

STAYUP

- By Nicholas DeMeo
- ndemeo25@gmail.com
- supervised by Professor Hui Chen
- chen@sci.Brooklyn.cuny.edu



ABSTRACT

StayUp is a machine learning-driven web application designed to predict stock prices using Long Short-Term Memory (LSTM) neural networks. By leveraging historical stock data from Yahoo Finance, the project aims to provide investors with an intuitive tool for analyzing trends, visualizing data, and making informed financial decisions. The application will be developed using Streamlit for an interactive user experience, making stock market analysis accessible even to non-technical users. This project aligns with the growing need for data-driven investment strategies, combining machine learning, finance, and user-friendly web technology.

TOOLS

Software:

- **Python** (Version 3.x) – Primary programming language
- **NumPy** – Numerical computing and array manipulation
- **Pandas** – Data manipulation and analysis
- **Matplotlib & Seaborn** – Data visualization
- **Scikit-learn** – Machine learning utilities
- **TensorFlow/Keras** – Building and training LSTM neural networks
- **Pandas DataReader** – Fetching financial data from Yahoo Finance
- **Streamlit** – Creating the web application interface
- **Jupyter Notebook** – Prototyping and testing models
- **Git/GitHub** – Version control and collaboration

Hardware:

- **Laptop/Desktop** (Minimum: 8GB RAM, Recommended: 16GB RAM for faster training)
- **GPU (Optional but recommended)** – For faster model training (e.g., NVIDIA GPU with CUDA support)

DIAGRAMS



System Architecture Diagram

(Illustrating data flow: Data retrieval → Preprocessing → LSTM Model → Web Application)



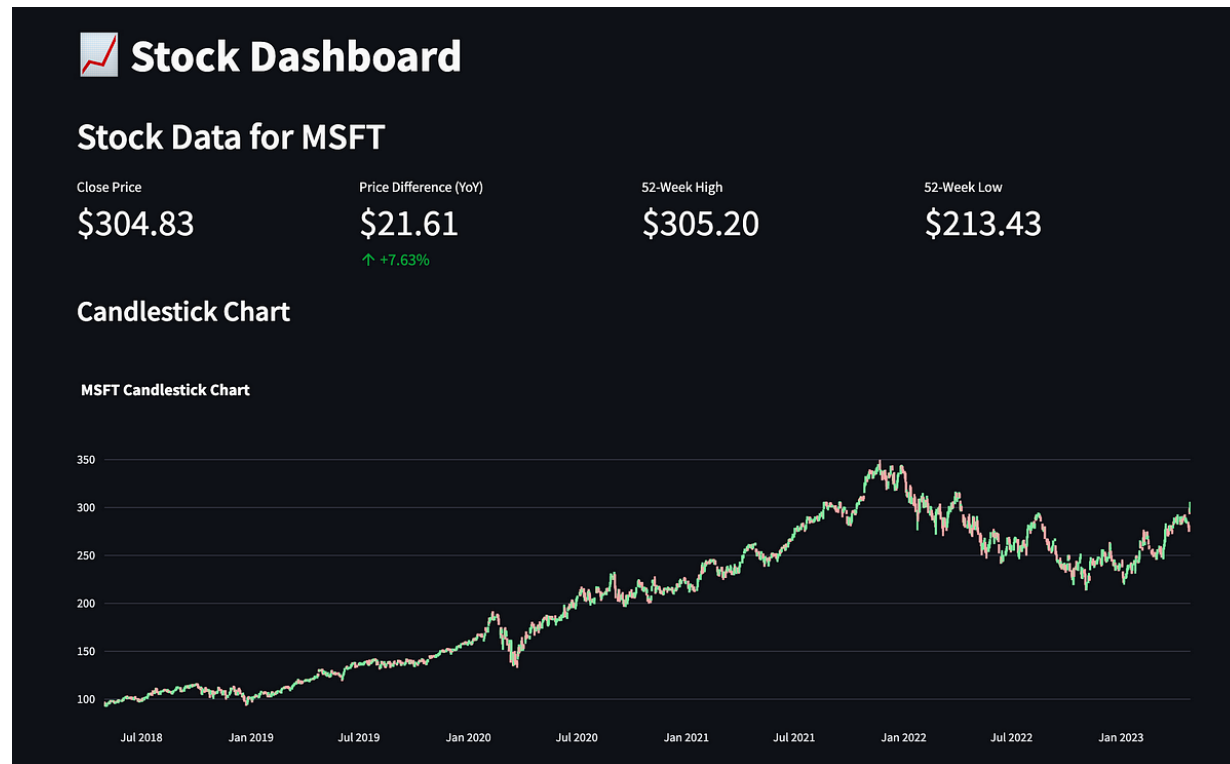
Machine Learning Workflow

(Data Collection → Data Preprocessing → Model Training → Model Evaluation → Deployment)

