ABSTRACT

RANDOM FOREST HYPERPARAMETER OPTIMIZATIONS OBSERVATIONS IN PREDICTING DOTA 2 MATCH OUTCOME

By

Putu Rayno Sebastian

21110017

This research data is sourced from the OpenDota API, encompassing professional DotA 2 match data on patch 7.37, including matches, players, heroes constants, and item constants with a total of 11,829 matches. This study aims to build a Dota 2 match outcome prediction model using the Random Forest algorithm with proper encoding techniques for hero and item features and hyperparameter optimization using Random Search to improve prediction accuracy. The main challenge in Dota 2 match outcome prediction lies in handling complex categorical hero and item data, where improper data representation can cause decision tree-based models to misinterpret relationships between categorical features. The proposed solution employs the Random Forest algorithm with specific encoding for representing hero data (value -1 for Dire team, 1 for Radiant team) and item data (difference in quantity between teams), along with hyperparameter optimization using Random Search. The research results demonstrate that applying encoding to item and hero features combined with hyperparameter tuning successfully achieved 90.03% accuracy with ROC-AUC value of 96.40%, proving the effectiveness of the specific encoding approach in handling categorical data for professional DotA 2 match outcome prediction.

Keywords: ***dota 2, random forest, random search, encoding***