

Winning Duels in VALORANT: A Predictive Analytics Approach

NRG DeMars DeRover / NRG Esports / [@DeMarsDeRover](#)

VALORANT is a:

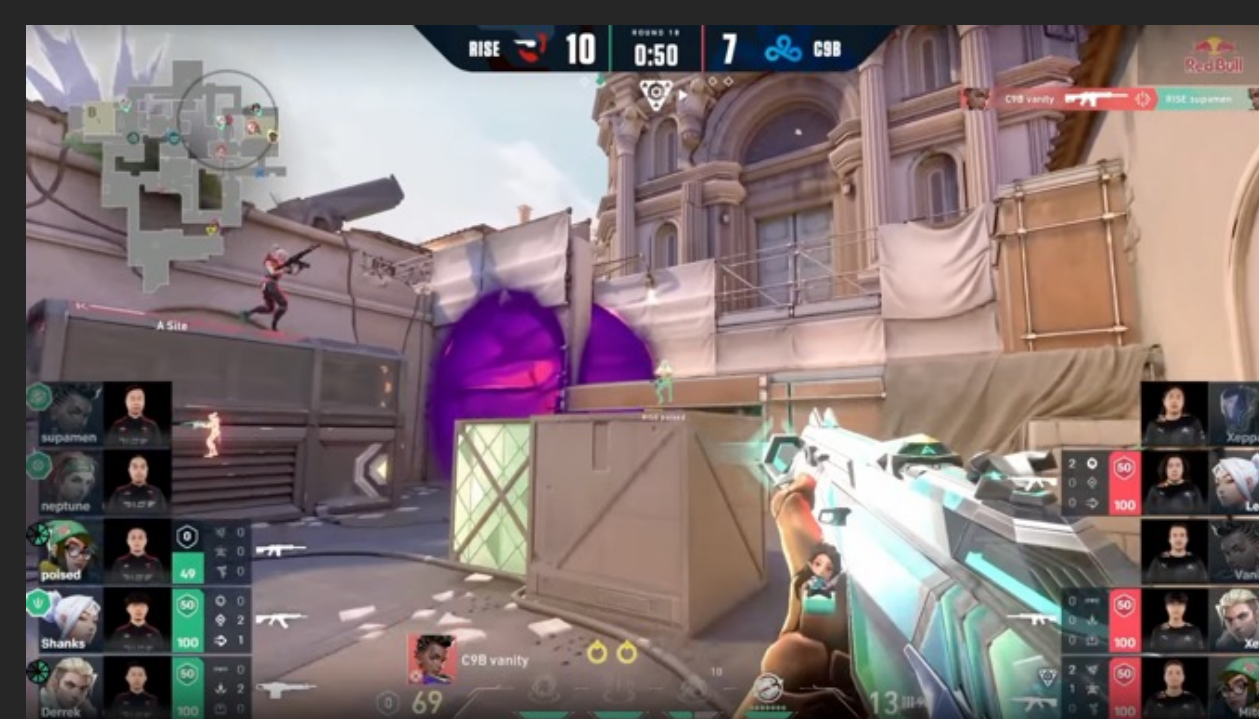
- 5v5 competitive shooter, first to 13 rounds win. Each game on 1 map
- Win round by winning gun fights, each fight eliminates one enemy
- Among fastest growing Esport: 15 million players, \$5 million prize pool after 1 year

NRG is a:

