Stock Market Analysis Using LSTM

Introduction

This project implements a machine learning pipeline to predict stock prices using Long Short-Term Memory (LSTM) models. The pipeline includes data preprocessing, model training, evaluation, prediction, and visualization**.**

In financial markets, predicting stock prices has always been a challenging yet crucial task for investors and traders. With the vast amount of historical data available, understanding trends and making informed predictions can significantly enhance investment strategies. However, traditional analysis methods often fall short of capturing the complex patterns in stock price movements.

This project addresses this challenge by leveraging advanced machine learning, specifically LSTM (Long Short-Term Memory) models, to predict stock prices based on historical data. The application provides an intuitive and user-friendly interface where users can analyze stock trends, predict future prices, and visualize results interactively.

By combining secure user authentication, robust predictive models, and dynamic visualizations, this software empowers users with actionable insights into the financial markets. It bridges the gap between sophisticated analytics and accessibility, making predictive tools available to both novice and experienced traders alike.

Data Source:

The stock data used in this project is sourced from Kaggle, a widely recognized platform for sharing datasets and conducting data science competitions. Specifically, this dataset contains Nasdaq stock market data, covering historical stock prices for various companies from their origins up until 2022.

Key Features of the Dataset:

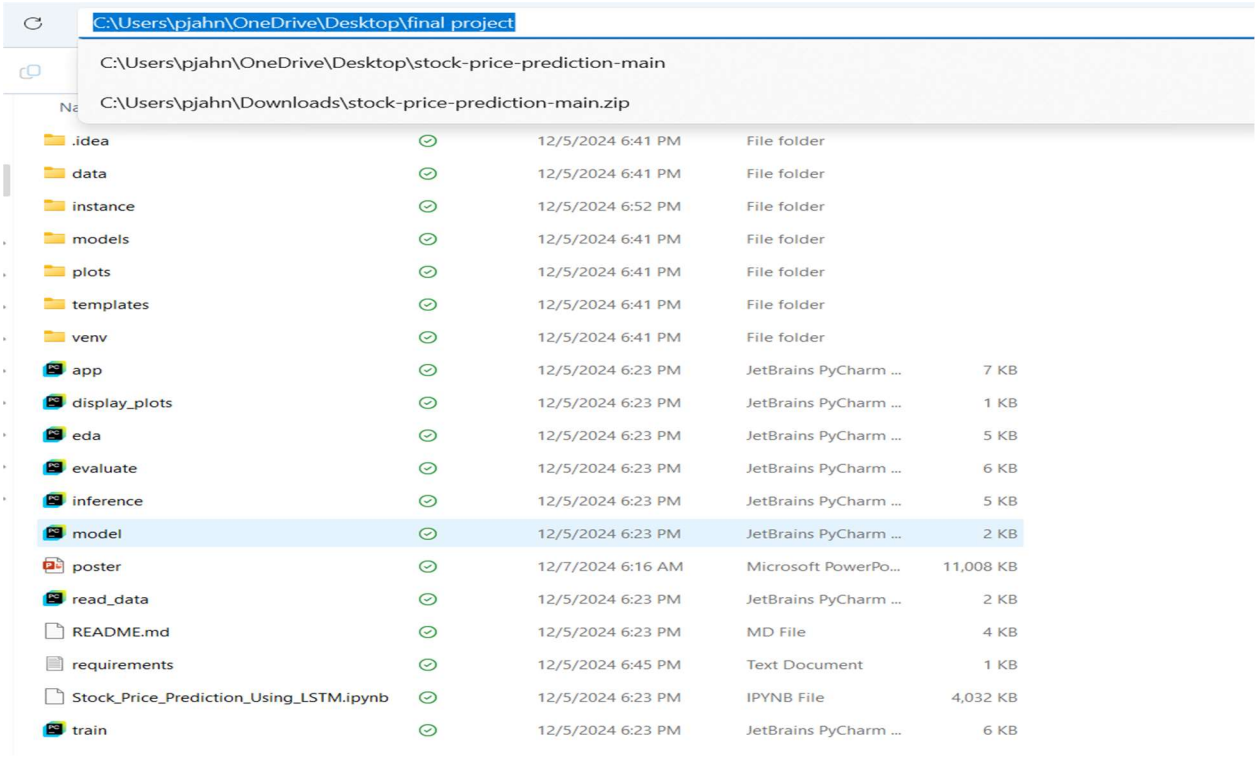
Comprehensive Coverage: Includes data from the inception of the companies listed on Nasdaq up to 2022, offering a detailed view of historical price trends.

