



# Machine Learning Based ESports Winner Prediction

ShanghaiTech CS181 Project

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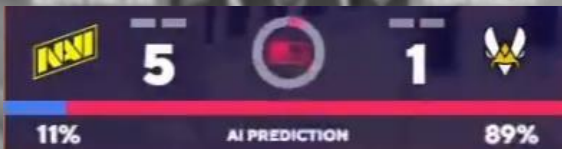
01

# Motivation

When watching esports matches,  
did you notice this?





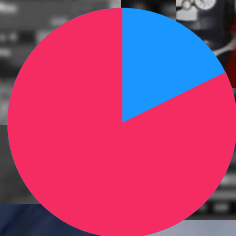


CSGO

Round Winner Prediction

LOL

看懂了的请扣1  
KI Colonel (KFC-AI) Win Rate



DOTA PLUS

胜率

71% 23%

DOTA2

DOTA PLUS Win Rate

GEN\_Inonix

SPECTATE

FOLLOW

NH	GEN	DNW	TL
WWCD%	WWCD%	WWCD%	WWCD%
52%	31%	16%	1%

PUBG

Chicken Dinner Prediction

# Motivations

## This work may...

- Decide better game lineup
  - “the meta of current game patch” 版本答案
- Help improve pro player's match win rate
  - Focus on factors those greatly affect win rate
- Predict winner for bet industry
  - Bet Is BAD but making money!



02

# Possible Methods

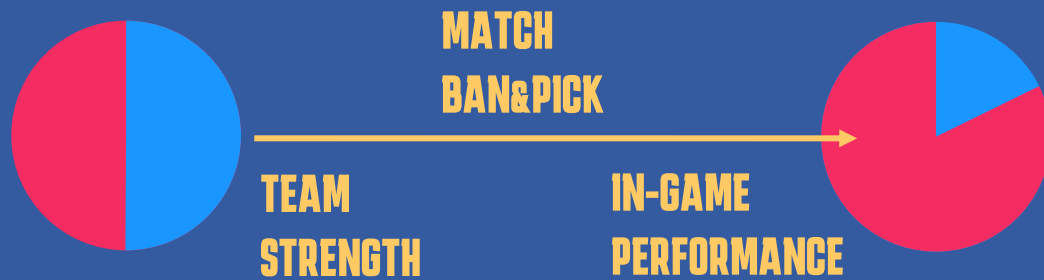
How can we determine who can win the game?



# WHO WILL WIN THE GAME?



# WHO WILL WIN THE GAME?





# Supervised Machine Learning Approach

$$f(\text{TEAM STRENGTH, MATCH BAN\&PICK, IN-GAME PERFORMANCE}) = \begin{pmatrix} 0 \\ 1 \end{pmatrix} \text{ or } \begin{pmatrix} 1 \\ 0 \end{pmatrix}$$

# Supervised Machine Learning Approach

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**ENCODING**

Extract feature vector  
from current game state

**CLASSIFICATION**

dimensions of vector  
= # of players

# Dataset for LOL Winner Prediction

It is possible to generate self-designed dataset from

- Online database
  - can acquire using web spider
  - e.g. Liquipedia [liquipedia.net/leagueoflegends](http://liquipedia.net/leagueoflegends)
- APIs
  - directly request data
  - e.g. Riot Official API/Leaguepedia API
- Public Dataset
  - Oracleselixir [kaggle.com/fernandorubiogarcia/2020-league-of-legends-competitive-games](https://kaggle.com/fernandorubiogarcia/2020-league-of-legends-competitive-games)



# Feature Encoding for LOL Winner Prediction

Which factors matter to winning the match?

- Pre-match:
  - Team comprehensive strength (global ranking, avg win-rate)
  - Game patch released by Riot Company
- Ban&Pick phase:
  - Champion BP & Lineup
  - Player-champion historic win-rate
- In-game:
  - Gold/EXP difference
  - Player K/D/A
  - Tower/Dragon/Baron

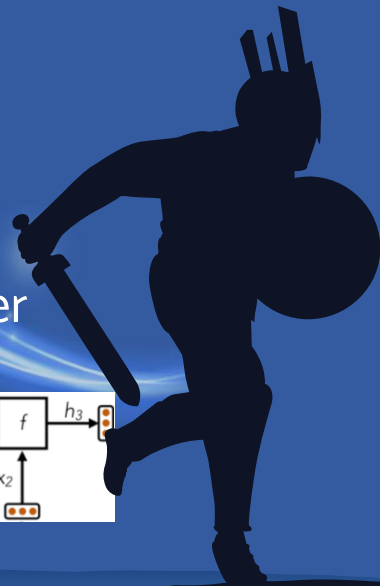
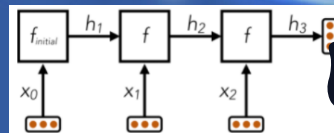
—————→ (Feature Vector)



# Classification Method for LOL Winner Prediction

## Using classification method taught in class:

- Method 1: Naïve Bayes
  - Compute  $P(Y) P(F_i|Y)$  from dataset
  - Infer  $P(Y|F_1, F_2, \dots, F_n)$
- Method 2: Logistic regression
  - With softmax loss + gradient ascent
- Method 3: Neural Network
  - Simplistic structure: 2-3 hidden layers + 1 LR layer
  - Possible improved structure: RNN
    - Encode each time step in game
    - Implement real-time prediction



A silhouette of a dragon is positioned on the left side of the slide, facing right. It is breathing a stream of fire that curves upwards and to the right, ending near the top center of the slide. The background is a solid blue color with some darker blue wavy lines at the bottom representing a horizon or ground.

# THANKS!

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