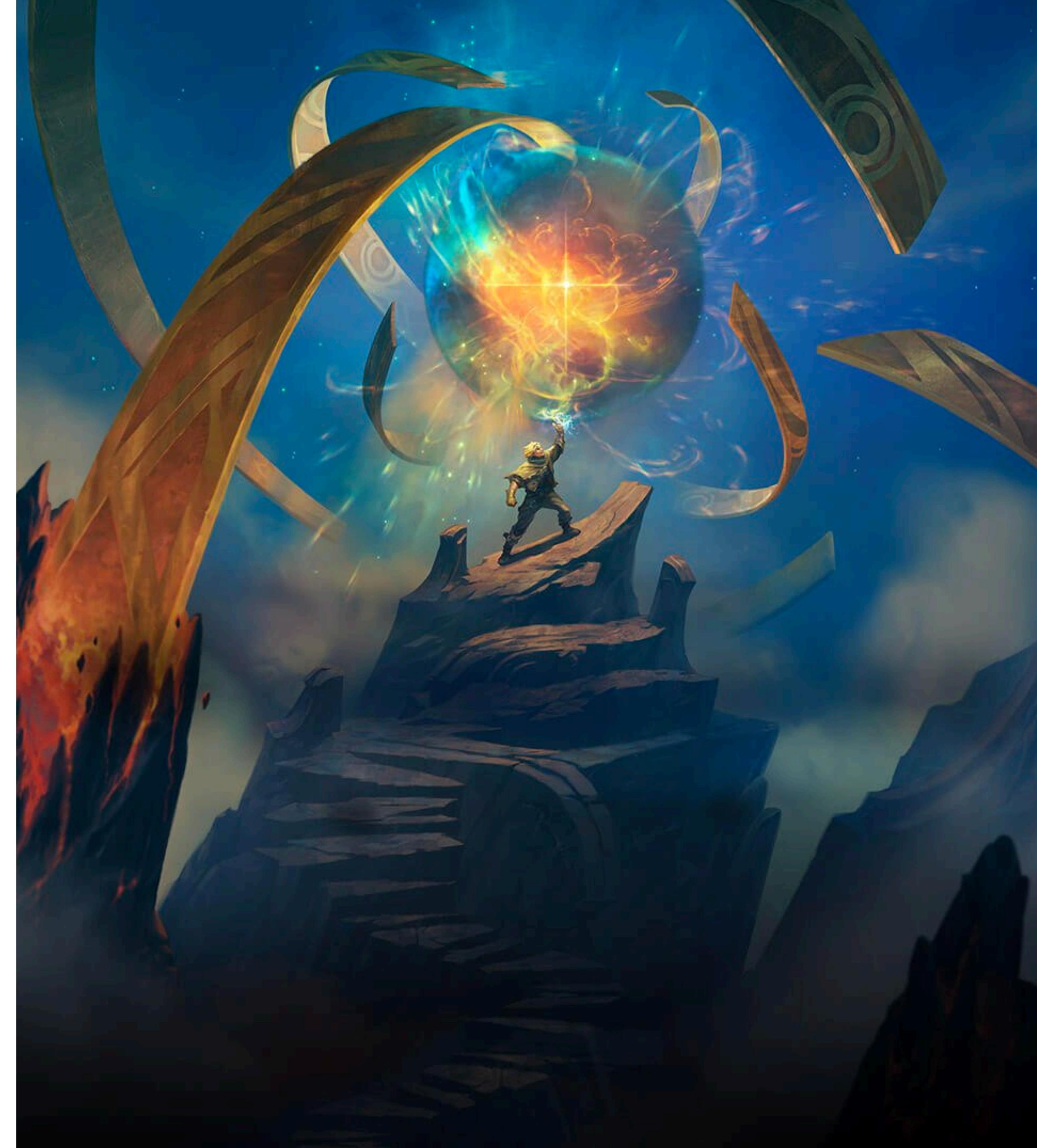
Part I: The Data

100-200k games for each ranked division and tier

Collected using APIs

Assume divisions are “separable” -
GOLD II is much different than IRON IV

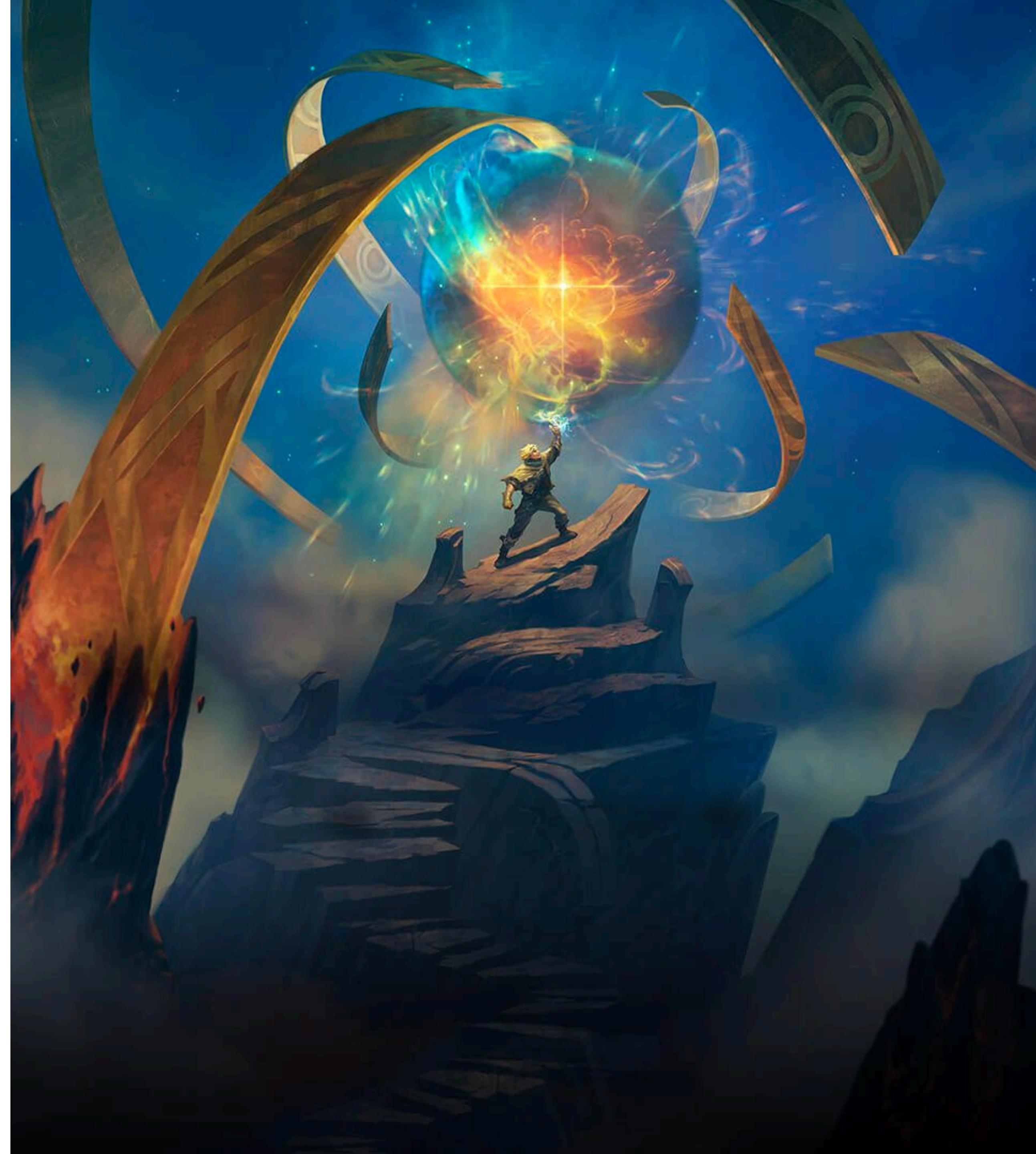
