COUNTER-STRIKE WIN ANALYSIS

(using decision tree)

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ABSTRACT

- Data Science is a wide concept that cannot be explained or categorized by normal or easier means. Data has played and is playing a significant role in research and development in almost every aspect of life known to mankind. And one such field/aspect is our Gaming Industry. Currently Gaming industry is one of the most developing fields along with this the ESports Community is also growing.

- On this basis we decided to take it to next level by implementing statistics and predictions of various ESports game. In this case we are focusing on CSGO (Biggest Esports game).

- The project is based upon predicting the Win Percentage of a team depending on several recorded factors.

- Supervised Machine learning technique is used to predict the outcome of the matches using the data obtained from various resources.

CSGO Win Rate Analysis

What is CSGO?

- ***Counter-Strike: Global Offensive*** (***CS:GO***) is a multiplayer first-person shooter video game developed by Valve and Hidden Path Entertainment.

The game pits two teams against each other: the Terrorists and the Counter-Terrorists.

Both sides are tasked with eliminating the other while also completing separate objectives.

The Terrorists, depending on the game mode, must either plant the bomb or defend the hostages, while the Counter-Terrorists must either prevent the bomb from being planted, defuse the bomb, or rescue the hostages.

Why CSGO?

- CSGO is one of the biggest ESports game out in the market with over 20+ years of competitive history.
- It's competitions have a price pool between $27,000 to $1,000,000 currently.
- User base of over 20 million players in Jan 2020 and more that 143,000 professional players.

INTRODUCTION

- Many data from official CS:GO tournaments and public match are collected for the analysis, whereas game refinement measure is employed for the assessment with a focus on two aspects: gameplay and rounds system.

- The results show that the gameplay aspect has lower game refinement, i.e., the game is highly skillful, whereas the rounds system aspect has higher game refinement, i.e., the game is highly stochastic.

- The combination of the two aspects successfully balances the skillfulness and chance, which results in their popularity.

- In addition, since their release, CS: GO has sold more than 40 million game copies, awarded as "Best eSports Game of The Year" and updated maps and successfully maintain the game balance of the maps, as measured by game refinement.

Motivation and Objective of Project

- Determining the ideal circumstances for ideal performance.
- As players ourselves, we aim to improve our chances of winning by adjusting several factors involved/analysed.
- Analysis and interpretation of various factors like Ping, Map played and hours dedicated to the game.
- Predicting the chances of winning based on these features.

FLOW PROCESS

CODE - *https://github.com/oron-sinaa/csgo-win-analysis*

- *Sourcing data of an individual CSGO player*
- *Data cleaning*
- *Simple analysis of win/loss data*
- *Extracting features and target feature for our model dataset*
- *Splitting dataset in 1:4 ratio for testing and training*
- *Classifier training by DecisionTreeClassifier with impurity criterion of Gini-impurity (Add formulae and other impurities if you want)*
- *Tweaking classifier to prevent over/under fitting*
- *Testing and determining model accuracy*
- *Visualizing Decision Tree*

Experimental Results

- ***CONFUSION MATRIX***

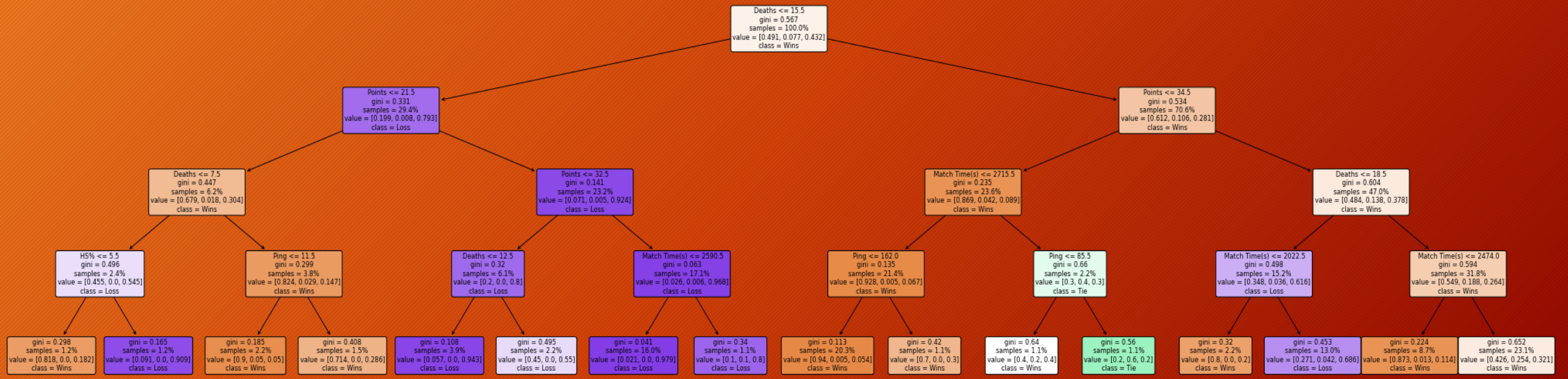
  [[99 , 0 , 16]
    [13 , 0 , 2]
    [27 , 0 , 70]]

- ***Accuracy***: 74.449%
- ***Precision Score***: [71.22302158 , 0.0 , 79.54545455]

REPORT

	PRECISION	*RECALL*	*F1-SCORE*	*SUPPORT*
LOST	0.71	0.86	0.78	115
TIE	0.00	0.00	0.00	15
WIN	0.80	0.72	0.76	97
ACCURACY			0.74	227
MACRO avg	0.50	0.53	0.51	227
WEIGHTED avg	0.70	0.74	0.72	227

DECISION TREE MODEL



CONCLUSION

- Average match time = 38 minutes
- Wins if time > 38 minutes = 232
- Wins if time < 38 minutes = 256
- The ratio 0.9062 concludes that length of match does not have a big impact on win/loss

- Chances of winning with ping greater than 150ms = 39.0625%
- Chances of winning with ping less than 150ms = 47.0051%
- Win/loss ratio if your mvp's were greater than 2 = 1.220

- There's a good chance that you will lose 5 matches out of 10 regularly if you got a fair competition.
- Ping does matter but would make you win just 1 more match if you've the upper side with ping and similar competition.

- Chances of tie = 7.5022%

REFERENCES

- https://www.kaggle.com/thesiff/counterstrike
- https://stackoverflow.com
- https://towardsdatascience.com/