



# Valorant Champions

Predicting the Winner of the 2023 Valorant  
Champions Tournament

Ahram Lim, Amogh Parab, Yuqing (Frank) Lin, Alex Elchesen

Mentor: Emiliano Santarnecchi

The Erdős Institute, Data Science Boot Camp, Spring 2024

# Valorant

Valorant is a competitive first-person tactical hero shooter

Teams of 5 take turns attacking or defending a bomb site

Attackers try to plant and detonate a spike, while defenders try to defuse the spike or eliminate the attackers



# Valorant - Agents

Players play as characters called Agents

Each Agent has a unique set of abilities

Agents are divided into 4 roles: Initiators, Sentinels, Duelists, and Controllers



# Valorant - Economy

Players can purchase weapons, armor, and ability charges at the start of each round

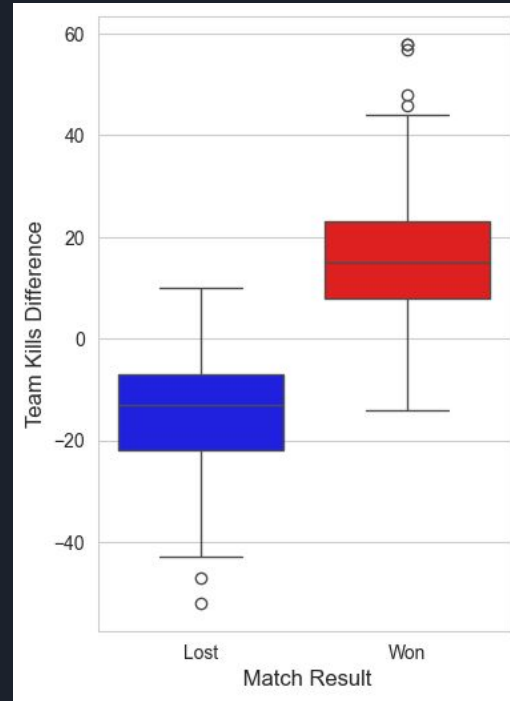
An in-game economy system awards money based on the outcome of the previous round



# Preliminary Analysis - Predicting with Kills

Our initial goal was to predict the outcome of a match using match statistics

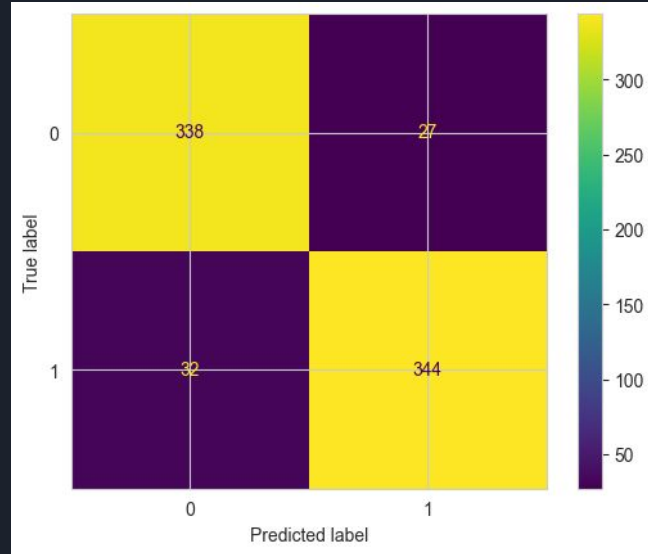
Kills are highly correlated with match outcome



# Preliminary Analysis - Predicting with Kills

Using logistic regression on kills difference alone, we can predict match outcome with 92% accuracy

But, this is comparable to the baseline model which predicts the winner to be the team with the most kills, breaking ties randomly

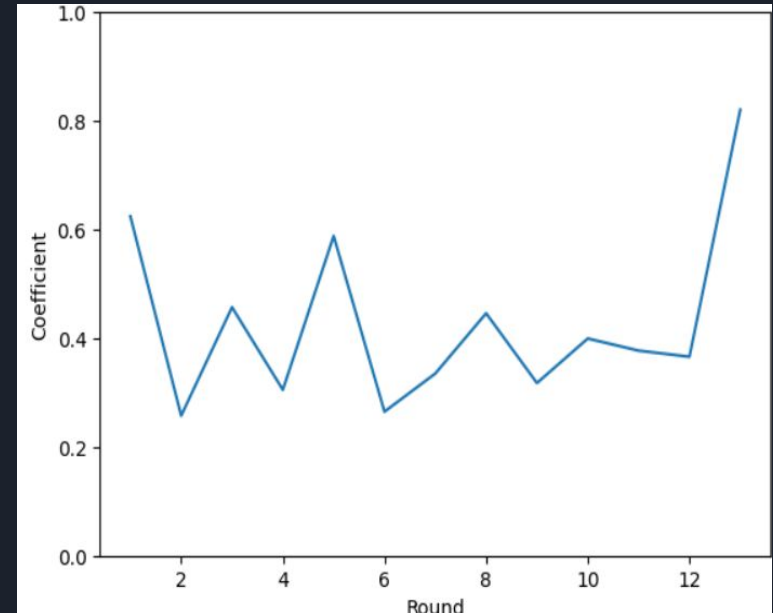


# Round Analysis

Performed Logistic regression on the outcome of the first n rounds to predict outcome of a game