Assume game’s structure is largely the same as 1 mo. ago (1 patch behind)



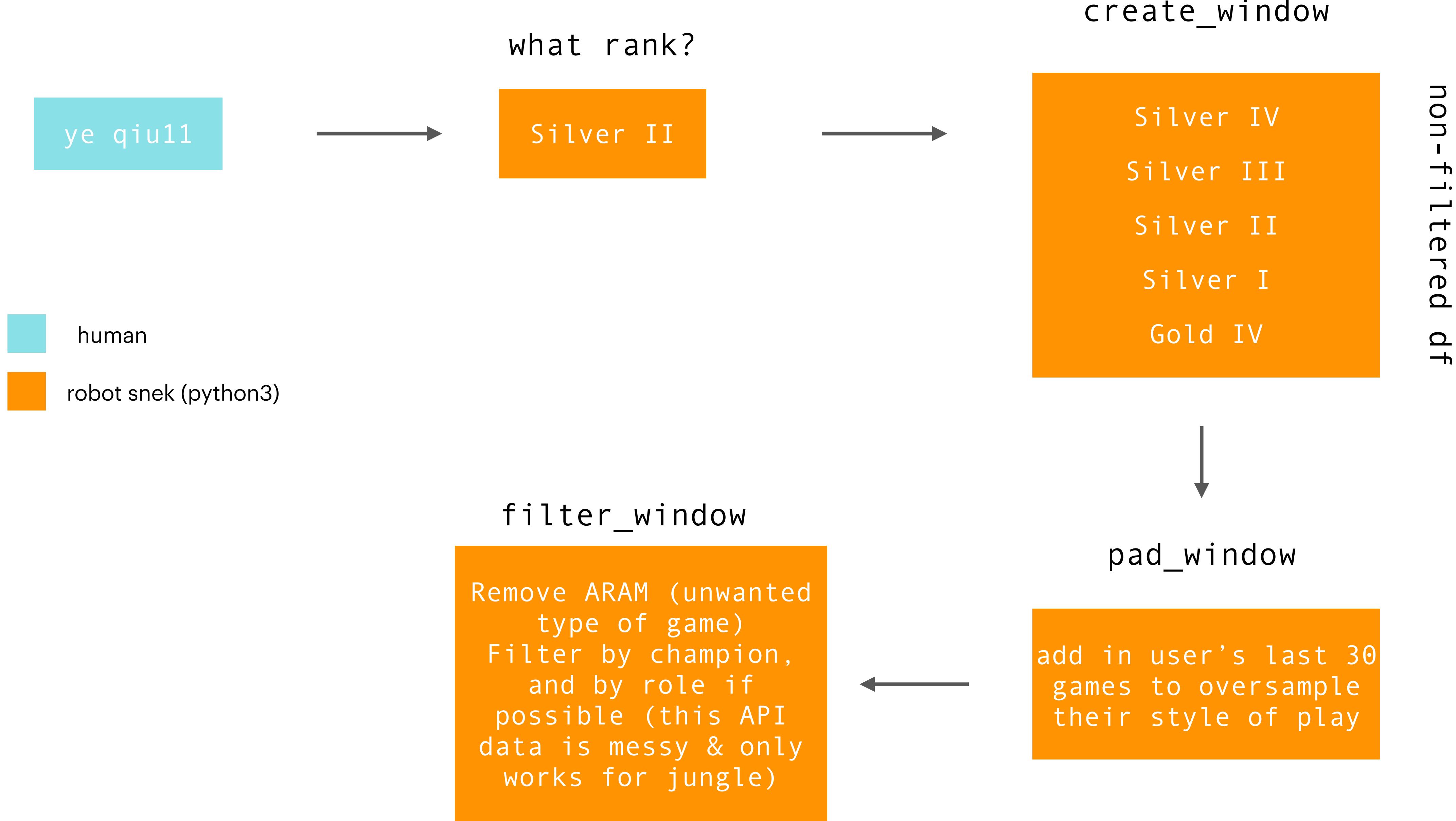
Part II: Data Cleaning

League is a series of
decisions

Jump straight to ensemble models (RF & XGBoost)



