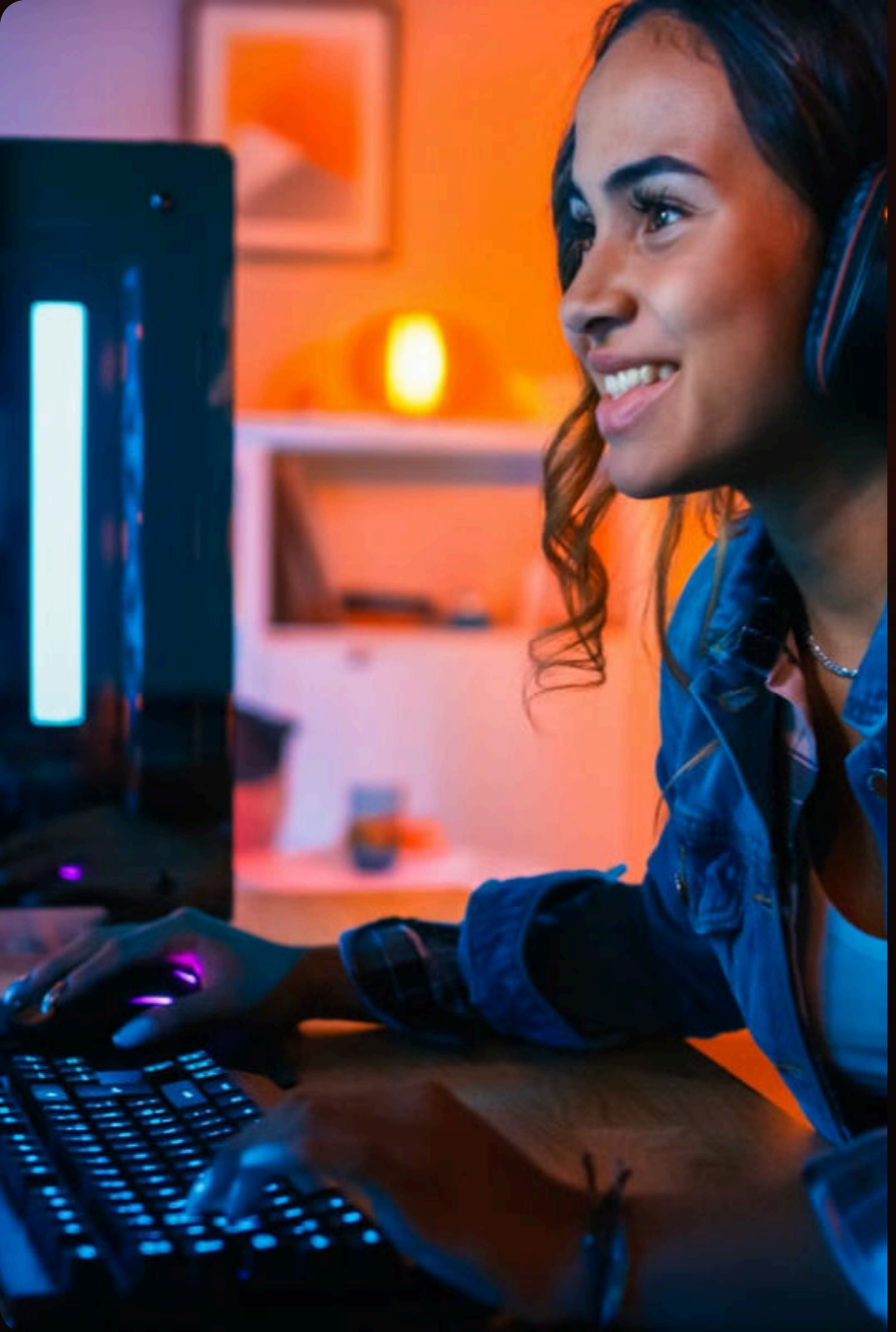


Matchmaking in Online Video Games

Matchmaking in online games aims to determine who should play together. It's complex, considering factors like skill, region, and behaviour. We'll explore defining good matches and using machine learning to improve player experience.

by Juan Pablo Nieto

Challenges in Matchmaking

Matchmaking in online games faces various challenges. These include balancing skill levels, regional considerations, and player behavior.

Skill Balance

Ensuring players of similar skill levels are matched together.

Regional Factors

Considering geographical location to minimize latency issues.

Wait Times

Balancing match quality with acceptable queue times.

