

Stock Price Prediction Using LSTM Algorithm

New Era New Technology!

Problem Statement

This project is about developing a predictive model that uses historical stock price data to predict future stock prices.

The project aims to leverage deep learning, specifically LSTM (Long Short-Term Memory) neural networks, to build a model that can capture complex patterns and relationships in data and make accurate predictions.

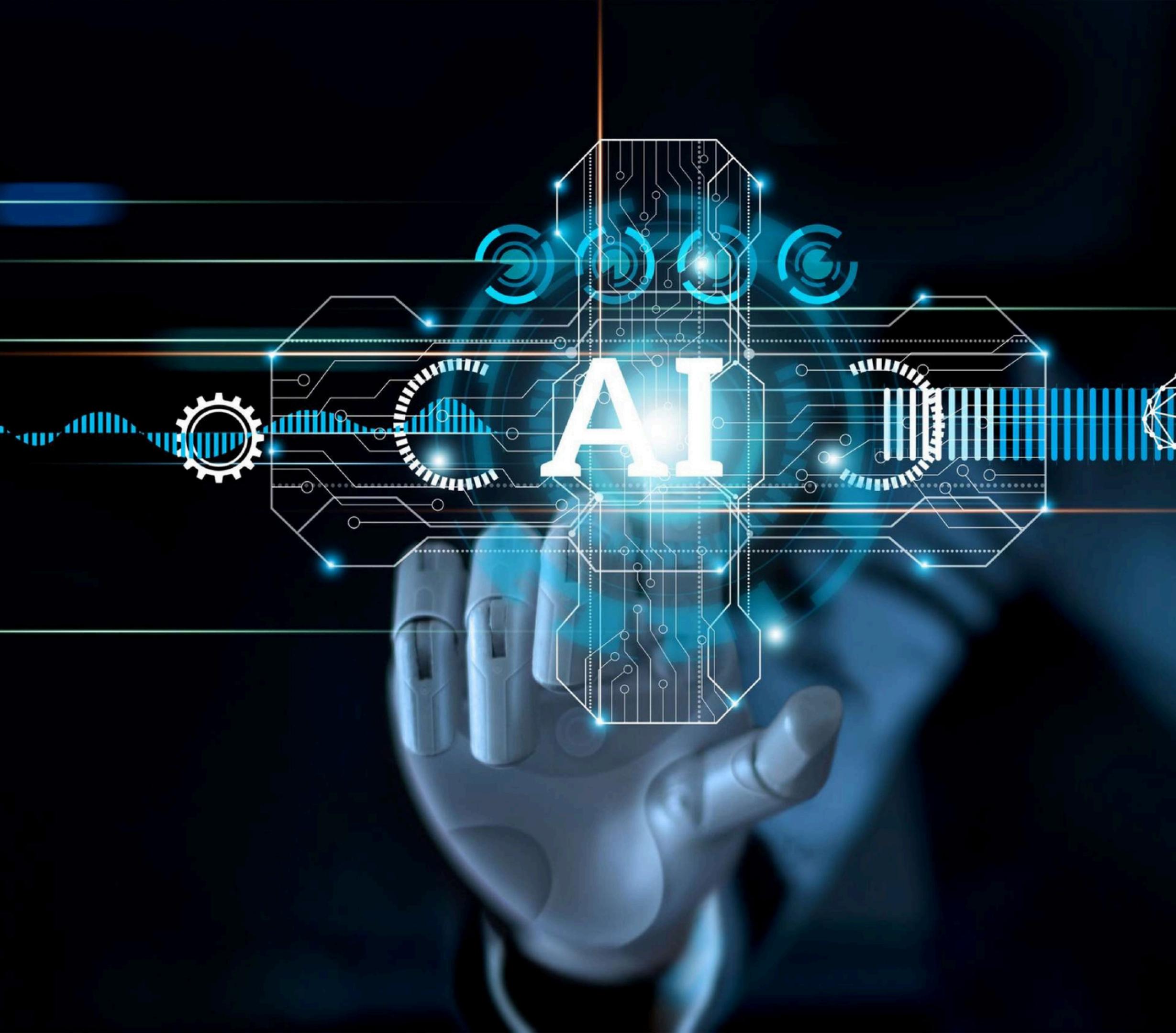
In the project, historical stock price data is collected, cleaned, and preprocessed, the LSTM model is trained on the data, and its performance is evaluated using various metrics to assess how well the model predicts future stock prices.

