Stock Market Forecasting Using LSTM

Project Overview

This project presents a **Streamlit web application** that utilizes **Long Short-Term Memory (LSTM)** neural networks to predict stock market prices based on historical data. The application allows users to:

- Upload stock data

- Visualize price trends

- Train an LSTM model

- Evaluate performance

- Predict future stock prices based on user inputs

Features

- **Data Upload**: Users can upload a CSV file containing stock market data.

- **Data Visualization**: The application plots the **normalized closing prices** over time.

- **LSTM Model Training**: Enables training on uploaded data to learn patterns.

- **Performance Metrics**: Shows **MAE** and **RMSE** for model evaluation.

- **Future Price Prediction**: Accepts statistics like previous close, open, high, low, and volume for prediction.

Installation

1. **Clone the Repository:**

   ```
   git clone https://github.com/Tesa2035/Stock-Market-Forecasting3.git
   ```

2. **Navigate to the Project Directory:**

   ```
   cd Stock-Market-Forecasting3
   ```

3. **Create Virtual Environment:**

   ```
   python3 -m venv venv
   source venv/bin/activate   # Windows: venv\Scripts\activate
   ```

4. **Install Requirements:**

   ```
   pip install -r requirements.txt
   ```

Usage

Run the Application

```
streamlit run app.py
```

Interact with the App

- **Upload Data**: Ensure the file contains columns: `date, open, high, low, close, adjclose, volume`.

- **Visualize Data**: Normalized closing prices are plotted.

- **Train Model**: Automatically preprocesses and trains the LSTM model.

- **Predict Prices**: Enter relevant stock metrics to forecast next price.

Data Preparation

- **Format**: CSV with columns — `date, open, high, low, close, adjclose, volume`.

- **Date Format**: Ensure date is in `YYYY-MM-DD`.

- **Missing Values**: Clean the data before upload.

- **Frequency**: Use daily time series data.

Model Details

- **Architecture**:

  - 2 LSTM layers with 50 units
  - Dense layer with 25 units
  - Dense output layer with 1 unit

- **Sequence Length**: Uses past 10 days to predict the next closing price.

- **Scaling**: All features are Min-Max scaled to range [0, 1].

Screenshots

- **Figure 1**: Normalized Closing Price Over Time

- **Figure 2**: LSTM Model Training Progress

- **Figure 3**: Future Price Prediction Interface

Repository Link

https://github.com/Tesa2035/Stock-Market-Forecasting3