Pre-made Groups

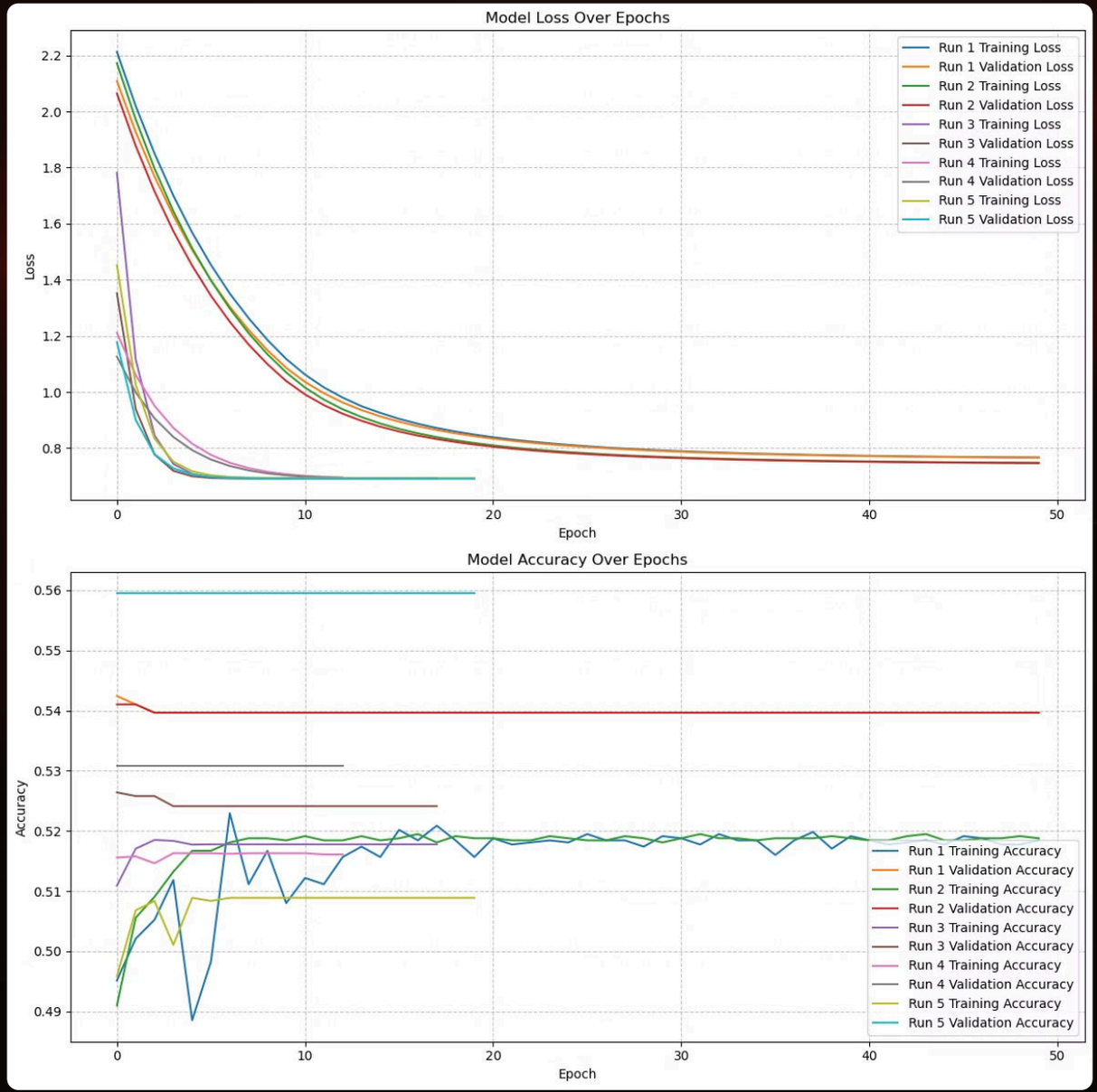
Handling matchmaking for players in pre-formed teams.

How to Balance Matchmaking?