Objectives

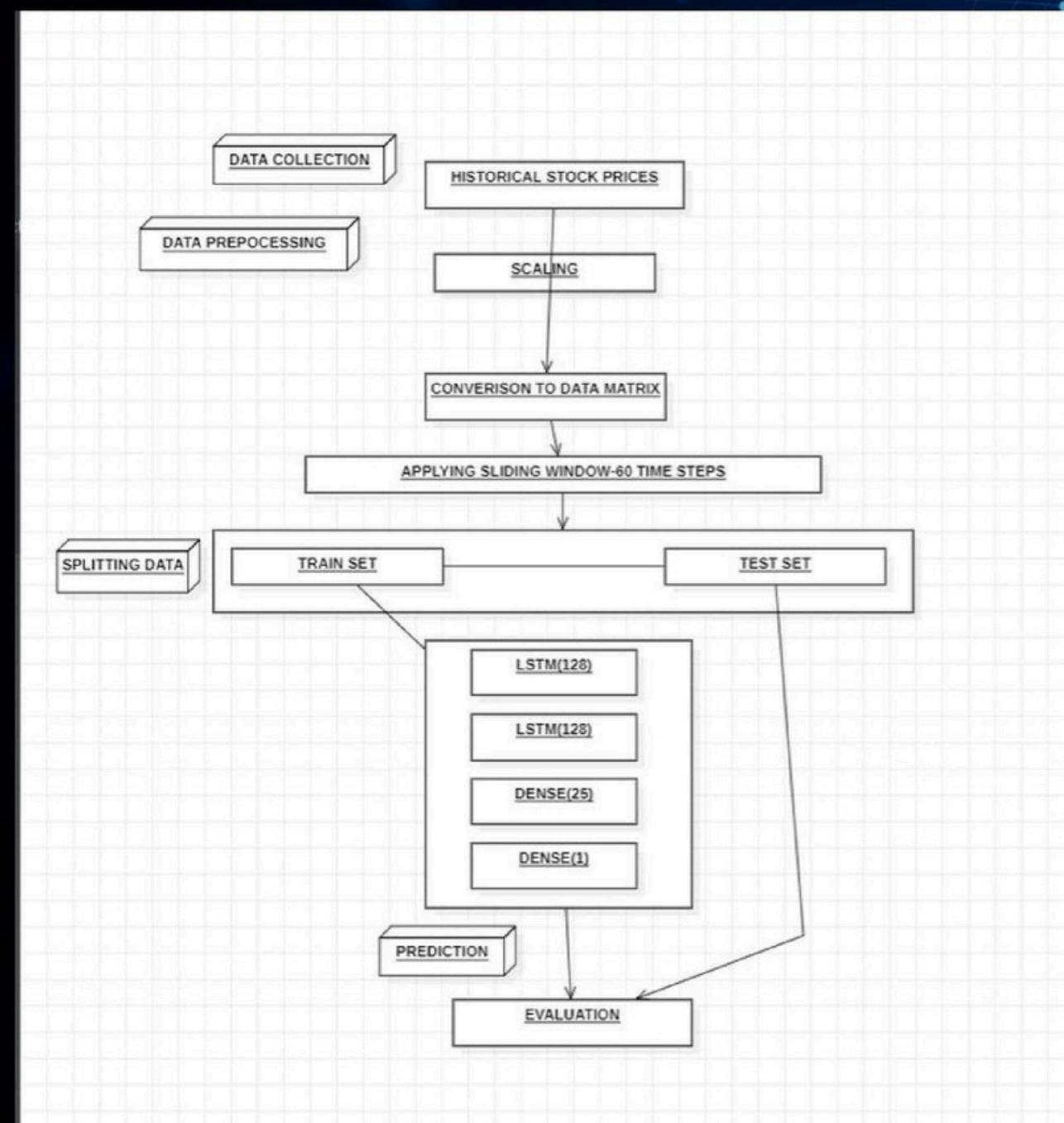
The primary objective of stock prediction using LSTM is to forecast future prices or trends in the stock market.