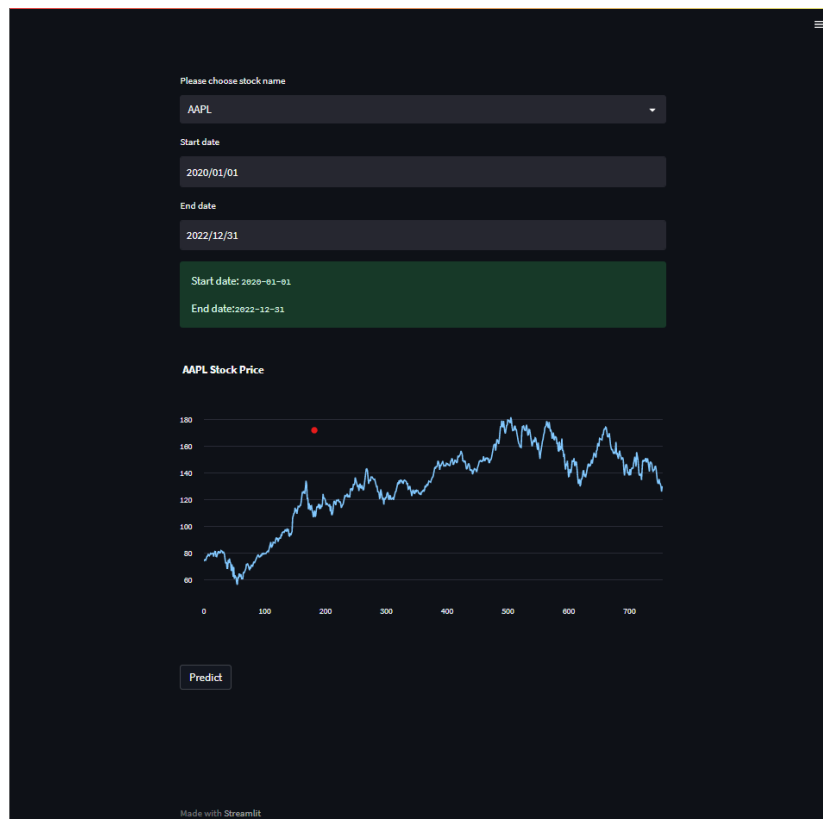


Web Application UI Wireframe (Sketch of how users will interact with the app)

DESIGN EXAMPLES (NOT MINE)

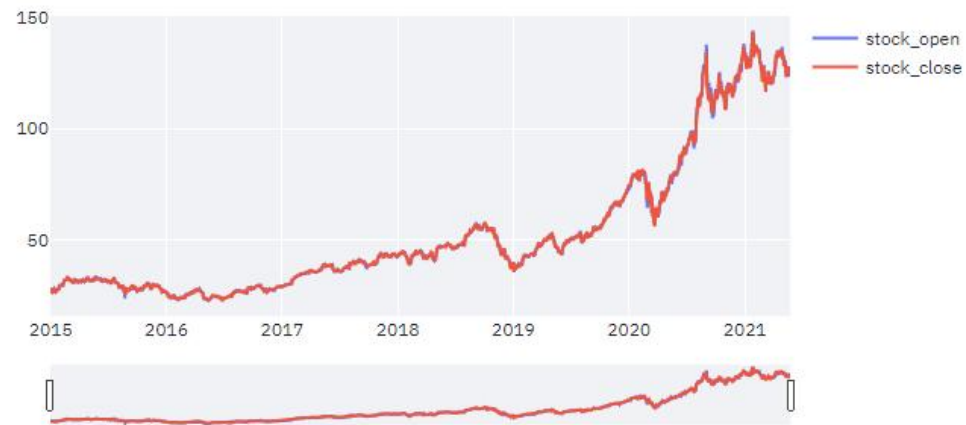


DESIGN CONTINUED



DESIGN CONTINUED

Time Series Data



SCHEDULE

Week	Task	Estimated Time
1-2	Research & Data Collection	1-2 weeks
3-4	Data Preprocessing & Feature Engineering	1-2 weeks
5-6	Model Selection & Training (LSTM Implementation)	2 weeks
7	Model Evaluation & Optimization	1 week
8	Web Application Development (Streamlit)	1 week
9	Integrating Model with Web App	1 week
10	UI/UX Improvements & Testing	1 week
11	Final Testing & Debugging	1 week
12	Project Presentation & Submission	1 week

DATA SOURCES

I will be using Yahoo Finance API as a data source. It is essential as it provides access to historical stock data and past trends.

USE CASES



Investor Analysis

Input: User selects a stock symbol (e.g., AAPL), date range, and prediction interval.

Process: The system retrieves historical data, preprocesses it, and runs it through the LSTM model.

Output: The predicted stock price is displayed alongside historical trends and visualizations.



Portfolio Management Support

Input: Users enter multiple stock symbols and investment horizon.

Process: The system predicts stock price movements and suggests potential high-performing stocks.

Output: Users receive trend analysis and insights for portfolio adjustments.



Backtesting & Strategy Validation

Input: Users input custom strategies or select predefined ones (e.g., moving average crossover).

Process: The system simulates past performance based on historical stock prices.

Output: Users can compare predicted versus actual stock movements for strategy validation.

FINAL THOUGHTS



Personally, I wanted to complete this project to learn something new and use the skills I learned to make something I can call my own. I also want to thank Professor Chen for his willingness to help me accomplish my goals.