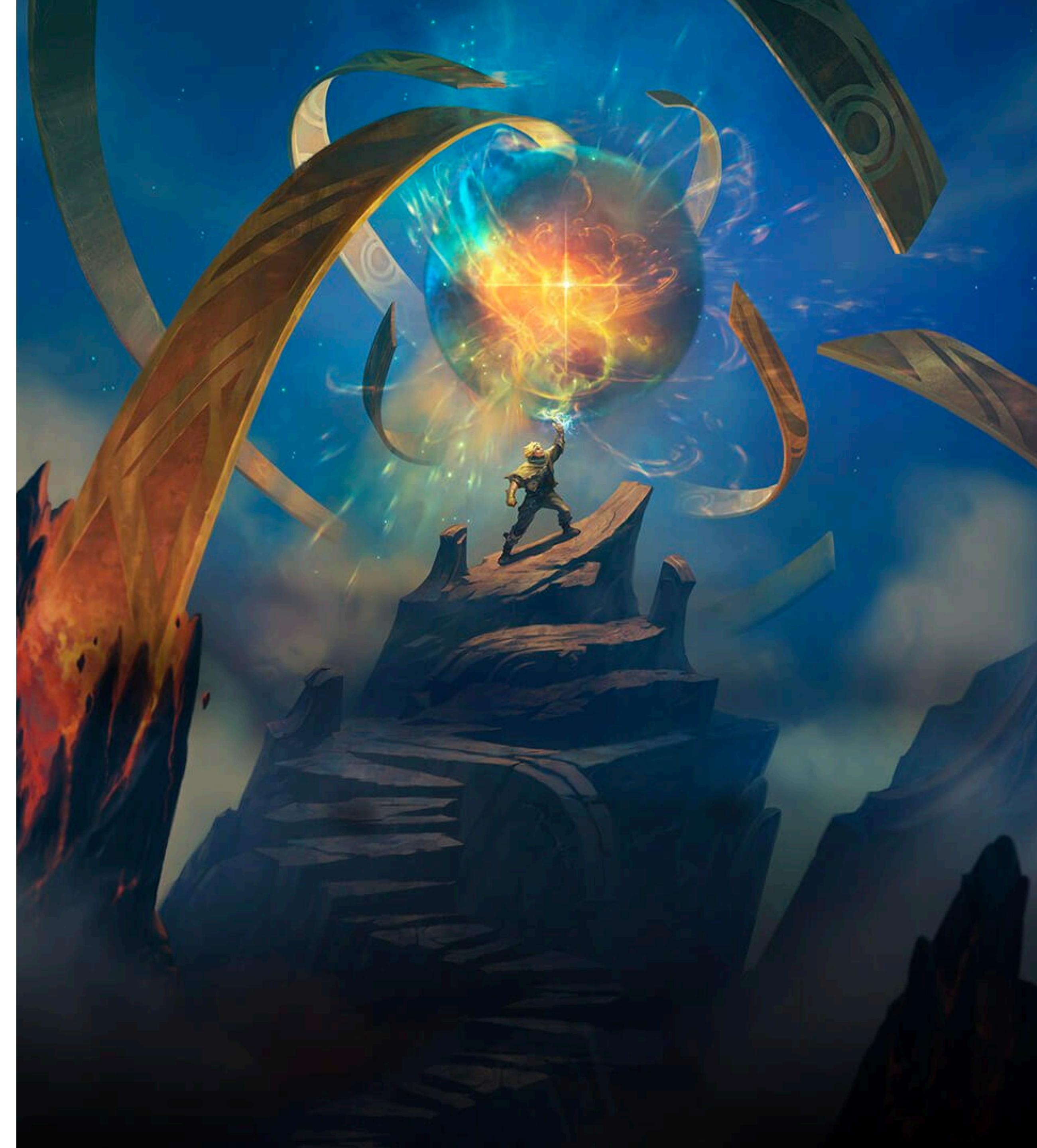
The Data Cleaning Pipeline



Part III: Choosing a model

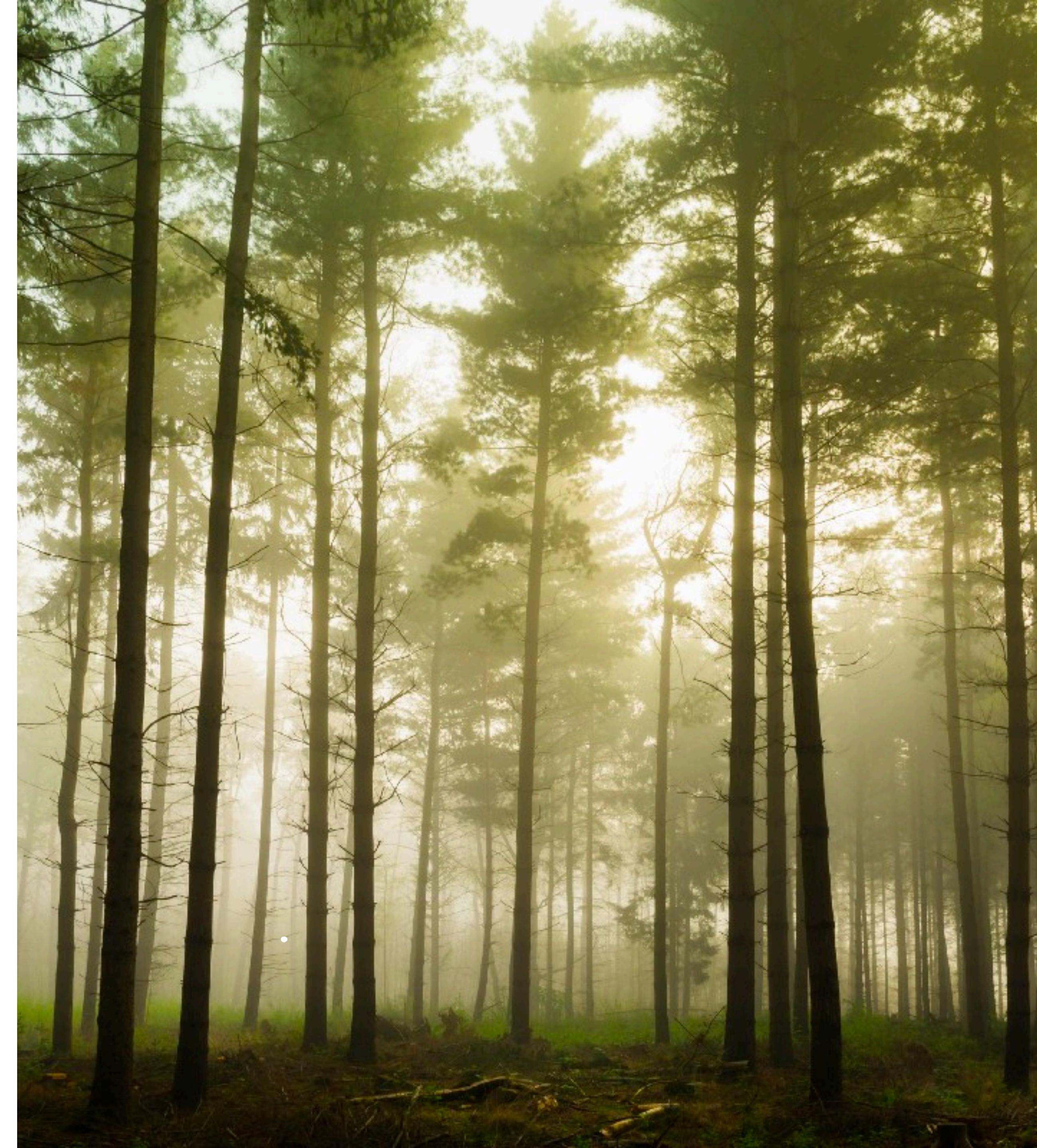
Want interpretable results

RF & XGBoost do **not** give interpretable results



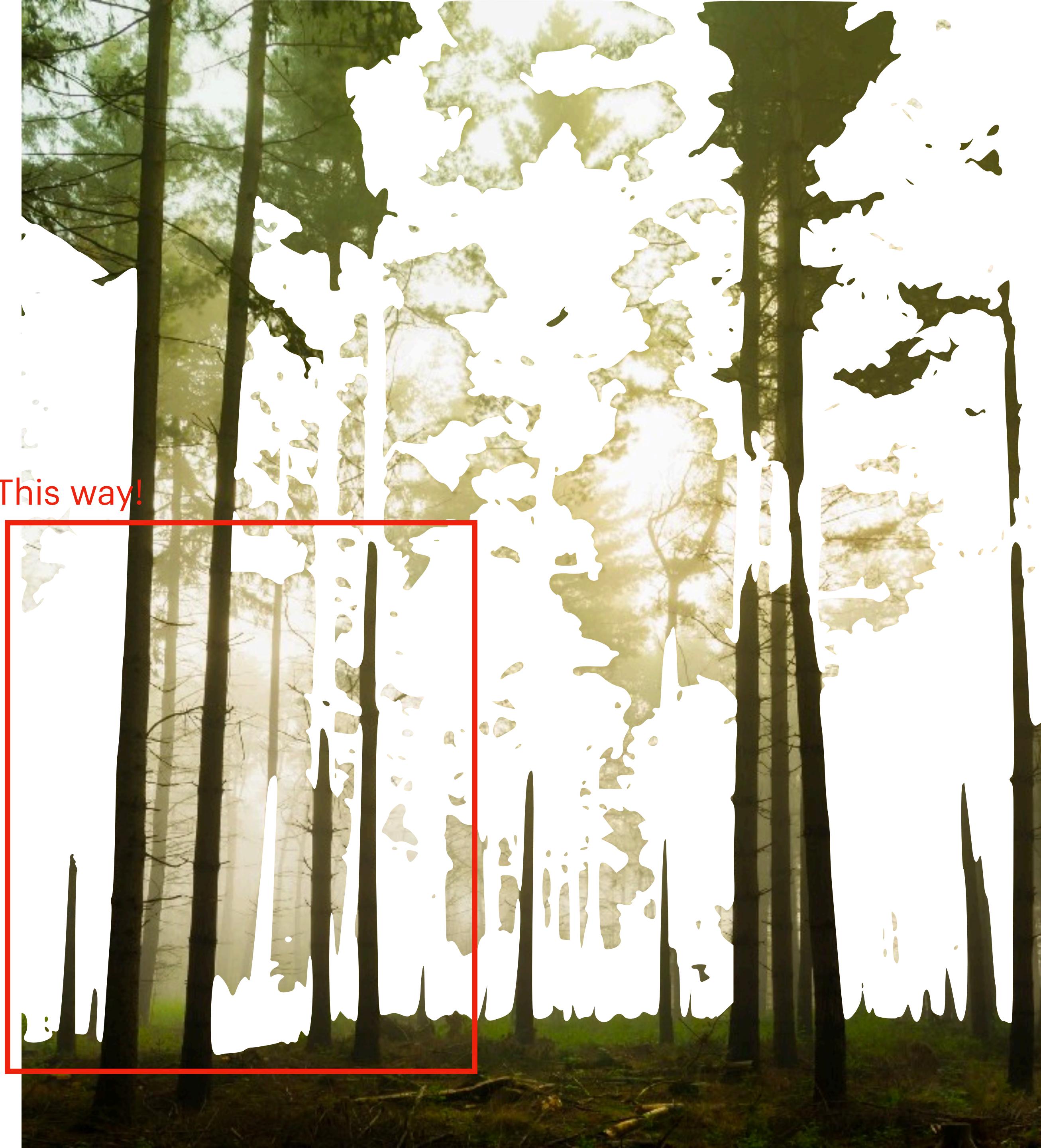
RandomForest

bagging & feature randomness



RandomForest