rounds_seen	train_acc	test_acc	coefficients
1	0.63	0.62	[0.53]
2	0.66	0.59	[0.1, 0.58]
3	0.66	0.60	[0.29, 0.5, 0.48]
4	0.65	0.57	[0.24, 0.48, 0.41, 0.42]
5	0.67	0.64	[0.34, 0.43, 0.42, 0.34, 0.5]
6	0.68	0.64	[0.3, 0.47, 0.43, 0.35, 0.45, 0.34]
7	0.71	0.68	[0.33, 0.42, 0.43, 0.32, 0.46, 0.28, 0.28]
8	0.72	0.67	[0.42, 0.37, 0.43, 0.32, 0.46, 0.26, 0.24, 0.5]
9	0.73	0.67	[0.39, 0.39, 0.42, 0.31, 0.46, 0.23, 0.24, 0.45, 0.36]
10	0.76	0.71	[0.41, 0.38, 0.42, 0.29, 0.48, 0.24, 0.23, 0.45, 0.3, 0.4]
11	0.75	0.69	[0.45, 0.37, 0.45, 0.3, 0.43, 0.22, 0.23, 0.44, 0.3, 0.36, 0.44]
12	0.75	0.69	[0.5, 0.32, 0.48, 0.3, 0.42, 0.21, 0.24, 0.47, 0.3, 0.34, 0.42, 0.37]
13	0.80	0.72	[0.66, 0.31, 0.55, 0.38, 0.52, 0.24, 0.26, 0.5, 0.34, 0.39, 0.5, 0.37, 0.85]

Coefficient of each round averaged across 300 random splits



Test Data

Training Data

How each team, each player performed before Champions?

### Valorant Champions 2023

Completed  
STATUS

\$2,250,000  
PRIZE POOL

Aug 6–26  
DATES



REGION



### Champions Tour 2023: Americas Last Chance Qualifier

Completed  
STATUS

TBD  
PRIZE POOL

Jul 15–17  
DATES

Ultimate Goal:  
Winning  
Champions!