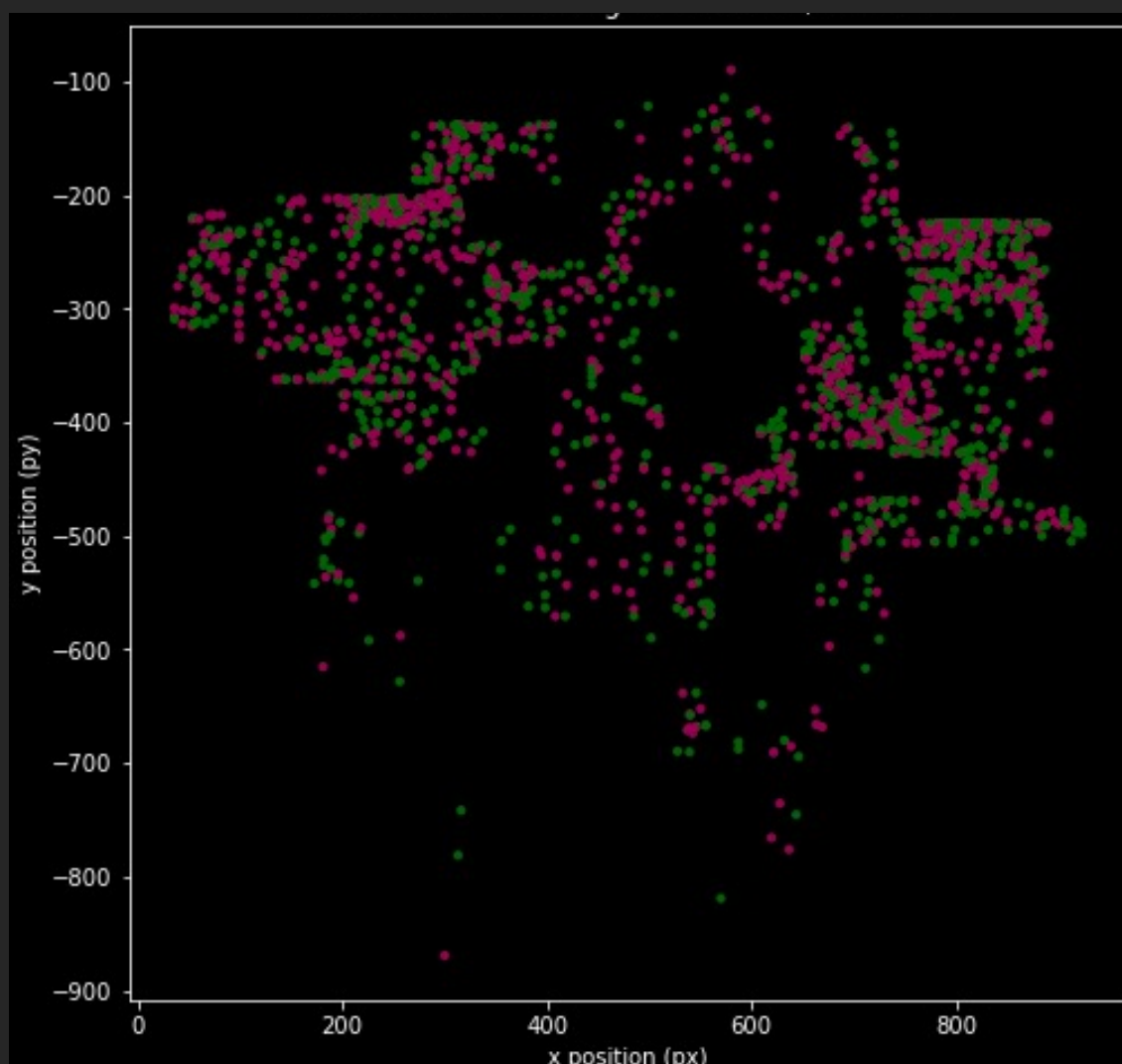
- Professional Esport organization
- NRG VALORANT is currently ranked 7th in North America

We use analytics to:

- Quantify gunplay as a skill to identify and develop talent
- Optimize decision making in game



The map Ascent in VALORANT (top)
Pro match and data collected (bottom)

