STOCK MARKET PREDICTION USING LSTM

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ABSTRACT

This project aims to analyze historical stock market data and predict future stock prices using Long Short-Term Memory (LSTM), a type of Recurrent Neural Network (RNN) known for its ability to handle sequential data. The model learns from historical patterns of stock prices and generates predictions that can assist investors and analysts in decision-making. Using Python, TensorFlow/Keras, and real-time stock market APIs, this solution offers a user-friendly interface for analyzing, visualizing, and forecasting stock prices.

INTRODUCTION

The stock market is volatile and influenced by various factors. Traditional prediction models struggle with sequential dependencies in financial data. This project addresses the issue using LSTM networks that capture temporal patterns for more accurate forecasting. The tool benefits investors, researchers, and enthusiasts by offering reliable short-term stock predictions with interactive visualizations.

METHODOLOGY

- Data Collection: Fetched stock price data using yfinance API.
- Data Preprocessing: Scaled data using MinMaxScaler; prepared sequences for training.
- Model Design: Implemented LSTM layers in Keras; tuned hyperparameters for accuracy.
- Training & Validation: Split data into training and testing sets; trained with epochs and batch sizes.
- Prediction & Evaluation: Used RMSE and graphs to compare predicted vs actual prices.
- Visualization: Matplotlib and Seaborn for plotting trends and evaluation metrics.
- Deployment: Developed interactive UI on Google Colab for user interaction and real-time predictions.

MODEL

- INPUT: HISTORICAL STOCK DATA (OPEN, HIGH, LOW, CLOSE)
- OUTPUT: PREDICTED FUTURE STOCK PRICES
- LIBRARIES: TENSORFLOW, KERAS, YFINANCE, NUMPY, MATPLOTLIB, SEABORN, SKLEARN
- FEATURES: REAL-TIME FETCHING, ROLLING PREDICTIONS, COMPARATIVE GRAPHS

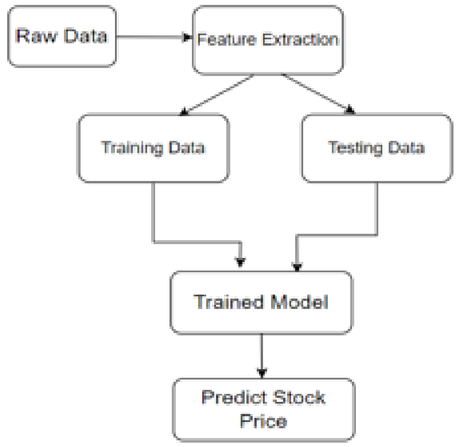
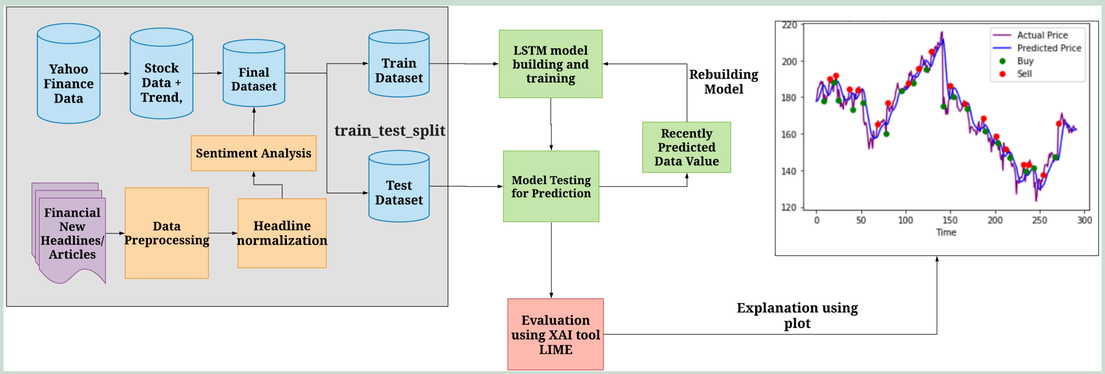


Fig.1. Flow chart of Prediction model

ARCHITECTURE DIAGRAM



RESULT

- ACCURATELY PREDICTED SHORT-TERM STOCK PRICE TRENDS FOR MULTIPLE COMPANIES.
- ACHIEVED LOW RMSE VALUES INDICATING MODEL RELIABILITY.
- ENABLED REAL-TIME VISUALIZATION AND COMPARISON.
- IMPROVED DATA-DRIVEN DECISION MAKING FOR USERS.

CONCLUSION

This project demonstrates the effectiveness of LSTM in stock price forecasting. By leveraging historical data and deep learning, the model provides reliable predictions, helping users reduce financial risks. With potential enhancements like sentiment analysis and multi-variable inputs, it can become a comprehensive financial forecasting tool.

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