

Stock Trend Prediction Web Application (LSTM)

1. Executive Summary:

This project aims to develop web application to predict stock prices and trends based on historical stock market data with deep learning-based solution Long Short-Term Memory (LSTM) networks. This streamlit web application presenting stock trends and predicted outcomes built based on leveraging the sequential learning capabilities of LSTM models to achieve accurate forecasting, which can aid investors and analysts in decision-making.

2. Problem Statement:

Predicting stock prices is a challenging task due to their volatile and non-linear nature. This project aims to develop a web application to predict stock trends for educational purposes, demonstrating the application of deep learning in financial forecasting using Long Short-Term Memory (LSTM) model.

3. Data Sources

- Primary Source: Publicly available historical stock market data from platforms such as Yahoo Finance.
- Features Used: Open, Close, High, Low prices, trading volume, and other financial indicators.

4. Methodology:

1. Data Collection and Preprocessing
 - Collect historical stock price data.
 - Normalize and structure the dataset for sequential input.
2. Model Development
 - Build and train an LSTM model to capture temporal dependencies in the data.
 - Optimize hyperparameters for improved performance.
3. Model Evaluation
 - Evaluate the model using metrics such as Mean Squared Error (MSE) and visualizations of predicted vs. actual values.
4. Visualization and Reporting
 - Present findings through charts, graphs, and a detailed report.
5. Development of Web Application:
 - Develop streamlit web application to obtain stock details from user.
 - Present findings of requested input stocks using LSTM Model on web application
 - Present Predicted vs Original Details of the requested stock on web application

5. Expected Outcomes

- Development of LSTM-based model capable of predicting stock prices for educational purposes.
- Development of streamlit Web Application for obtaining user inputs and presenting insights based on machine learning model
- Insights into the effectiveness of deep learning models in time-series forecasting.
- A foundation for understanding the application of machine learning in financial data analysis.

6. Risks and Challenges

1. Overfitting: The model may overfit the training data due to limited datasets or noise.
2. Data Quality: Incomplete or inconsistent data can affect prediction accuracy.
3. Model Complexity: Proper tuning and architecture design are critical for the success of LSTM models.
4. Interpretability: Understanding deep learning models can be challenging compared to traditional methods.

7. Conclusion

This project will demonstrate the potential of LSTM models in predicting stock trends by leveraging historical market data on Web Application. While the model's predictions are not intended for real-world financial decisions, the project provides valuable insights into time-series analysis and the application of machine learning techniques.