Understanding Your Model's Settings

This guide explains the key terms and settings you can adjust in the stock predictor application. Understanding these will help you fine-tune the model for better performance.

🧠 **Core Training Parameters**

These are the most fundamental settings that control how the model learns.

Epochs

- **What it is**: One complete pass through the entire training dataset.

- **Simple Analogy**: Imagine you're studying a textbook for an exam. Reading the entire book from cover to cover one time is **one epoch**.

- **Effect**:

    ○ **Too Low**: The model doesn't get enough chances to learn the patterns (like skimming the book once).

    ○ **Too High**: The model might "memorize" the training data instead of learning the general patterns, which hurts its ability to predict future prices (overfitting).

- **Optimum Value**: A range of **30-75** is usually a great starting point.

Batch Size

- **What it is**: The number of data samples (in this case, days) the model looks at before updating its internal knowledge.

- **Simple Analogy**: Instead of studying the whole textbook at once, you study it one chapter at a time. The size of the chapter is the **batch size**. The model learns a little from each "chapter."

- **Effect**:

    ○ **Too Low**: Learning can be unstable, like trying to understand a book by reading one random sentence at a time.

    ○ **Too High**: Learning is stable but can be slow and sometimes less effective.

- **Optimum Value**: **32, 64, or 128** are very common and effective choices.

Learning Rate

- **What it is**: Controls how much the model adjusts its knowledge based on the errors it makes. It's the most sensitive setting.

- **Simple Analogy**: You're adjusting a thermostat. The learning rate is how much you turn the dial each time.

- **Effect**:

    o **Too High**: Like yanking the dial aggressively. You'll constantly overshoot the perfect temperature. The model's learning will be unstable.

    o **Too Low**: Like turning the dial by a microscopic amount. You'll get there eventually, but it will take a very long time.

- **Optimum Value**: **0.001** is an excellent and widely used default. It's best to start here and only change it if you have a specific reason.

📊 Model Performance Metrics

These numbers tell you how good your model's predictions are.

MAE (Mean Absolute Error)

- **What it means**: On average, how many dollars off is the prediction from the actual price?

- **Goal**: **Lower is better.** An MAE of 5.0 means the model is off by an average of $5.

RMSE (Root Mean Squared Error)

- **What it means**: Similar to MAE, but it penalizes large errors more heavily. If your RMSE is much higher than your MAE, it means the model made a few very bad predictions.

- **Goal**: **Lower is better.**

R^2 (R-squared)

- **What it means**: How much of the stock's price movement can the model explain? It's like a percentage score of its accuracy.

- **Goal**: **Higher is better.**

    o **1.0**: Perfect score.

    o **0.5**: The model explains 50% of the price movement (a good result).

    o **Negative**: The model is worse than just guessing the average price.

⚙️ Hybrid Model Parameters

These sliders control the two "experts" inside your Hybrid model.

LSTM Settings (The Sequence Expert)

- **LSTM Units**: The size of the model's **short-term memory**. A higher number lets it remember more complex historical patterns. A value of **64 or 128** is a strong choice.

- **LSTM Dropout**: A technique to prevent the model from "cheating" by memorizing the data. It randomly ignores a small fraction of information during training to force it to learn more robustly. A value between **0.1 and 0.3** is typical.

Transformer Settings (The Relationship Expert)

- **Transformer Blocks**: The **number of analytical layers**. More blocks allow the model to find deeper and more complex patterns. A value of **1 or 2** is usually sufficient.

- **Attention Heads**: The number of **different things the model can focus on at the same time**. More heads allow it to find hidden relationships between multiple features (e.g., how price, volume, and RSI all affect each other simultaneously). A value of **2 or 4** is a powerful starting point.