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Enhancing Stock Market Analysis & Prediction System with LSTM Model

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Abstract: ***In this report we analyze existing and new methods of stock market prediction. We take three different approaches at the problem: Fundamental analysis, Technical Analysis, and the application of Machine Learning. We find evidence in support of the weak form of the Efficient Market Hypothesis, that the historic price does not contain useful information but out of sample data may be predictive. We show that Fundamental Analysis and Machine Learning could be used to guide an investor's decisions. We demonstrate a common flaw in Technical Analysis methodology and show that it produces limited useful information.***
Technical Keywords: Stock Prediction, Data Analysis, Natural Language Processing, Machine Learning.

I. INTRODUCTION

Investment in Stock is one of the most rated businesses for making money for middle class investors. After that it is actual trading business of high-class investors and traders. Company's share price is most important point for investor which always fluctuates up and downwards. Eyes always need on live price of share market and instant decision making is necessary to prevent loss of money and eventually to gain money. For this you have to do study of the company's financial history and future agenda. Dependent on overall study related to market and company you can decide to invest. But you have limits to study because one cannot be sure about that study and analysis is correct. Company's market history, tendency of maintaining business in any period or slack, policies and announcements are the key points of Stock Rate. It is difficult field of work and need lot of experience to be a successful investor.

II. LITERATURE SURVEY

In a 2019 study, This paper of author Du Peng collects the data of web news emotion index, web search volume, social network emotion index, social network heat index, and establishes corresponding analysis index.

In a 2017 study, by authors Nonita Sharma and Akanksha Juneja, The Technical indicators are selected as inputs to each of the prediction models.

In this paper, the focus is to predict the future values of stock market indices based on the previous stock values using regression.

In a 2018 study, by authors Dev Shah; Haruna Isah; Farhana Zulkernine, the sentiment scores obtained from the analysis of the news articles is a powerful indicator of stock movements and can be used to effectively leverage the prediction of short-term trends.

Overall, these findings indicate that LSTM networks can be utilised to accurately anticipate future stock values and can be highly useful for stock market prediction. But it's crucial to keep in mind that the stock market is a complicated and dynamic system, so the success of predictions will rely on the particular stock and the time frame being taken into account.

A. Feasibility Study

In addition to advancements and applications of AI in the financial sector, the article provides an overview of several sentiment and stock price prediction models.

Possibility Analysis Simply put, it is impossible to predict the stock market accurately. Like any complicated issue, the future has an excessive number of variables. In this research, we try to use a machine learning strategy to forecast stock prices. Stock forecasting successfully uses machine learning. The project uses the latest technology stack. The estimated time the project will take is 6 months.

III. PROPOSED METHODOLOGY

The following steps are commonly included in the suggested methodology for stock market prediction using LSTM networks:

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1) *Data Gathering:* The first stage is to gather historical information on trade activity, stock prices, and other financial indicators for the stock or stock index that you desire to forecast. Usually, this information is collected from a stock market data source or a financial database.
2) *Data Preparation:* The gathered data is then cleaned and prepared for usage in the model through pre-processing.
3) *Model Training:* Using the retrieved features and historical stock prices, the LSTM model is then trained. This usually entails dividing the data into a training set and a test set, then training the model on the training set.
4) *Web UI:* Stock Market Prediction Web App based on Machine Learning. The front end of the Web App is based on HTML, CSS & JS, and the back end of the Web App is based on Django. The App forecasts stock prices of the input (by user) days for any given stock.

It's vital to keep in mind that this is only a rough overview and that depending on the study, different phases and strategies may be employed. Before attempting to replicate the study, it is also important to carefully examine and comprehend the methods and procedures utilised in the literature as they may differ from those employed in the study.

IV. TECHNOLOGIES USED

Python: Python is a well-liked computer language that is frequently used in data science and machine learning. Tensorflow, keras, and pytorch are just a few of the tools and frameworks that are useful for forecasting the stock market.

RNNS: Recurrent Neural Networks rnns are a particular kind of neural network that operate well with sequential data, such time series data. Rnns of a particular kind called lstms are frequently employed for stock market prediction

Machine learning libraries: To Enhance the predictions made by lstm networks, a variety of machine learning libraries can be utilised.