Specifically, the objectives can be:

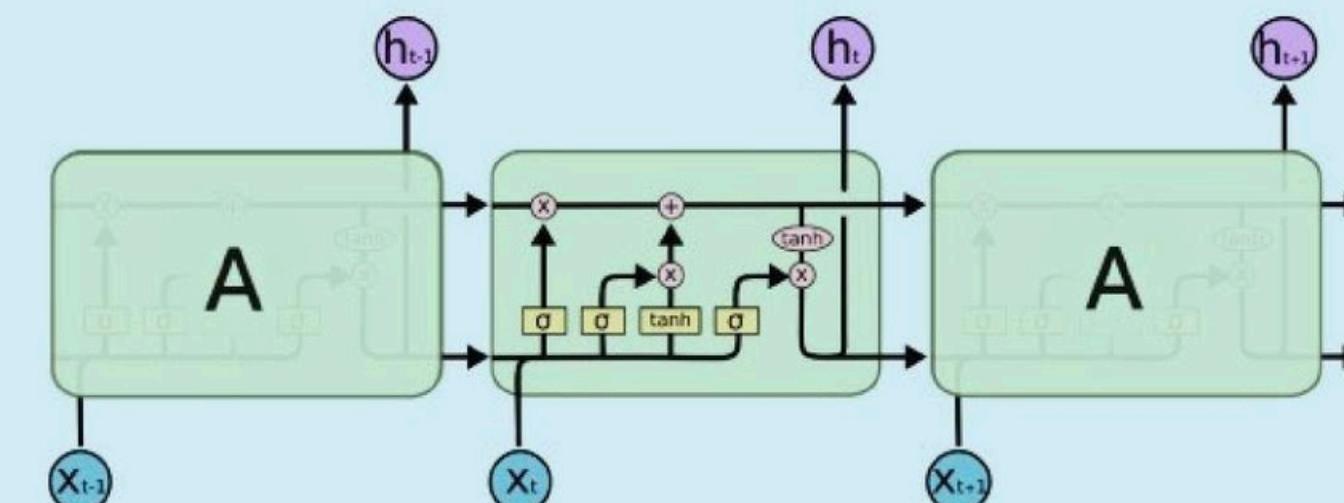
- Short-term prediction
- Long-term prediction
- Risk management
- Market analysis