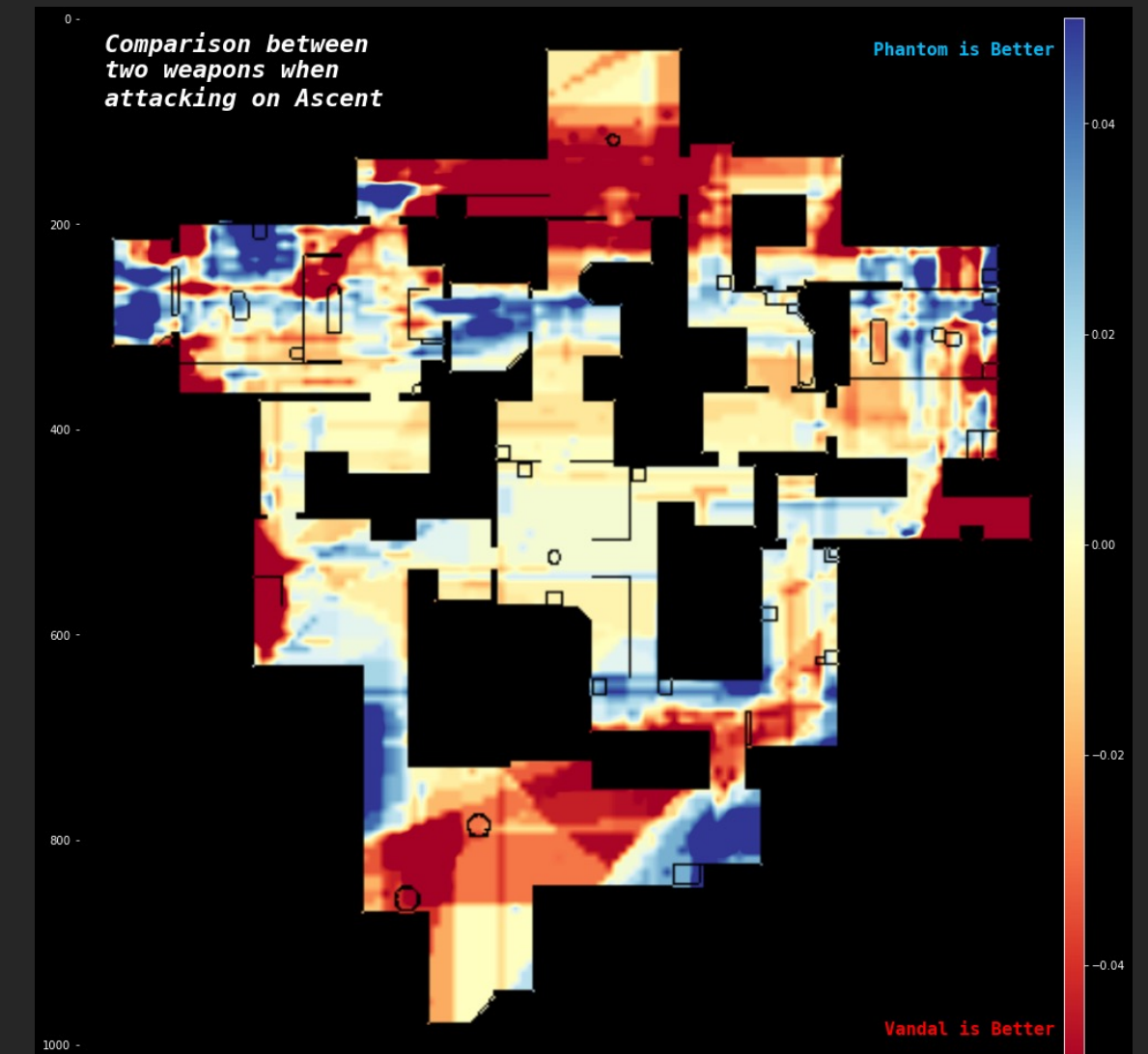


All kills (green) and deaths (red) on Ascent

The Goal is to find the expected win probability of each gun fight, to see which players are performing above expected and how players can take better fights

- The Data
 - is provided via RIOT Games API
 - collected and stored on runitback.gg, also used for scouting opponents from their previous games
 - over 3000 rounds, 20000 fights used, features:

Player: x, y	Enemy: x, y	Both: guns	Both: armor
Both: agents	Teammates alive	Time: spike plant	Last round won



Model prediction of win probability for 2 guns

- Ensemble forest models used to make probabilistic predictions
- Training and testing on different tournaments
- Prediction accuracy modelled with Brier Score

$$\text{Brier Score} = \sum_{i=0}^N (\hat{p}_i - o_i)^2$$

\hat{p}_i : predicted win probability of fight i
 o_i : actual outcome of fight i {1 = win, 0 = loss}