### Champions Tour 2023: Masters Tokyo

Completed  
STATUS

\$1,000,000  
PRIZE POOL

Jun 10–25  
DATES



REGION



### Champions Tour 2023: Americas League

Completed  
STATUS

\$250,000  
PRIZE POOL

Apr 1–May 28  
DATES



REGION



### Champions Tour 2023: EMEA Last Chance Qualifier

Completed  
STATUS

TBD  
PRIZE POOL

Jul 19–23  
DATES



REGION



### Champions Tour 2023: EMEA League

Completed  
STATUS

\$250,000  
PRIZE POOL

Mar 27–May 28  
DATES



REGION



### Champions Tour 2023: Pacific Last Chance Qualifier

Completed  
STATUS

TBD  
PRIZE POOL

Jul 18–23  
DATES



REGION



### Champions Tour 2023: Pacific League

Completed  
STATUS

\$250,000  
PRIZE POOL

Mar 25–May 28  
DATES



REGION



### Champions Tour 2023: Champions China Qualifier

Completed  
STATUS

\$0  
PRIZE POOL

Jun 1–Jul 16  
DATES



REGION



### Champions Tour 2023: LOCK//IN São Paulo

Completed  
STATUS

\$500,000  
PRIZE POOL

Feb 13–Mar 5  
DATES



REGION





# Team A Rating vs Team B Rating

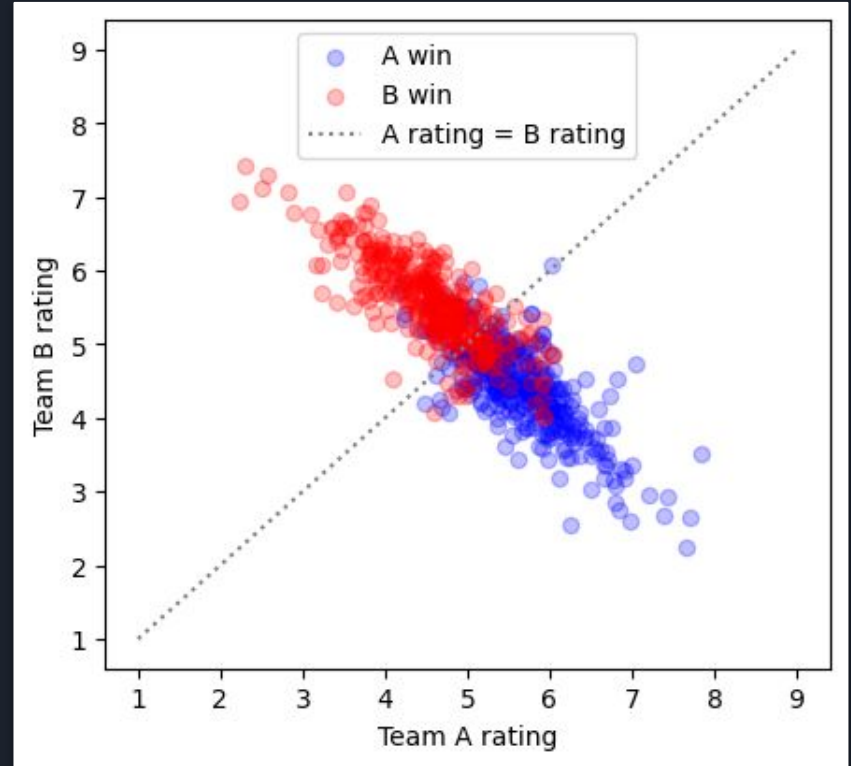
Team rating = the sum of five players' ratings \*

Team B rating >> Team A rating

Team B  
win!!

Team A rating >> Team B rating

Team A  
win!!



\* <https://www.vlr.gg/160667/vlr-gg-player-rating-explained>

# Team A rating vs Team B rating

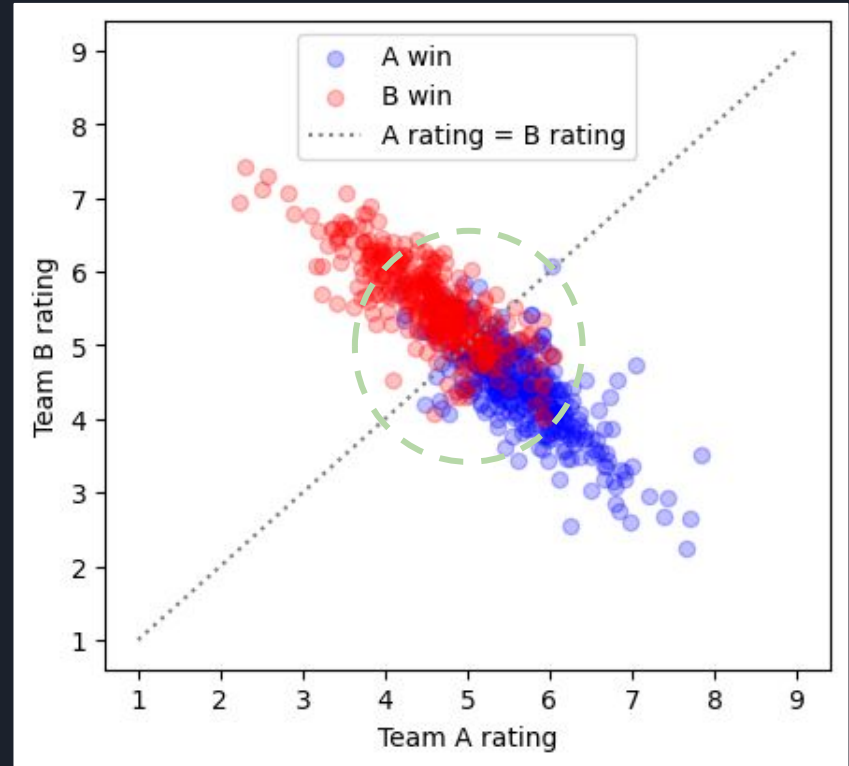
Team rating = the sum of five players' ratings \*

Closer ratings

→ Not predict correctly

It will get worse.