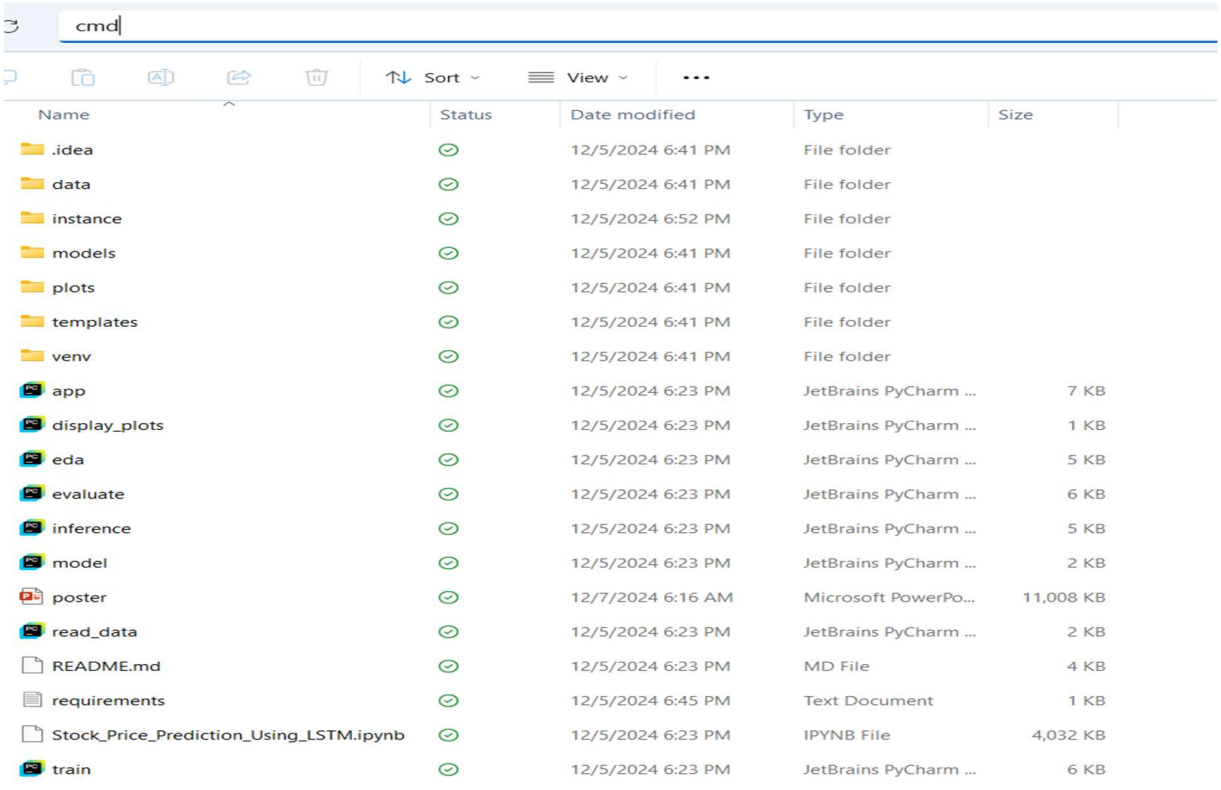
Data Points: Features critical metrics such as opening price, closing price, highest price, lowest price, and trading volumes.

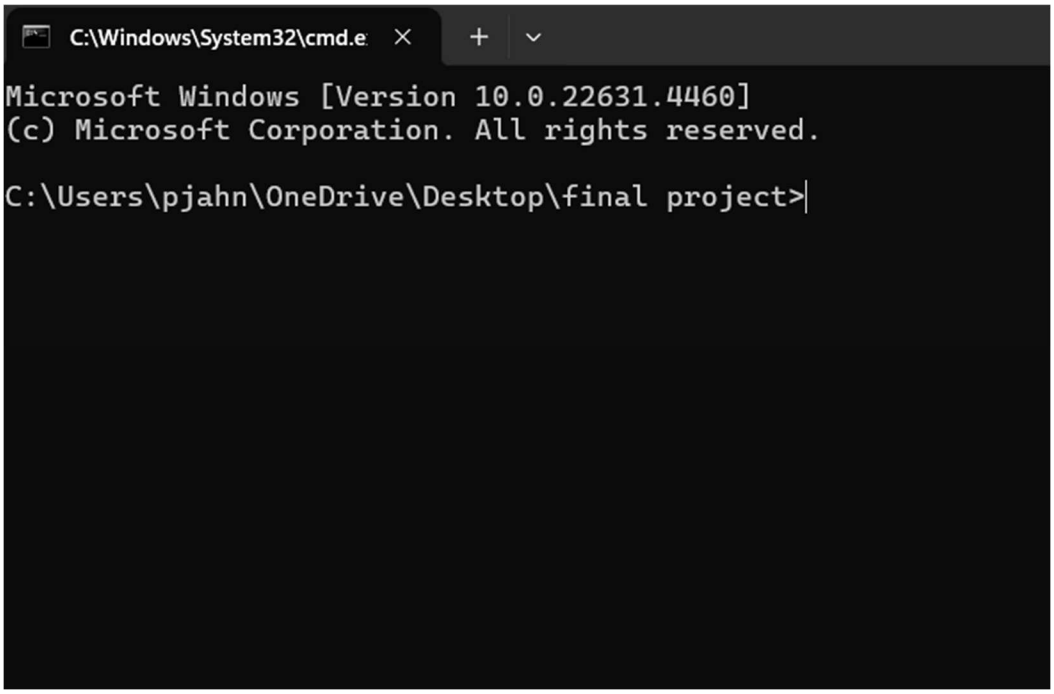
High Quality: The dataset is well-organized and cleaned, making it ideal for machine learning applications like stock price prediction.