It's Crucial to note that this is not a comprehensive list and that other technologies and approaches may be employed in lstm networks for stock market prediction. Additionally, the study and the particular problem being addressed influence the technology and technique selection.

V. SYSTEM ARCHITECTURE

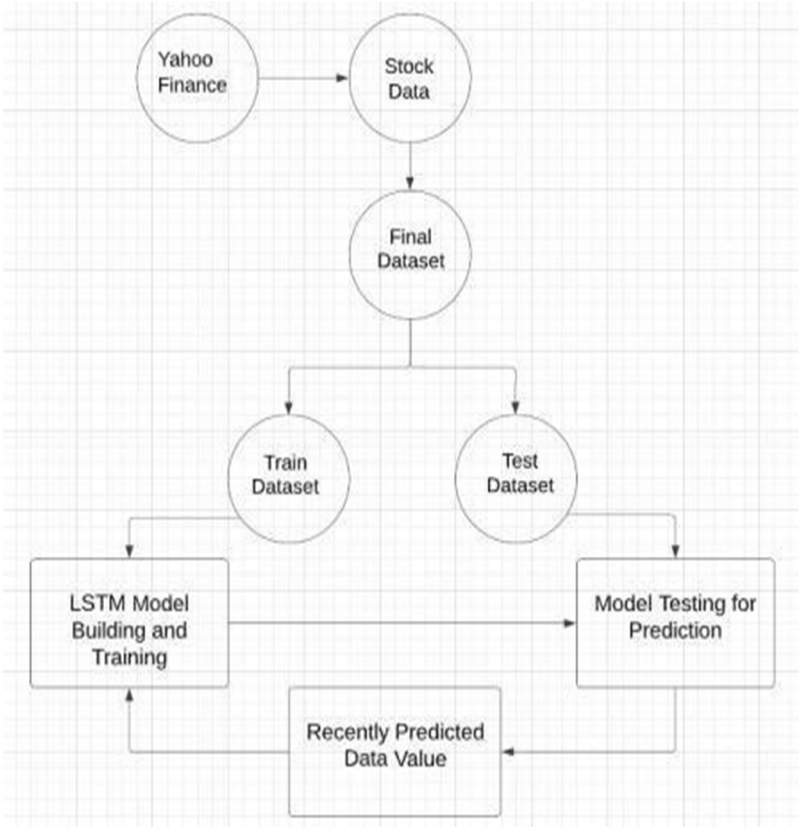


Fig: System Architecture

VI. WORKING MODULES

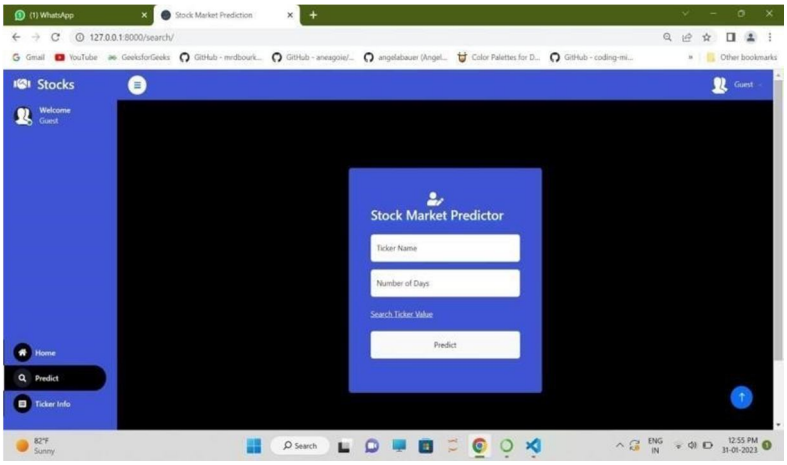


Fig. Predict Screen

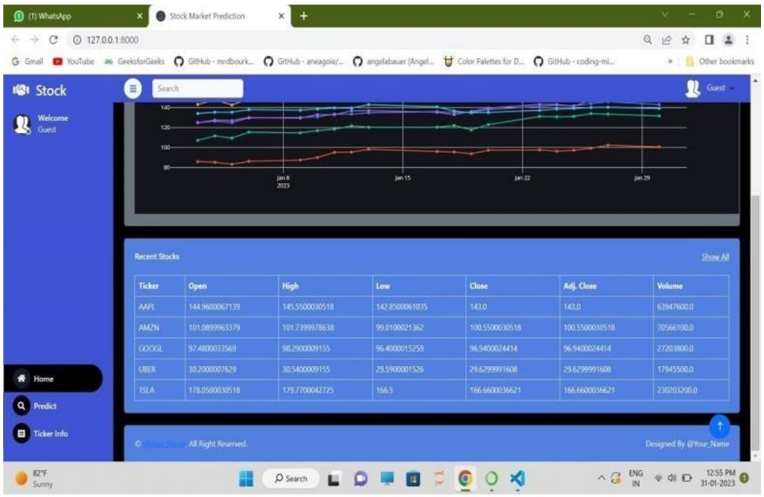


Fig. Predict

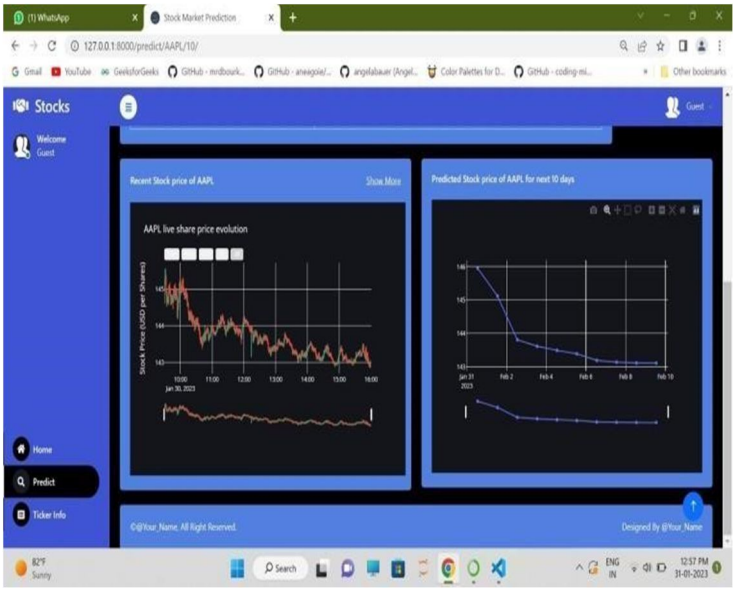


Fig. Graph

VII. SPECIFICATIONS

A. Advantages

There are several advantages of using LSTM networks for stock market prediction, some of the most notable ones are:

1) *Handling Sequential Data:* LSTMs are designed to handle sequential data, such as time series data, which makes them well-suited for stock market prediction. They are able to capture long-term dependencies in the data, which is important in the stock market, where prices can be affected by events that occurred in the past.
2) *Handling Missing Data:* LSTMs are able to handle missing data, which is a common problem in stock market prediction as financial data may not always be available.
3) *High-level of accuracy:* LSTMs have been shown to achieve high levels of accuracy when predicting stock prices, outperforming traditional statistical methods and other machine learning techniques.

Additionally, stock prices are influenced by many factors, and therefore predictions generated by LSTM models may not always be accurate.

VIII. LIMITATIONS

While LSTM networks have shown promise in stock market prediction, there are also some limitations to be considered:

1) *Complexity of the stock market:* The stock market is a complex and dynamic system that is affected by a wide range of factors, such as economic indicators, company performance, and global events. This complexity makes it difficult to make accurate predictions about future stock prices.
2) *Unpredictable nature of the stock market:* The stock market is inherently unpredictable and LSTM models may not always be able to accurately predict future stock prices.
3) *High Computational Requirements:* LSTM networks require a significant amount of computational power to train, which can be a limitation when working with large data sets.

It's important to keep in mind that these limitations and the accuracy of predictions may vary depending on the specific stock and the time period being considered. Additionally, it's important to consider the general economic conditions, political stability, and other factors that could influence the stock market.