Architecture Diagram



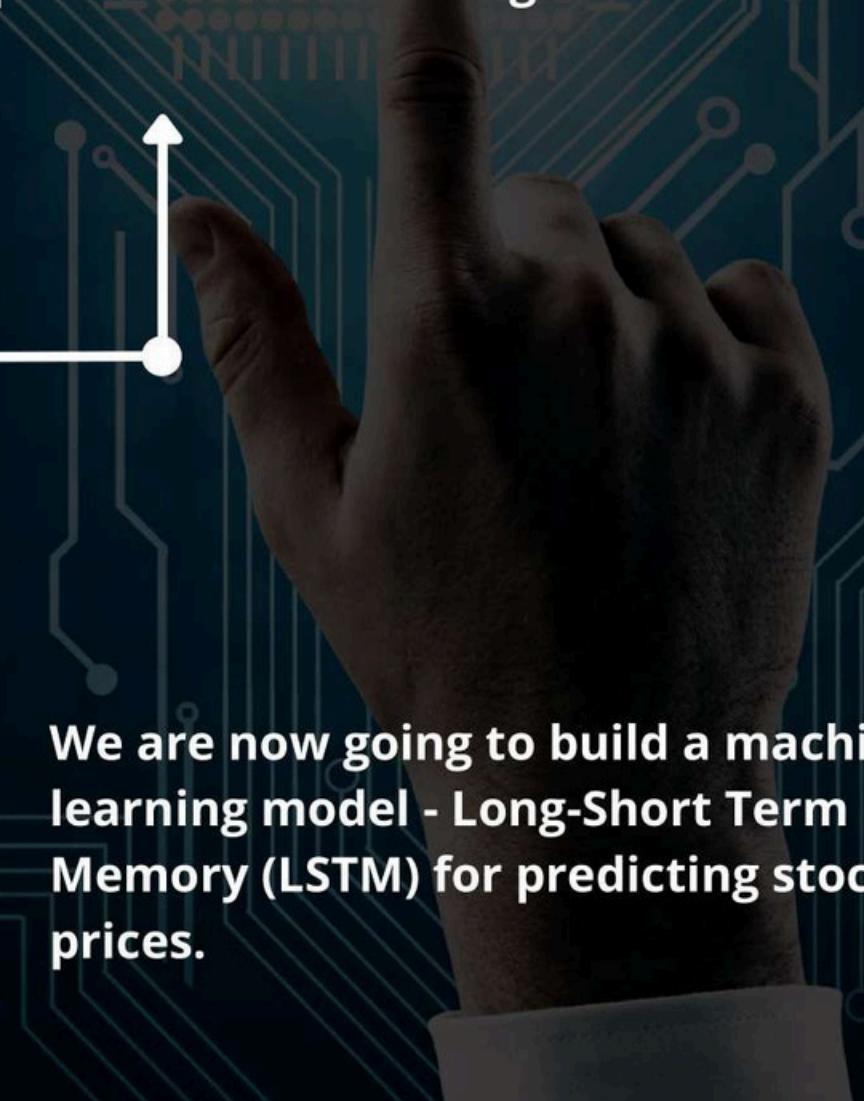
LSTM Architecture



Modules

- **Task 1** - Getting started with required files and dependencies
- **Task 2** - Creating a basic website layout
- **Task 3** - Styling the application's web page
- **Task 4** - Generating a company's information and graphs
- **Task 5** - Creating the machine learning model

We are going to use the `yfinance` python library to get company information (name, logo, and description) and stock price history. Dash's callback functions will be used to trigger updates based on changes in inputs.



We are now going to build a machine learning model - Long-Short Term Memory (LSTM) for predicting stock prices.

METHODOLOGY

1. Collect Data: Obtain historical stock prices from sources like Yahoo Finance.
2. Preprocess Data: Clean and format the data into a time-series.
3. Feature Engineering: Create features such as moving averages and RSI.
4. Build Model: Use Keras/TensorFlow to create an LSTM model.
5. Train Model: Optimize using techniques like gradient descent.
6. Evaluate Model: Use metrics like MAE and RMSE on a test set.
7. Predict: Make future stock price predictions.
8. Visualize: Compare predictions with actual prices.
9. Conclude: Summarize findings and discuss future applications.