bagging & feature randomness



RandomForest

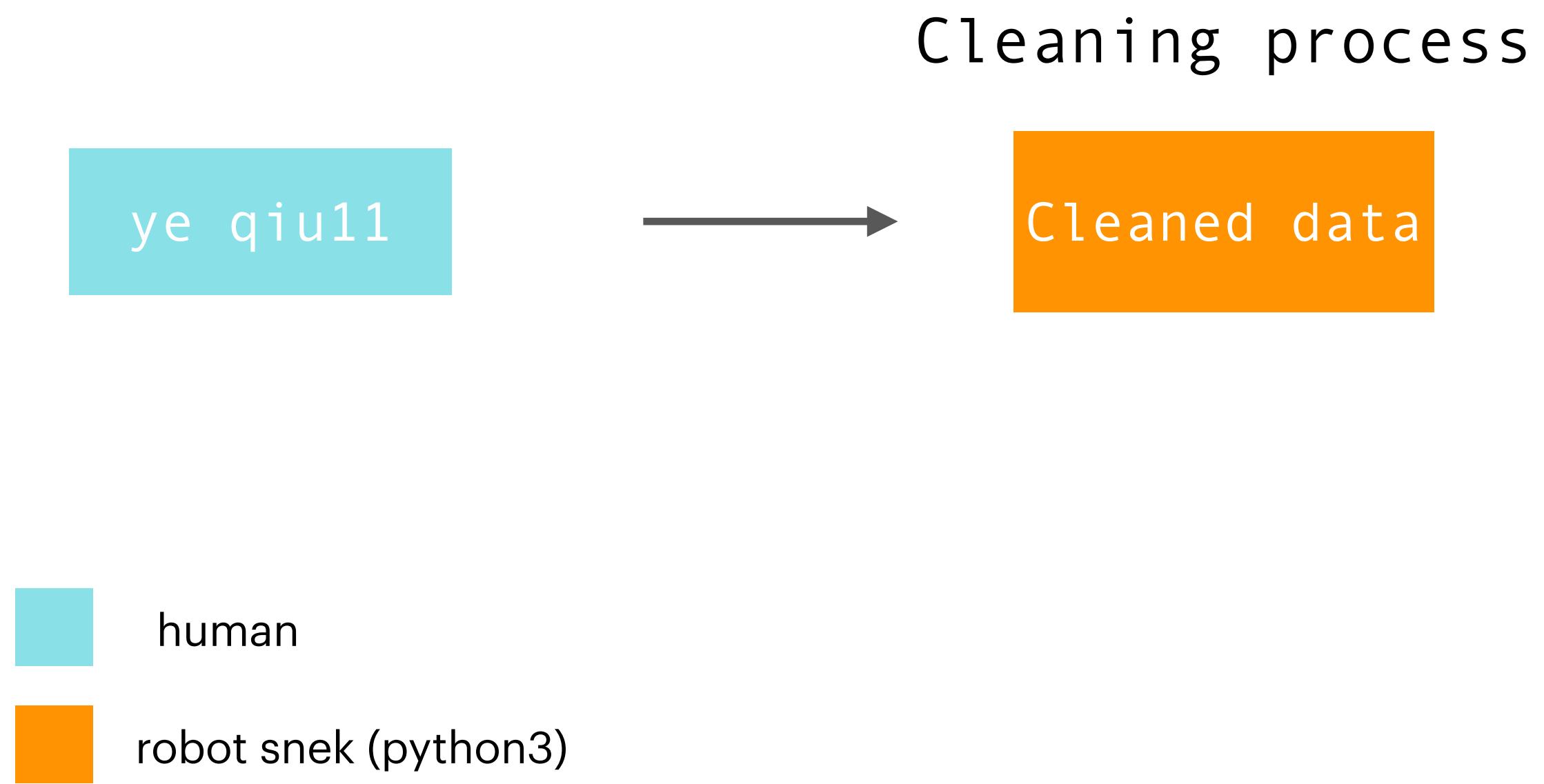
bagging & feature randomness



**“Which they go thru that forest I have no
idea my dear Frodo”**

-Gandalf

The Data Modeling Pipeline



generate_model

Convert to rates

```
Y = df['win']
```

```
Model = LogisticRegression()  
Lib linear, max_iter=900, C=0.1
```

model's fit on X, y
train-test-split

Render SHAP plot in HTML

Use unique feature as “primary key” to communicate btwn HTML and model

```
force_plot = shap.plots.force(shap_values[ind],  
                               matplotlib=False)  
shap_html = f"<head>{shap.getjs()}</head><body>  
{force_plot.html()}</body>"
```