The Model

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The Results

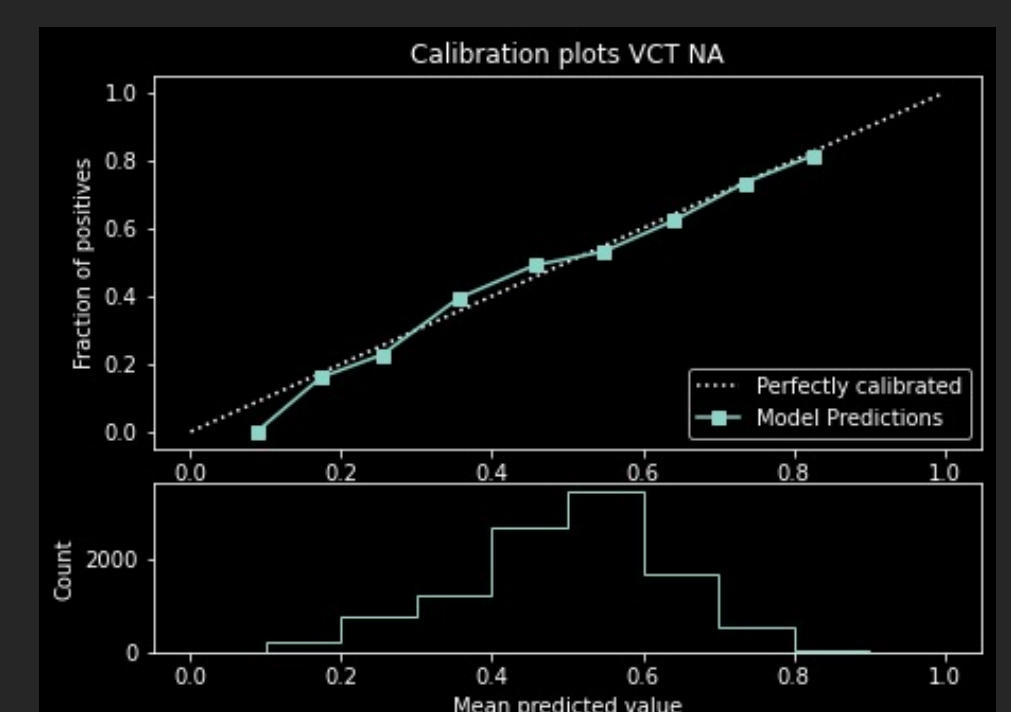
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- XGBoost was the best performing model on withheld data
- Majority of predicted win probabilities are within 40% to 60%, as expected
- Use probability to calculate:

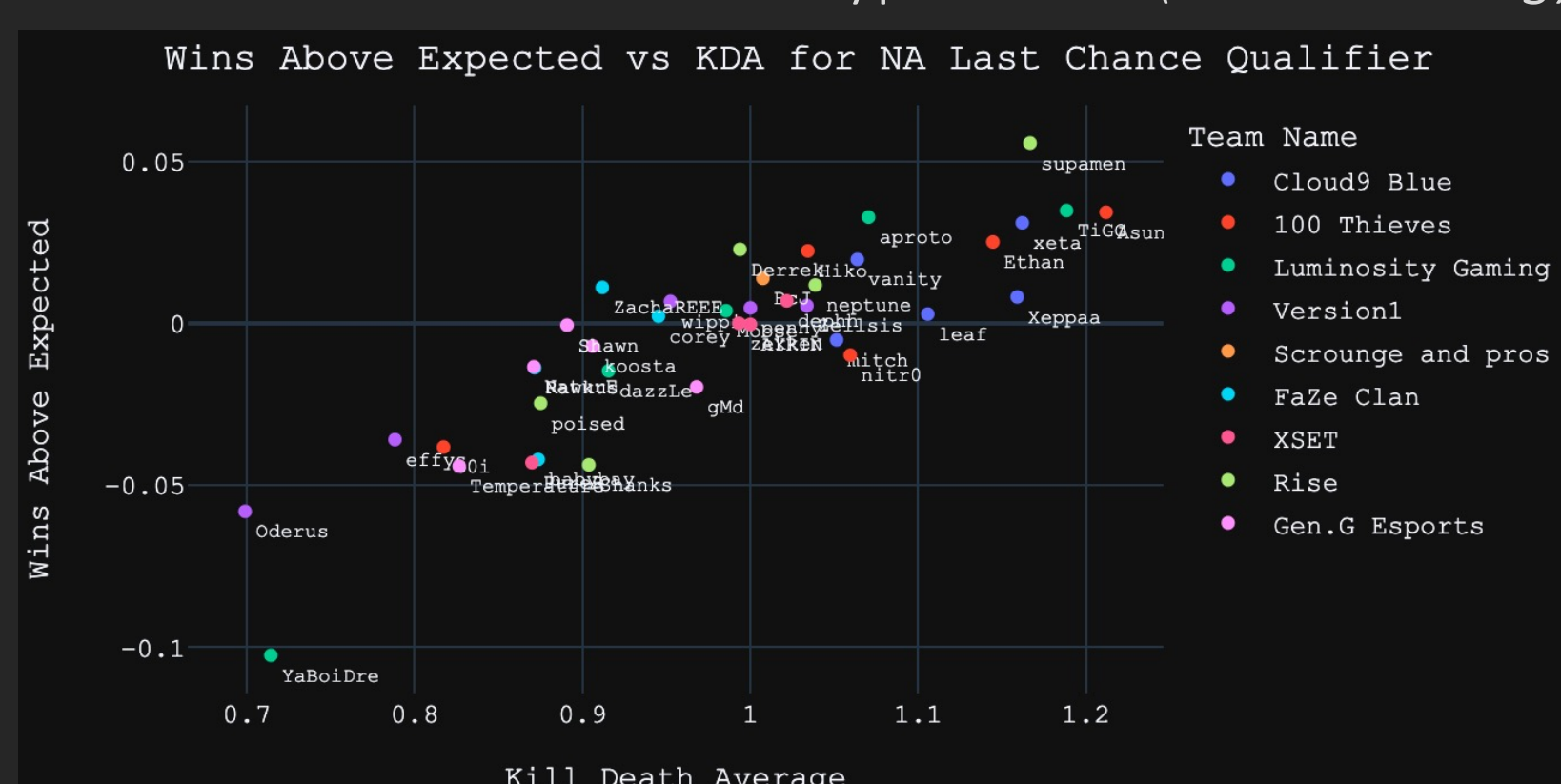
$$\text{Wins Above Expected} = \frac{1}{S} \sum_{i \in S} o_i - \hat{p}_i$$