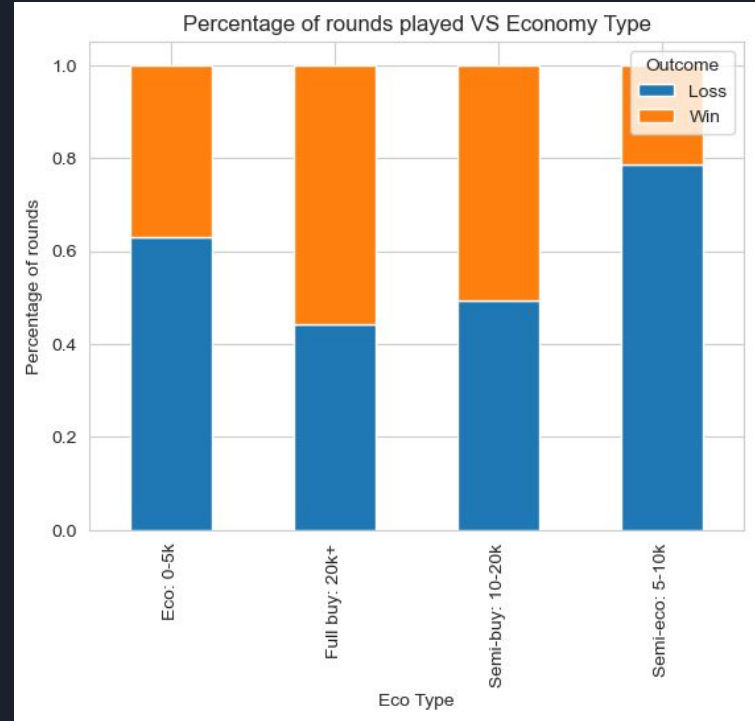
We will only use ratings from training data to predict a game result in the test data.



\* <https://www.vlr.gg/160667/vlr-gg-player-rating-explained>

# Team Economy: Observations

- Most rounds are played on Full Buy
- More credits spend corresponds to more wins

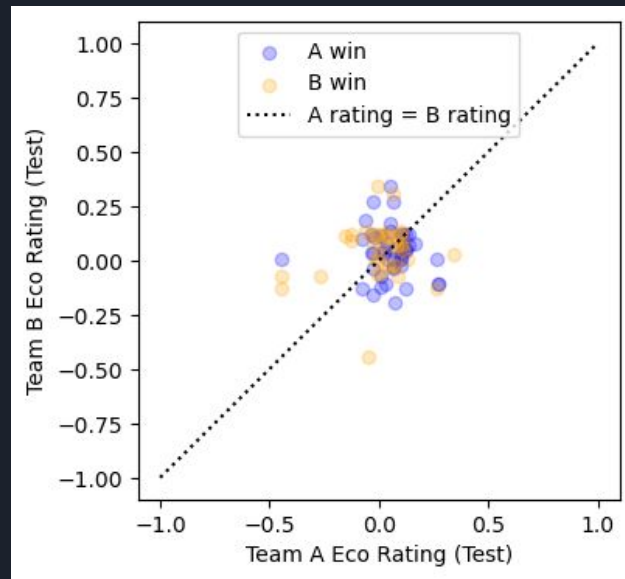
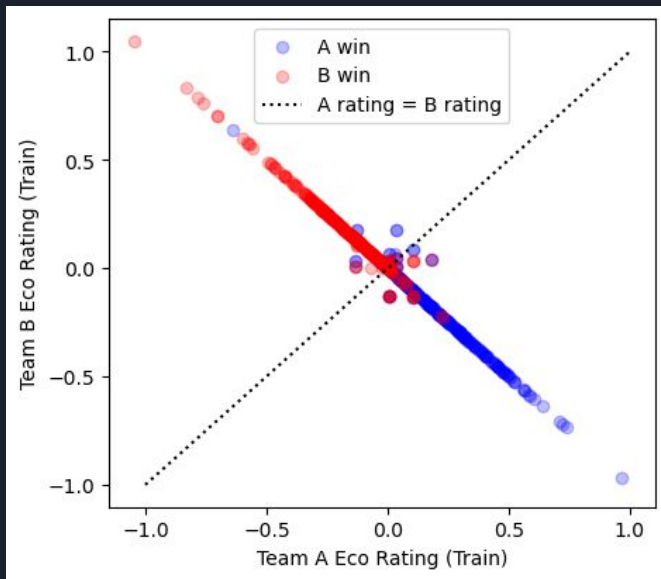




# Eco Rating

$$\text{EcoRating}_A = \text{Win}_A \left( \frac{\text{Loadout}_B}{\text{Loadout}_A} \right) - \text{Win}_B \left( \frac{\text{Loadout}_A}{\text{Loadout}_B} \right)$$

- This rating gives more points if a team beats worse odds and takes away more points if you blunder.
- Match rating will be the average over all ratings.



Train accuracy: 91%  
Test accuracy: 60%



# Conclusion: Accuracy of Different Models

Features Used: Eco Rating, Kills per Round, Team Rating, Average Combat Score, Round 3 Loadout, Assists per Round, etc...

- Baseline (Team A wins) : 54%
- XGBoost: 64%
- Logistic Regression: 52%
- K Nearest Neighbors: 58%
- Decision Tree : 56%
- Random Forest: 60%



# Acknowledgments

Thanks to all of the organizers and instructors of the Erdős Institute and to our mentor Emiliano Santarnecchi