

Stock Market Price Prediction Using LSTM

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Portfolio Website

Live Dashboard

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1 Abstract

This project presents a robust LSTM-based system for multi-stock price prediction. It integrates historical OHLCV data with technical indicators to forecast closing prices across major tickers like AAPL, GOOGLE, and TSLA. The pipeline includes data preprocessing, time series modeling, evaluation with accuracy metrics, and a fully responsive frontend dashboard hosted online.

2 Introduction

Stock market forecasting is inherently complex due to nonlinear patterns, noise, and dynamic dependencies. Traditional models often fail to capture these intricacies. By leveraging Long Short-Term Memory (LSTM) networks, this project addresses long-term dependencies in time series forecasting. The integration of a web-based dashboard further enhances accessibility and visualization.

3 Literature Survey & Objectives

3.1 Literature Insights

- “LSTM Fully Convolution Networks” highlight deep learning’s impact on time series modeling.
- Recurrent models struggle with vanishing gradients, tackled by architectures like LSTM and GRU.
- Previous efforts show high theoretical potential but limited real-time deployment.

3.2 Project Objectives

- Predict future stock prices using multivariate time series and LSTM.
- Evaluate model accuracy across various tickers.
- Deploy results in a public dashboard with charts and metrics.

4 Technology Stack

Tool	Role
Python	Core programming language
NumPy / Pandas	Data manipulation
TensorFlow / Keras	LSTM model training
Matplotlib	Chart generation
Chart.js / Plotly.js	Web dashboard visuals
Jupyter / Colab	Interactive development environment
HTML / CSS / JS	Frontend dashboard development

5 Data Sources

All datasets used in this project were sourced from Kaggle and free sources on the internet.
List of data files:

- AAPL.csv
- AMAZON.csv
- GOOGLE.csv
- MSFT.csv
- NETFLIX.csv
- TSLA.csv
- UBER.csv
- WALMART.csv

6 Proposed Model & Implementation

Pipeline Overview:

[Raw CSV] → [Preprocessing] → [Scaling + Sequencing] → [LSTM Model]
[LSTM Model] → [Inverse Scaling] → [Predictions CSV & JSON] → [Dashboard]

Workflow Diagram:

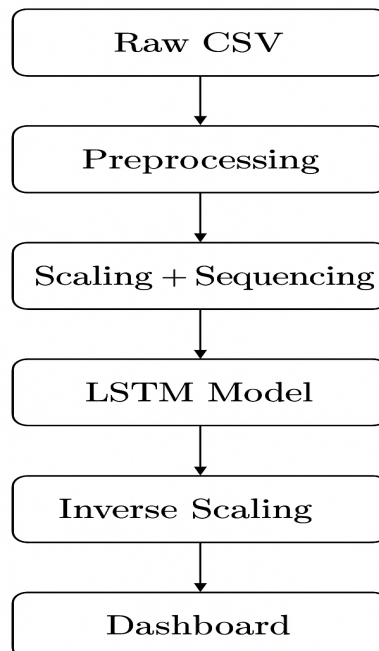


Figure 1: Workflow of the Stock Market Prediction Project Using LSTM

- Model: Stacked LSTM layers with dense output
- Sequence Length: 60 time steps
- Output: Predicted closing price
- Export Format: CSV and JSON
- Visualization: PNG charts and dashboard interface

7 Results & Accuracy Analysis

Accuracy Leaderboard

Rank	Ticker	MAE	RMSE	R ²	Accuracy (%)
1	WALMART	1.14	1.70	0.9963	98.86
2	GOOGLE	20.11	28.01	0.9979	98.35
3	AMAZON	34.43	49.03	0.9976	97.83
...	Others