S is a subset of one player's fights

MODEL	BRIER SCORE
Random Forest (Scikit Learn)	0.235
Random Forest of OCTs with Hyperplanes	0.232
XGBoost	0.231



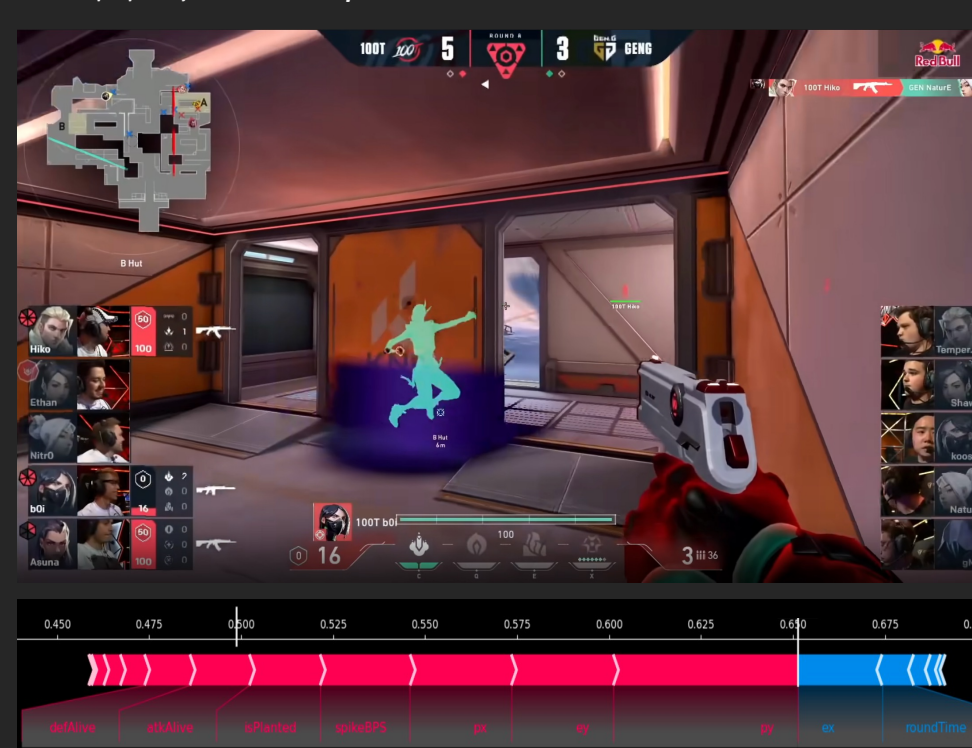
Top players consistently win difficult fights where \hat{p}_i is low. Our metric shows higher correlation between tournaments than typical KDA (kill death avg)



Individual players performance at NA tournament

Help players by using the model to understand why some fights are easier

*help players ≠ help sewer



SHAP plot for \hat{p}_i of one fight

The next steps are to:

- Build predictive models of where a certain player is likely to be
- Measure a player's utility efficiency
- Encourage more analytics in Esports + win 2022 VALORANT Champions Tour

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