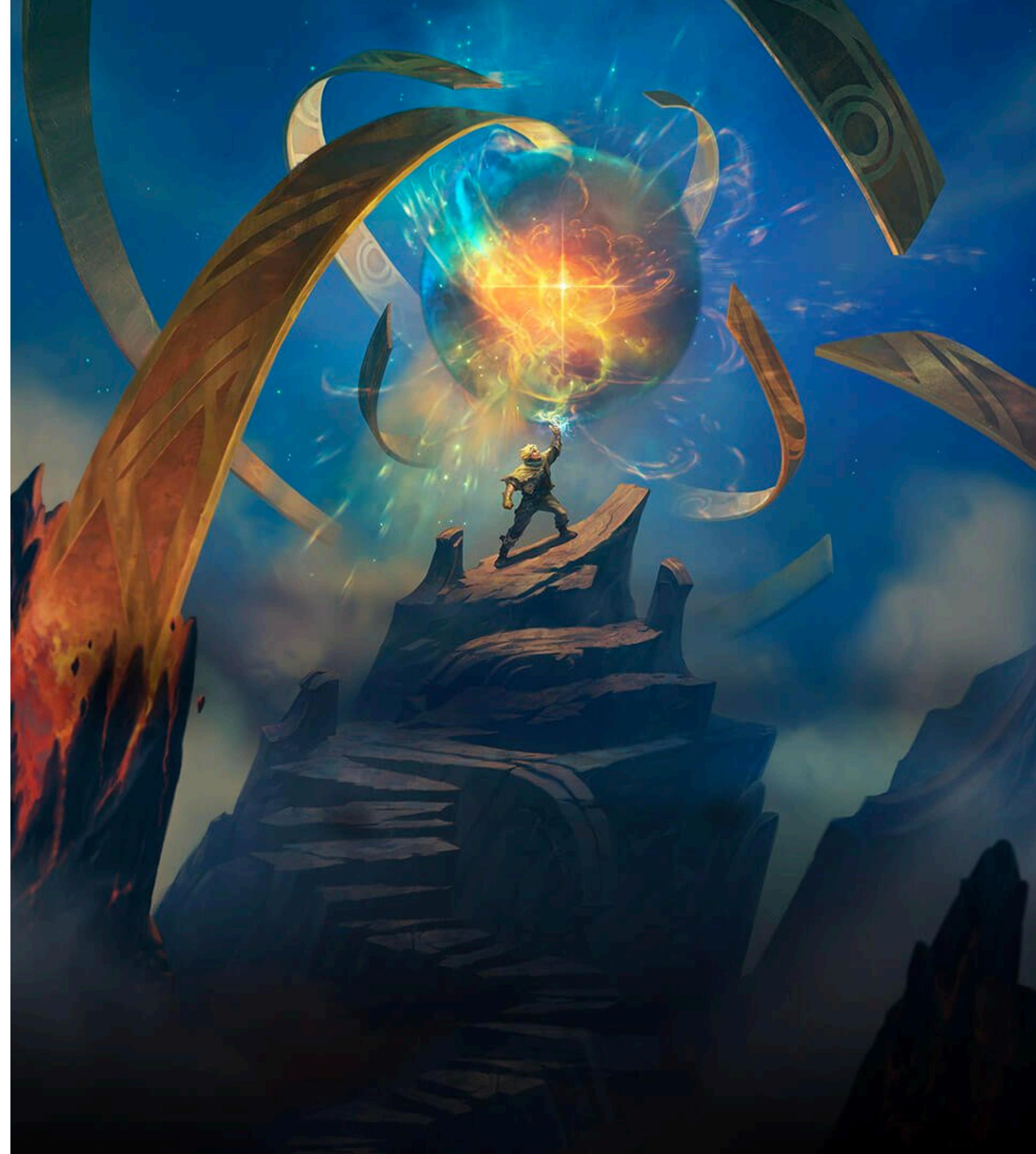
Prepare SHAP plot

```
shap.Explainer()  
shap_values
```