How to run the code:

Navigate to the file location and open it in the command prompt as follows.







Next, locate the requirements.txt file in the directory and install the dependencies using the following command.

pip install -r requirements.txt

This command will install all the dependencies required to run the code.

Run the Application:

- Execute the following command to start the Flask application:

Bash **python app.py**

Server Information:

- Once the application starts:
    - It will show a message indicating that the Flask app is running in debug mode.
    - The server will be available at: http://127.0.0.1:5000

Access the Application:

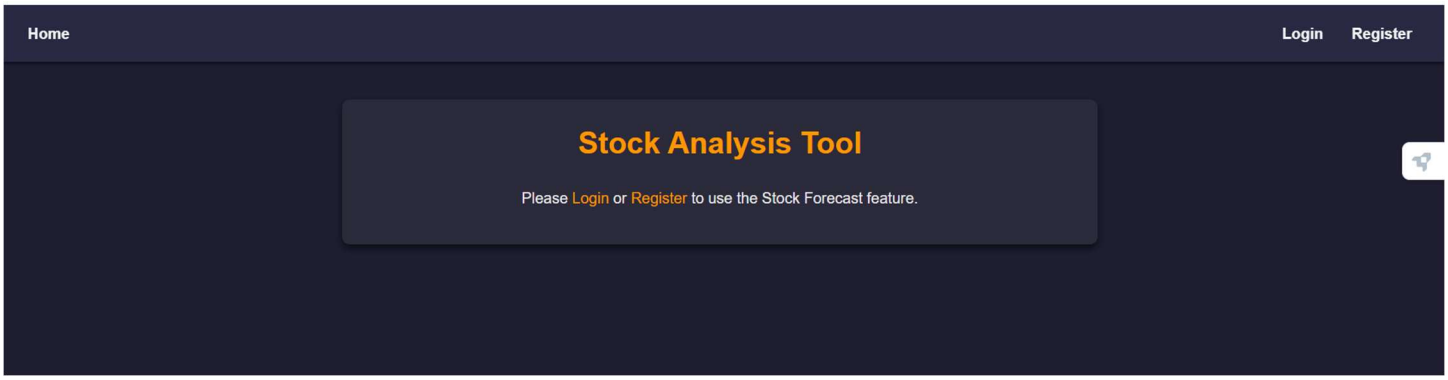
- Open a web browser and go to http://127.0.0.1:5000 to interact with the application.

Stopping the Server:

- To stop the server, press CTRL + C in the command prompt.

```
C:\Users\pjahn\OneDrive\Desktop\final project>python app.py
2024-12-08 04:12:27.005441: I tensorflow/core/util/port.cc:153] oneDNN custo
2024-12-08 04:12:33.967344: I tensorflow/core/util/port.cc:153] oneDNN custo
ating-point round-off errors from different computation orders. To turn them
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deploym
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with stat
2024-12-08 04:12:48.575266: I tensorflow/core/util/port.cc:153] oneDNN custo
ating-point round-off errors from different computation orders. To turn them
2024-12-08 04:12:50.539120: I tensorflow/core/util/port.cc:153] oneDNN custo
ating-point round-off errors from different computation orders. To turn them
 * Debugger is active!
 * Debugger PIN: 135-346-524
127.0.0.1 - - [08/Dec/2024 04:13:34] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [08/Dec/2024 04:13:37] "GET / HTTP/1.1" 200 -
```

Open the application :



Conclusion:

This project brings together the power of machine learning and web development to create an easy-to-use stock price prediction platform. Using advanced LSTM models, the application provides users with accurate stock forecasts while presenting the results through clear and interactive charts.

With features like secure user login, a simple dashboard, and seamless backend processing, the system is designed to make complex stock analysis accessible to everyonefrom beginners to seasoned investors. It simplifies the process of analyzing trends and predicting prices, helping users make smarter financial decisions.

This application is not just a tool for today but a foundation for future growth. With its flexible design, it can be expanded with new features to adapt to the evolving needs of users and the fast-changing financial world. It’s a step toward making advanced analytics available to everyone.