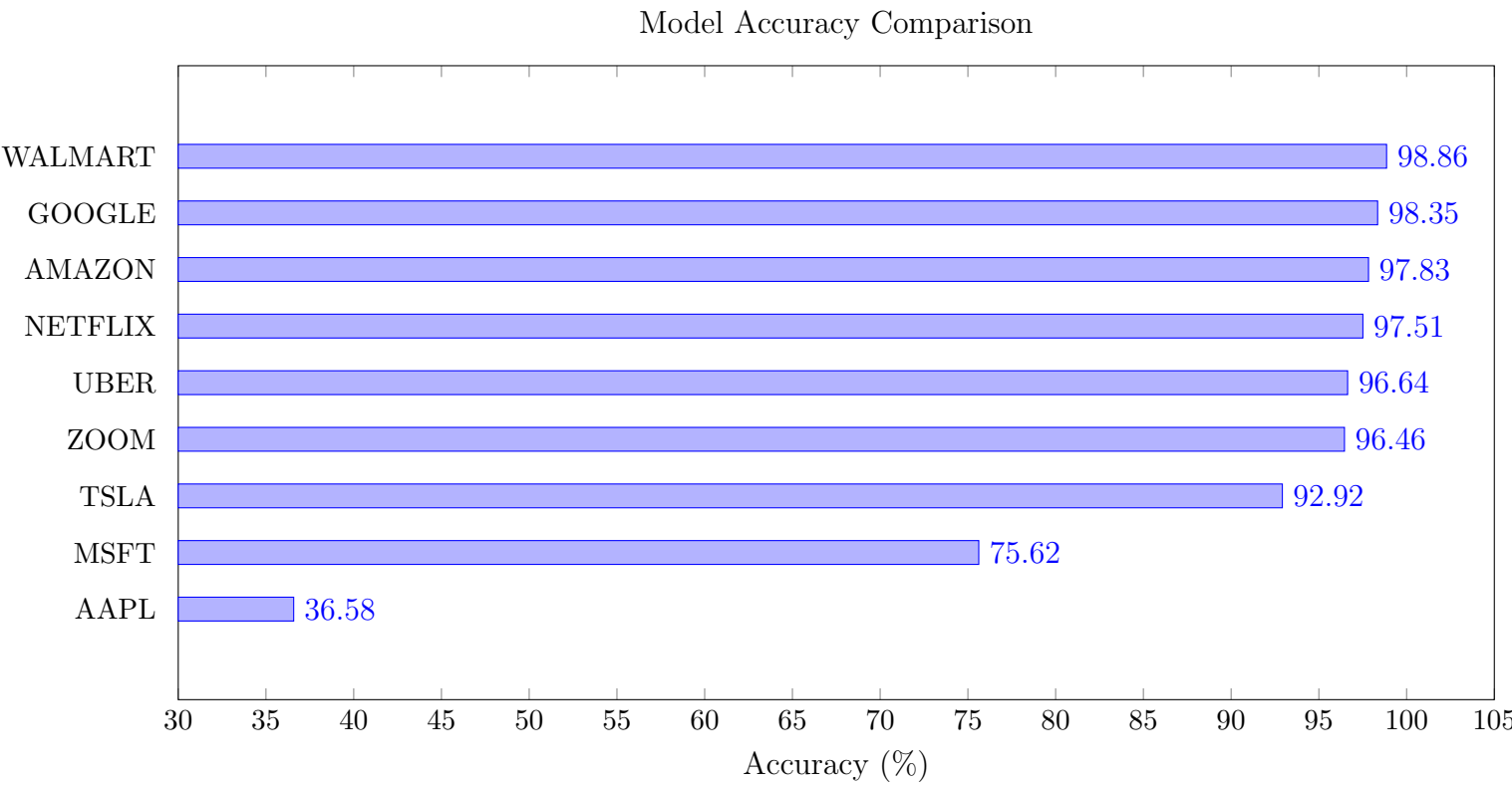


Figure 2: Accuracy Visualization Across Stock Tickers

- Metrics saved in `metrics.json`
- Charts stored in `/charts` folder
- Dashboard: Live Dashboard

Advantages

- Handles long-term temporal dependencies
- Scalable for multi-stock datasets
- Dashboard-ready output with metrics and visual plots

Limitations

- Real-time prediction not implemented yet
- Accuracy varies based on stock volatility

8 Conclusion & Future Scope

This project demonstrates the viability of LSTM for financial forecasting. Future improvements include:

- Real-time data streaming
- Integration with trading APIs
- Ensemble models or Transformer architectures
- Expanded technical indicators & global index forecasting

9 References

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”The End”