Problem Statement

Stock Price Forecasting Accuracy Using Machine Learning Models

Background: Investors and financial analysts often rely on accurate stock price predictions to make informed decisions regarding buying, holding, or selling stocks. Traditional forecasting methods sometimes fall short in capturing complex market patterns and volatility. With advancements in machine learning, it is now possible to leverage sophisticated algorithms to improve the accuracy of stock price predictions.

Objective: The objective of this project is to develop a robust application that accurately forecasts stock prices using historical data and multiple machine learning algorithms. The application should also provide clear visualizations and actionable recommendations based on forecasted trends.

Key Challenges:

- **Data Acquisition:** Ensuring reliable and timely fetching of historical stock data.
- **Data Processing:** Handling different intervals (minute-level and daily) and ensuring data consistency.
- **Model Selection:** Choosing appropriate machine learning models that can effectively capture market trends and patterns.
- **Prediction Accuracy:** Minimizing prediction errors to enhance the reliability of forecasts.
- **User Interface:** Creating an intuitive and user-friendly interface for inputting stock symbols and date ranges, and for visualizing the results.
- **Recommendations:** Providing actionable insights and recommendations based on forecasted stock trends.
    - ARIMA (AutoRegressive Integrated Moving Average)
    - Linear Regression
    - LSTM (Long Short-Term Memory)

Error Metrics:

Calculate and display error metrics for each model to assess prediction accuracy.

Expected Outcomes:

- A functional application that fetches, processes, and visualizes stock data.
- Accurate stock price forecasts using ARIMA, Linear Regression, and LSTM models.
- Clear visualizations that help users understand historical trends and future predictions.
- Actionable recommendations to assist users in making informed investment decisions.
- Comparative analysis of different forecasting models based on their prediction accuracy.