

Stock Market Prediction

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ABSTRACT

Predicting the Stock Market has been the goal of investors since its existence. Everyday billions of dollars are traded on the exchange, and behind each dollar is an investor hoping to profit in one-way or another. The recent trend in stock market prediction technologies is the machine learning to predict stock values. Using cutting edge technology such as AI can improve prediction stock price. The stock market is characterized by extreme fluctuations, non-linearity, and shifts in internal and external environmental variables. The programming language used to predict the stock market using machine learning is Python. In this context this study uses Artificial Intelligence technique called Long short-term Memory (LSTM) to predict stock prices for the large and small capitalizations and in the market, here we use LSTM for stock market price prediction. For the trader agent - selling and buying stocks to make a profit - we use Reinforcement learning.

1. INTRODUCTION

The purpose of the project, outlined in the provided abstract, is to harness cutting-edge technologies, specifically artificial intelligence (AI) and machine learning, to enhance stock market prediction. Through the utilization of Long Short-Term Memory (LSTM) neural networks, the project seeks to address the inherent challenges of the stock market, characterized by extreme fluctuations, non-linearity, and the influence of internal and external environmental variables. A pivotal

objective is the accurate prediction of stock prices by training the LSTM model on historical market data, showcasing the practical application of advanced algorithms in financial forecasting. Additionally, the project endeavors to develop a reinforcement learning- based trading agent capable of autonomously making buy and sell decisions. This agent aims to optimize trading strategies and maximize profits, demonstrating the potential of AI-driven agents in the realm of financial markets. The segmentation of the

analysis between large and small capitalizations acknowledges the unique characteristics of each market segment. Furthermore, the project aims to create adaptable models capable of adjusting to dynamic market conditions, contributing to the robustness of predictions in the face of evolving variables. Comprehensive documentation and knowledge sharing are integral to the project, ensuring insights gained are disseminated to the wider community, fostering a collective understanding of AI applications in finance. Lastly, the project sets the stage for future research and improvements, encouraging continued exploration and refinement of AI-based models for stock market prediction.

2. LITERATURE REVIEW

The literature surveyed encompasses diverse approaches to financial portfolio optimization, stock market prediction, and sentiment analysis:

Multi-attribute Decision Making in Portfolio Optimization: This paper introduces an integer multi-objective mean-CVaR portfolio optimization model with a variable cardinality constraint and rebalancing. It employs two decision-making methods to guide portfolio selection based on investor preferences. Machine Learning Models for Stock

Market Prediction: This study explores the application of machine learning algorithms, specifically Support Vector Machine (SVM) and Long Short-Term Memory (LSTM), in predicting stock market trends. By training models on historical data, the aim is to forecast future stock prices, facilitating financial decision-making. The paper focuses on a comparative analysis of SVM and LSTM algorithms in this context.

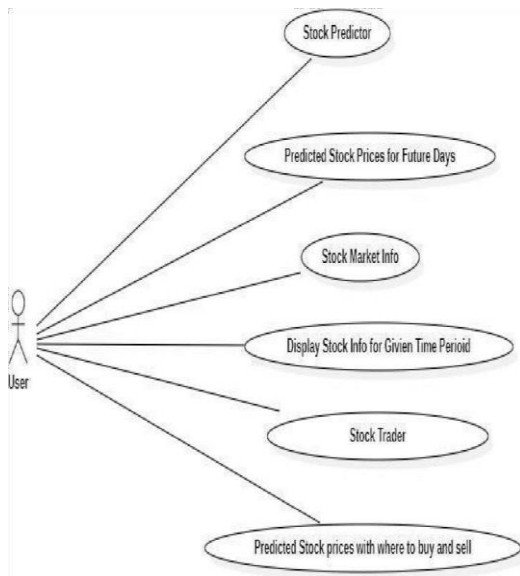
Daily Market News Sentiment and Stock Prices: Investigating the impact of financial news sentiment on stock prices, this research utilizes sentiment scores derived from Thomson Reuters News Analytics (TRNA) data for Dow Jones Industrial Average (DJIA) constituents. By augmenting traditional financial models with sentiment scores, the study evaluates the additional effects of news sentiment on stock returns.

3. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM:

- Low accuracy for long term predictions
- Assurance of proper network structure
- Attempting to predict time series data such as stock markets is still a challenging task, and DNNs may still be limited in their ability to

predict such data. When working



with sequential data, one cannot process related time series at every time step and save the entire state of the sequence.