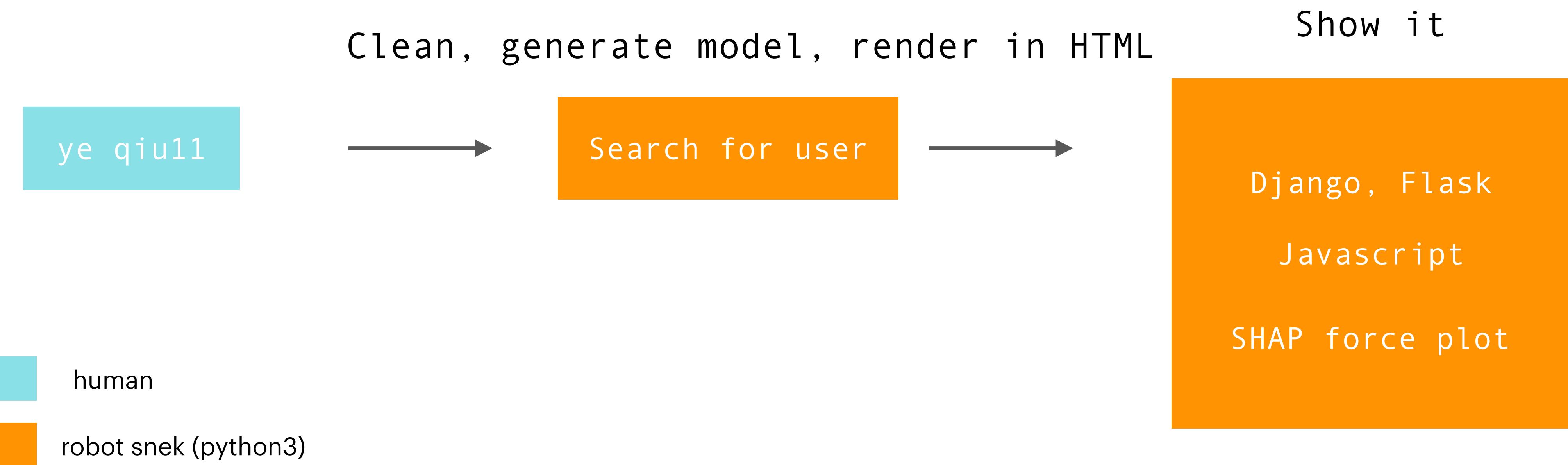
Just array
for each
data point

Part IV: The WebApp

Want easy-to-see-what's-
going-on results



The Human Experience Pipeline





On my website, liamisaacs.com

Search page, <http://liamisaacs.com/league>

[go back](#) IN BETA Patch 11.4

NA only atm; works best for junglers
只有NA, 对于打野人最合适 (有效) 的
search by user ID
请你搜索一下你英雄联盟的用户名

尔
英
准
关
且
勺
用
占
→
↑

Doublelift...

Loading animation...

[go back](#) IN BETA Patch 11.4

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bad bad kiwi

尔 英 隆 关 月 勺 用 句 一

Display user games

bad bad kiwi

GOLD III



14 LP
52 W
49 L

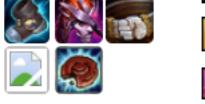
BOOST MY STATS

ARAM
2 days ago
胜利
14 m 43 s

Singed

6 4 18
KDA: 6.0
-

Lvl 15
CS: 18 (1.2)
KP: 75 %



SwollenGooch limch96
Divine Right ManButts
Positive Thots WillieDGoHam
Omnis31415 Ormin33
bad bad kiwi LJ6787

ARAM
2 days ago
失败
19 m 2 s

AurelionSol

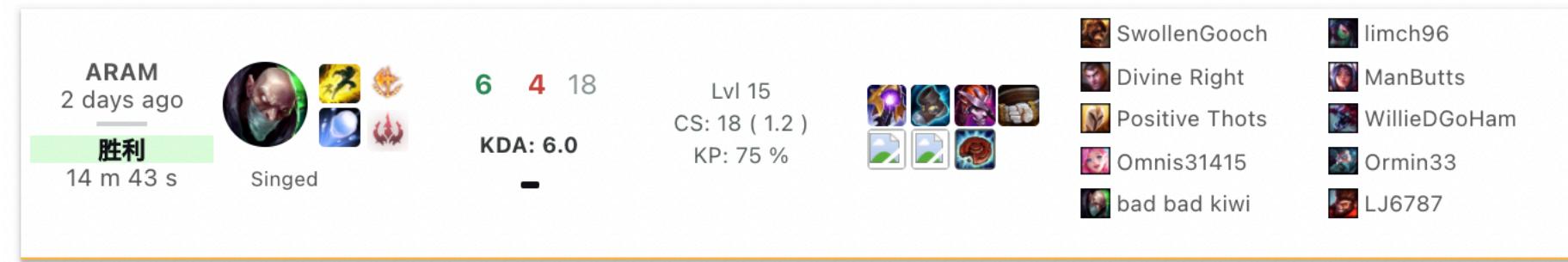
9 7 19
KDA: 4.0
-

Lvl 17
CS: 71 (3.7)
KP: 66 %



Ânathema ferda f
SwollenGooch ZettaVolt
Divine Right Glumbert
Omnis31415 eBully
bad bad kiwi DrDurk

What happens if we click a game?



Display in-depth statistics

ARAM 2 days ago										
胜利 14 m 43 s										
Singed	6	4	18	-	-	Lvl 15	CS: 18 (1.2)	KP: 75 %	-	-
KDA: 6.0	7	4	14	18639	0	22	1.5/min.			
-	5.25	, 65%	-	-	vis score: 0	43	3.0/min.			
-	5.0	, 78%	-	28312	0	50	3.5/min.			
-	5.25	, 65%	-	14746	0	18	1.2/min.			
-	6.0	, 75%	-	7306	0	18	1.2/min.			
-	6.0	, 75%	-	14576	0	18	1.2/min.			
Kills	32	21	0	0	0	0	0	0	0	0
Gold	51088	44797	0	0	0	0	0	0	0	0
胜利	Tier	1-10	KDA	英雄伤害	眼	CS	装备	物品		
14 SwollenGooch	no judge	1-10 1st	7 4 14	18639	0 vis score: 0	22 1.5/min.				
15 Divine Right	no judge	1-10 1st	11 5 14	28312	0 vis score: 0	43 3.0/min.				
14 Positive Thots	no judge	1-10 1st	5 4 16	14746	0 vis score: 0	50 3.5/min.				
14 Omnis31415	no judge	1-10 1st	3 4 21	7306	0 vis score: 0	18 1.2/min.				
15 bad bad kiwi	no judge	1-10 1st	6 4 18	14576	0 vis score: 0	18 1.2/min.				
失败	Tier	lr score	KDA	dmg to champions	wards	CS	装备	物品		
13 limch96	别判断人	1-10 1st	8 6 9	14793	0 vis score: 0	13 0.9/min.				
13 ManButts	别判断人	1-10 1st	3 9 12	10106	0 vis score: 0	40 2.8/min.				
13 WillieDGoHam	别判断人	1-10 1st	5 6 4	6843	0 vis score: 0	7 0.5/min.				
13 Ormin33	别判断人	1-10 1st	0 5 18	7419	0 vis score: 0	24 1.7/min.				
13 LJ6787	别判断人	1-10 1st	5 6 14	9499	0 vis score: 0	18 1.2/min.				