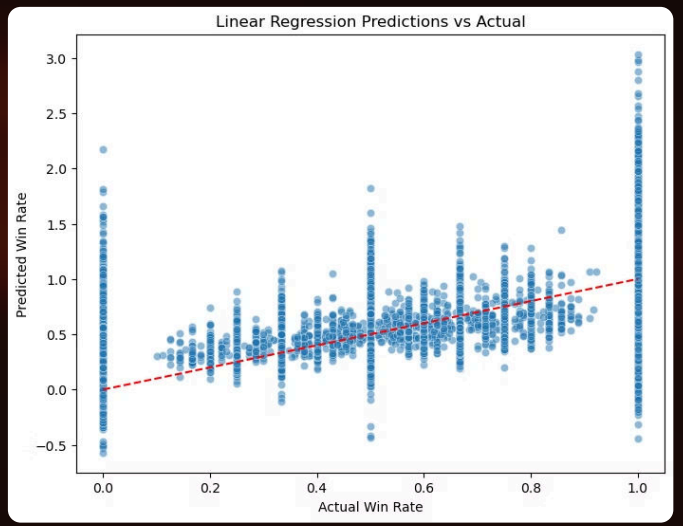
If you want to create balanced teams, you'll need a reliable predictive skill system and an optimizer. First, you assess the predictive skill system based on its accuracy in predicting historical match outcomes and then assign skills to all players. After that, you hand over the task to the optimizer to select two equally balanced teams of 5, taking into account specific role requirements.