IX. CONCLUSION

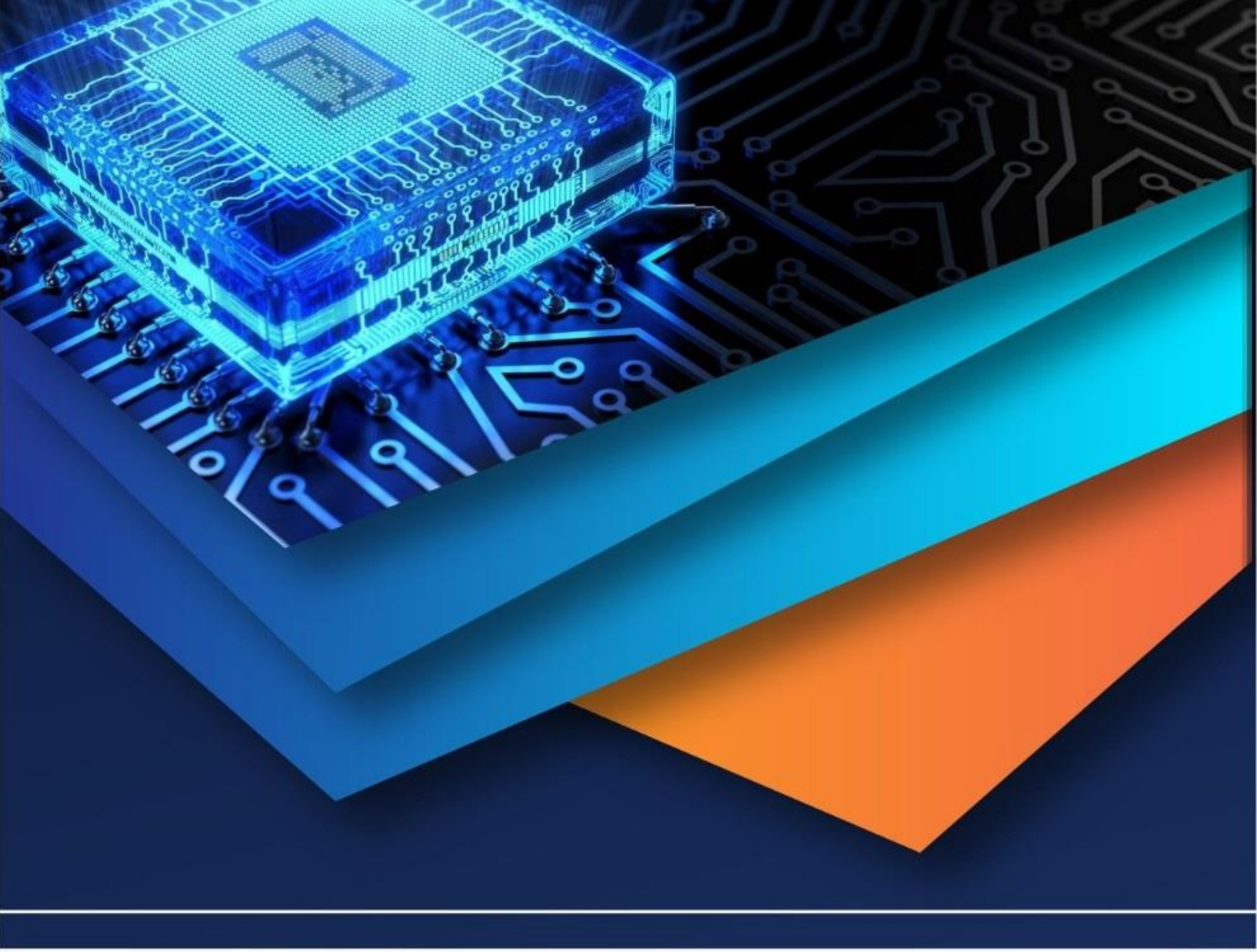
In conclusion, stock market prediction using LSTM networks is a promising approach that has been shown to achieve high levels of accuracy in making predictions about future stock prices. However, it's important to consider the limitations of this approach.

The stock market is a complex and dynamic system that is affected by a wide range of factors, making it difficult to make accurate predictions. Additionally, LSTM models may not always be able to accurately predict future stock prices due to the unpredictable nature of the stock market. Overfitting, high computational requirements, limited historical data and lack of interpretability are also limitations of stock market prediction using LSTM. Furthermore, LSTM models are limited to historical data and can't take into account future events that may impact the stock prices. Despite these limitations, stock market prediction using LSTM networks remains a promising approach and further research is needed to improve the accuracy and reliability of predictions.

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