What does this do

bad bad kiwi

GOLD III

14 LP
52 W
40 L

BOOST MY STATS

ARAM 2 days ago 胜利 14 m 43 s Singed

6 4 18 KDA: 6.0 Lvl 15 CS: 18 (1.2) KP: 75 %

SwollenGooch limch96
Divine Right ManButts
Positive Thots WillieDGoHam
Omnis31415 Ormin33
bad bad kiwi LJ6787

ARAM 2 days ago 失败 19 m 2 s AurelionSol

9 7 19 KDA: 4.0 Lvl 17 CS: 71 (3.7) KP: 66 %

Anathema ferda f
SwollenGooch ZettaVolt
Divine Right Glumbert
Omnis31415 eBully
bad bad kiwi DrDurk

Displays SHAP plot below game



Clicking gives in-depth statistics



What is this?

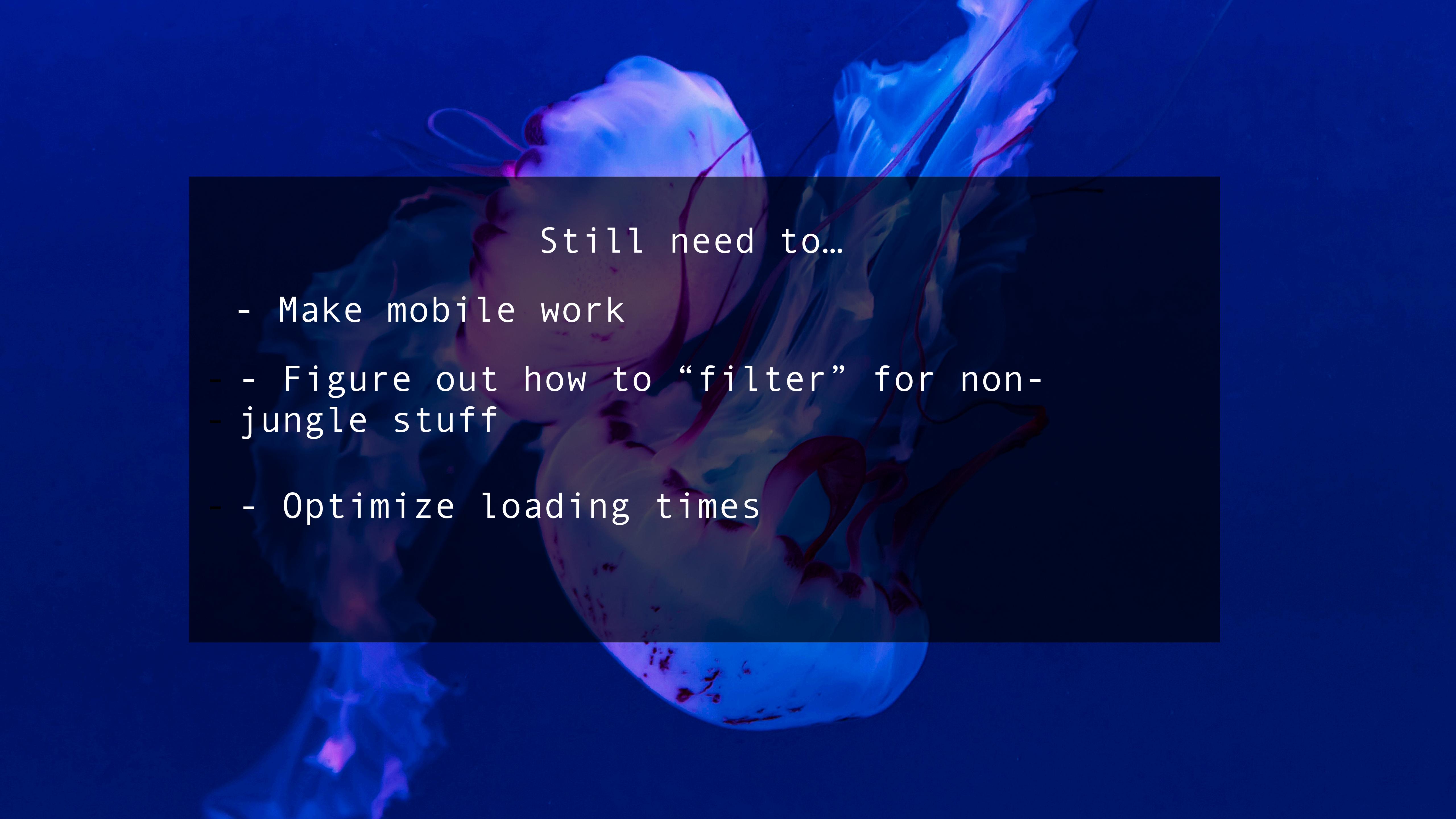
Analysis is of 41 games as Nocturne padded with 259 other games (if jungle => of junglers else nothing is padded) in divisions ['SILVERI', 'GOLDIV', 'GOLDIII', 'GOLDII', 'GOLDI']. The number on top of the graph represents: how likely or unlikely was this game to happen at all, given our data model?

Data is based off your past game data combined with anyone within 2 divisions of your rank (last updated patch 11.4), and 20-30% of sample data is just for that champion.

The **red bars** and their relative sizes indicate which things about this game DID help your log-odds chances of winning this game and by how much, and the **blue bars** are what aspects DID NOT help your log-odds chances and by how much.

“Time for a live demo”

-Gandalf



Still need to...

- Make mobile work
- - Figure out how to “filter” for non-jungle stuff
- - Optimize loading times