Graph Analysis



Close Price Graph Of Apple Stocks



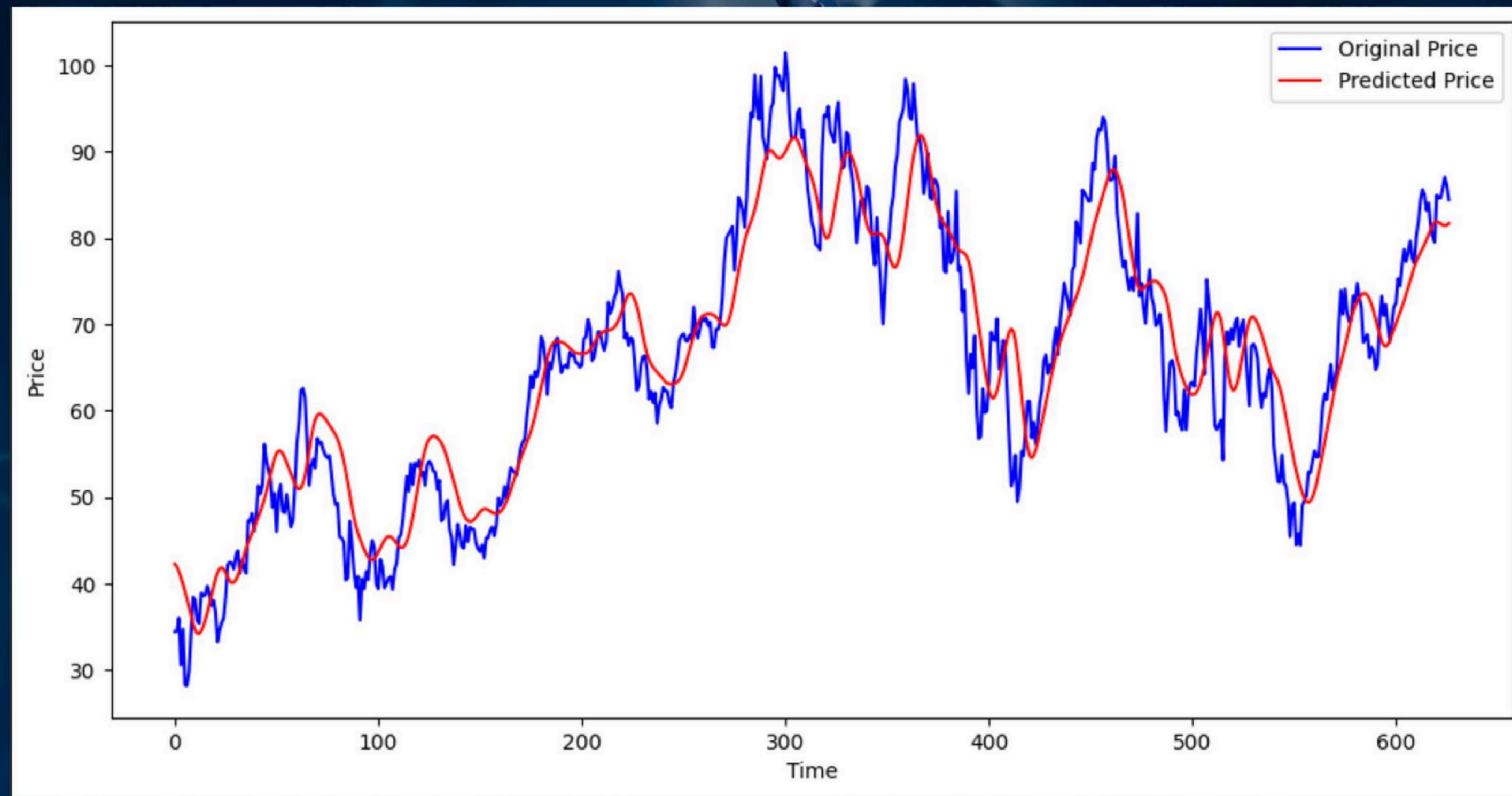
Moving Averages Graph For 100 Days



Comparision Of 100 Days And 200 Days Moving Averages



Results - Original Price Vs Predicted Price



FUTURE ENHANCEMENT

- 1. Feature Engineering:** Investigate and incorporate additional relevant features like news sentiment, corporate events, or geopolitical factors to improve accuracy.
- 2. Model Architecture:** Experiment with different LSTM models (e.g., bidirectional LSTMs) and other RNN variants (e.g., GRUs).
- 3. Ensemble Methods:** Use ensemble techniques, combining LSTM predictions with other machine learning methods (e.g., random forests, gradient boosting).
- 4. Hyperparameter Tuning:** Optimize the number of hidden layers, learning rate, batch size, and regularization techniques.

Thank You!