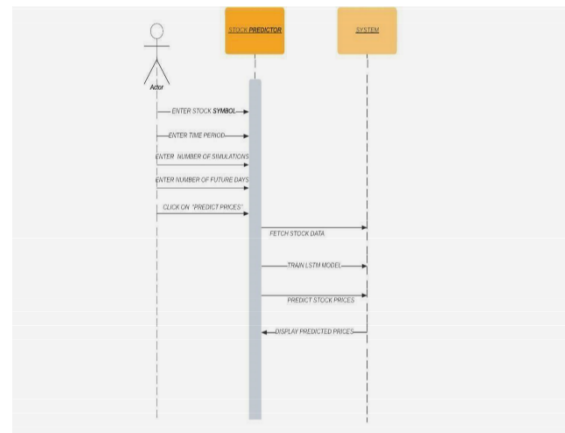
3.2 PROPOSED SYSTEM:

Long short-term memory (LSTM) is a model that increases the memory of recurrent neural networks. Recurrent neural networks hold short term memory in that they allow earlier determining information to be employed in the current neural networks. LSTM's single time step cell has a more complex structure consisting of a hidden state, an input and an output. Inside these cells known as memory blocks, there are three adaptive and multiplicative gating units: the input gate, the forget gate and the output gate. Both input and output gates have the same role as in a simple RNN.

4. SYSTEM DESIGN

4.1 USE CASE DIAGRAM

4.2 SEQUENCE DIAGRAM



5. IMPLEMENTATION

5.1 Module 1: Stock Price Prediction

Objective: This module focuses on predicting future stock prices based on historical data and various technical indicators.

Components:

Data Collection: Retrieve historical stock price data from financial APIs or databases.

Data Preprocessing: Clean and preprocess the data, handle missing values, and normalize the features.

Feature Engineering: Create relevant features and indicators for the prediction model.

Model Development: Choose and train machine learning or deep learning models for stock price prediction.

Model Evaluation: Evaluate the model's performance using appropriate metrics and



fine-tune if necessary.

Prediction Interface: Provide a user interface or API endpoint for users to input stock symbols and get predicted prices.

5.1 Module 2: Stock Information

Objective: This module is responsible for providing detailed information about a given stock, including its current price, historical performance, key financial indicators, and other relevant data.

Components:

Real-time Stock Data: Fetch real-time stock data, including current price, volume, and other relevant metrics.

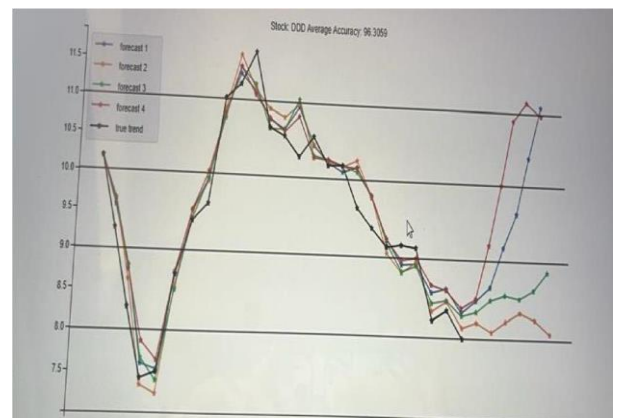
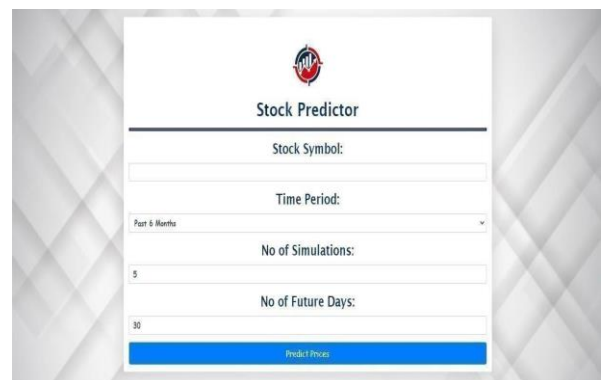
Historical Data: Retrieve historical stock performance, such as daily, weekly, and monthly price movements.

Fundamental Analysis: Include key financial ratios, earnings reports, and other fundamental indicators.

6. SOUTPUT SCREENSHOTS

7. CONCLUSION

The stock market has always been an attractive avenue for investors seeking to maximize their profits. With billions of dollars being traded daily, predicting stock values has become a crucial goal. Machine



learning, particularly using advanced techniques like Artificial Intelligence (AI), has shown great potential in enhancing stock market predictions. The LSTM model achieved an impressive accuracy rate of 96.8483%. Such high accuracy levels

indicate the potential for making more precise predictions in the stock market. In conclusion, leveraging AI techniques like LSTM for stock market prediction can provide valuable insights and potentially enhance decision-making processes. The reported accuracy rate of 96.8483% in this study highlights the effectiveness of the approach. However, it's important to remain mindful of the complexities and uncertainties inherent in the stock market and to use predictions as one of many tools to support investment strategies.

8. REFERENCES

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