Josh Menke - *Principal Matchmaking Game Designer @ Riot Games*

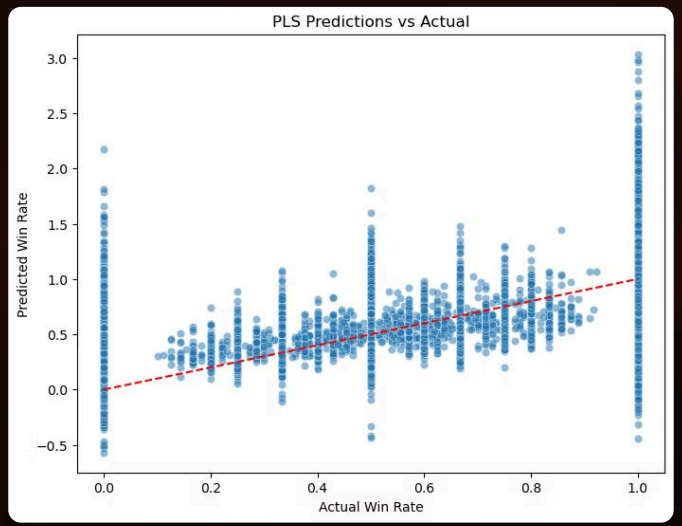
LSTMs - Sequential Data



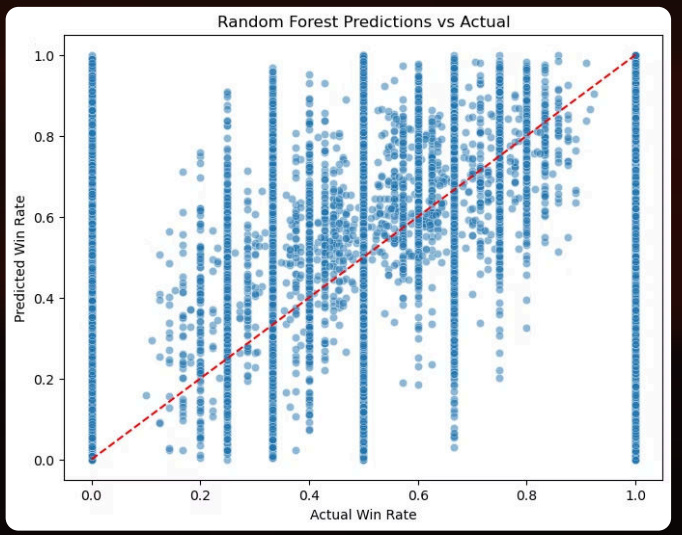
Predicting Win Rates



Linear Regression



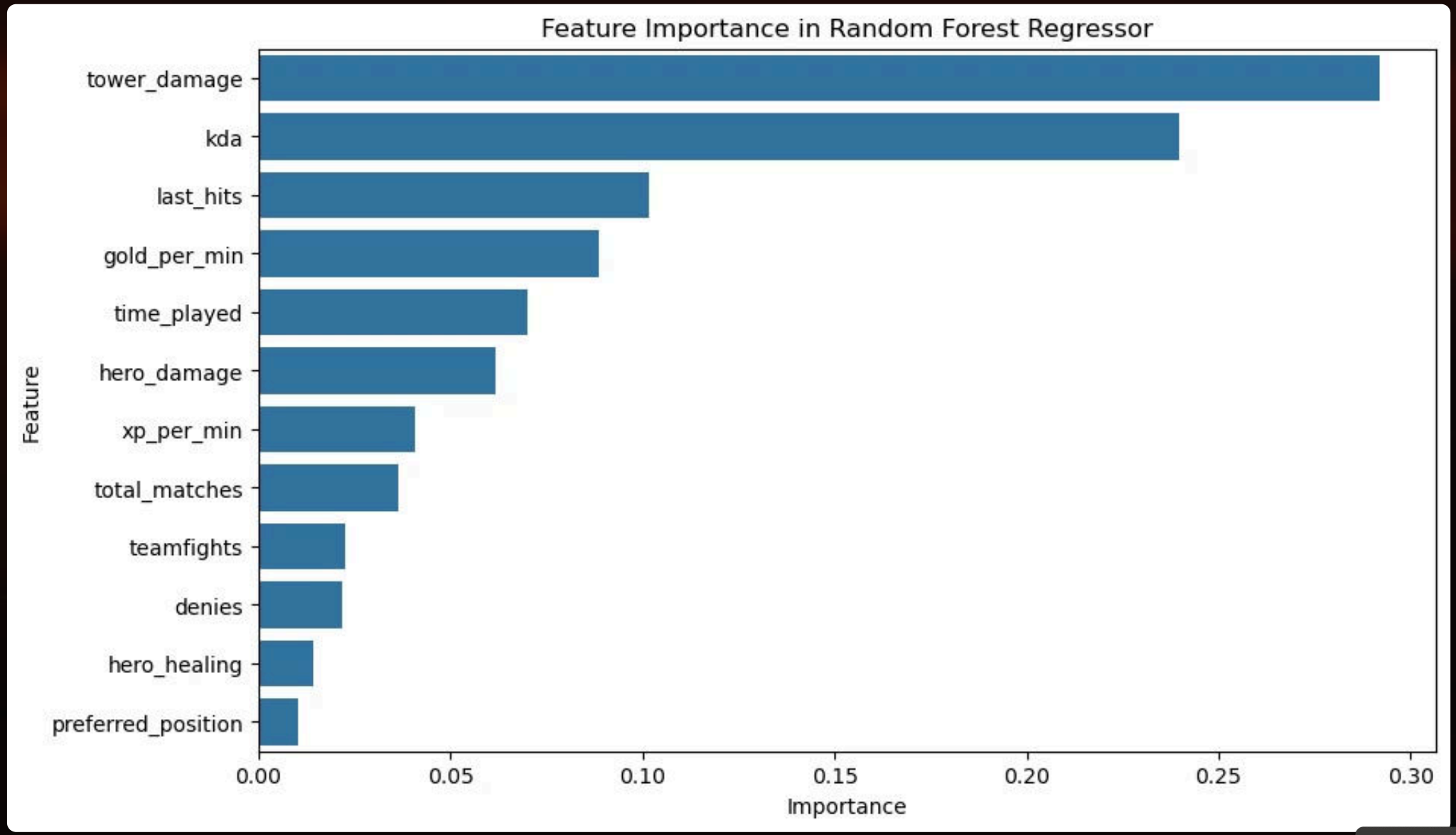
PLS



Random Forest

Model Type	Mean Squared Error	R-Squared
Linear Regression	0.1112	0.4813
Partial Least Squares	0.1112	0.4813
Neural Network	0.0698	0.6744

Feature Importance



Key Findings

1

Definition of Match Balance

Dota 2 is so complex that even esport teams haven't defined good performance metrics yet for balance

2

Win/Loss Skill Ratings

Measuring player skill level based purely on win/loss ratios are not good enough to balance matchmaking

3

Insufficient Sequential Data

Our minute-by-minute breakdown does not capture all the details that influence match outcomes

4

Potential Skill Indicators

Combat efficiency, objective control, and efficient farming look promising for our predictive skill system

Next Steps

The project will continue to refine models and explore new approaches. Future work will focus on improving the skill predicting system and implementing the genetic algorithm to optimize matchmaking.

1

Breaking Down the Problem

It's important to continue breaking the problem down to focus on a single variable at a time.

2

Additional Feature Eng.

Further feature engineering has to be done to reflect objective control and combat efficiency.

3

Build Predictive Skill System

Implement a multi-task learning approach to predict match outcomes and skill levels.

4

Genetic Algorithm

Create and fine-tune a genetic algorithm for matchmaking optimization.