

# Building an LSTM

...

August 23, 2024

# Overview

- LSTMs can be modified in various ways. Each modification has benefits and drawbacks.
- I am currently stuck, unable to improve performance (0.4 precision and 0.9 accuracy).
- In this presentation, I will give a rundown on what I've tried so far, and I look for your suggestions on future improvements.

# Parameters and How They Affect the Model (Part 1)

## Binary Focal Cross Entropy

- Alpha: Adjusts class weighting to focus on the minority class.
- Gamma: Increases focus on misclassified samples

## Batch Size

- Larger batches: more stable gradients, better generalization
- Smaller batches: help escape local minima favoring majority

## Sample Length

- Longer sequences capture longer context to make decision
- Shorter sequences: focus on short-term context, faster training

## Dropout

- Prevents overfitting.
- Balances focus on minority class.

# Parameters and How They Affect the Model (Part 2)

## Class Weights

- Adjusts loss function to penalize misclassification of minority class.

## SMOTE

- Creates synthetic minority class examples.
- Balances class distribution

## Learning Rate

- Lower rates can improve convergence, especially for minority classes.

## Imbalance Factor

- Measures the severity of class imbalance.
- Overlap Percent: percent overlap in timesteps

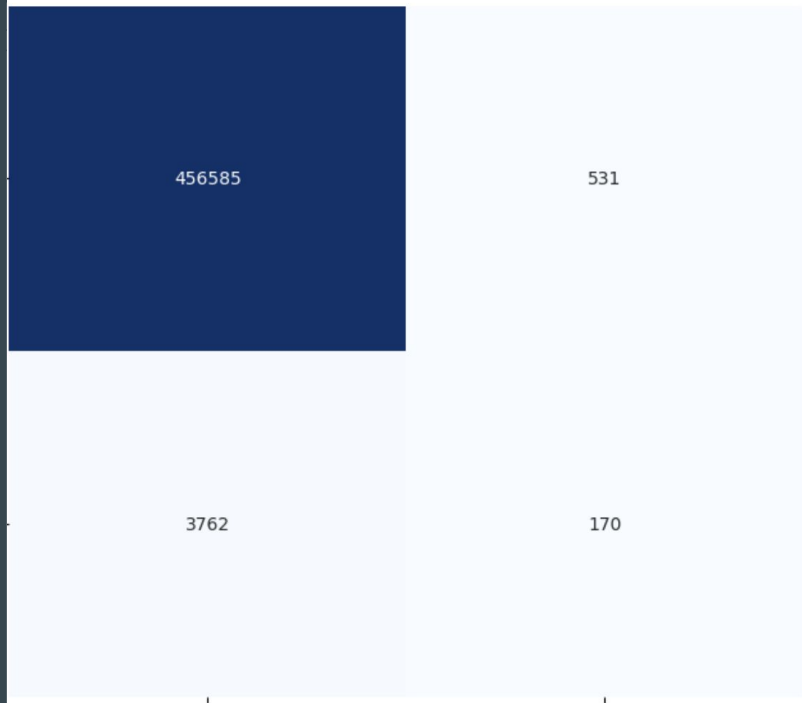
# Understanding the problem

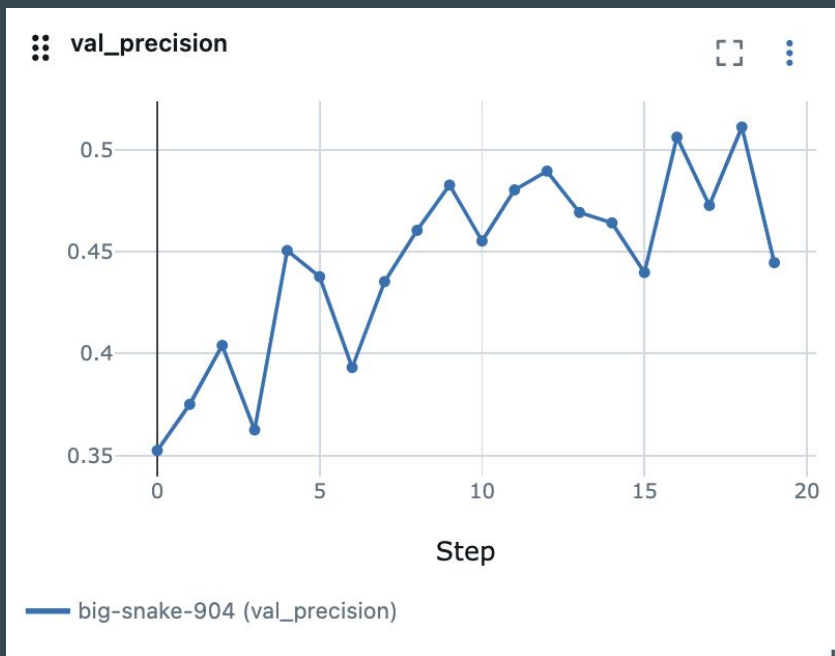
## Class Imbalance

Biases the model towards the majority class, hindering learning from minority class

Also, limited data on minority class limits ability to predict that class. As of now, we only have a handful examples of each type of play behavior in the labelled data.

## Confusion Matrix





**Note:** The imbalance factor is 5 for this model

## **Central Question:**

**What should I add or change to improve the model's performance?**

# Suggestions

