IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

STOCK MARKET SOCIAL MEDIA PLATFORM

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Abstract—Social media platforms have become increasingly popular in the financial world as a means for individuals to share information about their portfolios and investment strategies. In recent years, the integration of deep learning algorithms that are namely recurrent neural networks (RNNs) and long short-term memory (LSTM) networks has opened up new possibilities for using social media data to predict stock prices. This abstract aims to provide an overview of the use of RNNs and LSTMs for stock prediction using social media data. Social media platforms offer a vast amount of data that can be used to perform analysis of stock prices. This includes data about individual stocks, news articles, and sentiment analysis of social media posts. With the help of RNNs and LSTMs, this data can be processed to make accurate predictions about the future performance of individual stocks. The use of social media platforms for stock prediction has several advantages. For example, the vast amount of data available on social media platforms allows for a more comprehensive understanding of market sentiment and the impact of external factors on stock prices. Additionally, the ability to share portfolios and investment strategies with other users provides a unique opportunity for collaborative analysis and insight.

Keywords: Social media, portfolios, stocks, RNN, LSTM, Stock prediction.

I. INTRODUCTION

The world of investing and trading has evolved significantly in recent years, with the advent of new technologies and platforms enabling greater access and participation for individuals. One such development is the emergence of stock social media platforms, which allow users to share their portfolios and investment strategies with others. These platforms provide a unique opportunity for individuals to learn from each other, collaborate, and potentially benefit from collective knowledge and insights. They also offer a level of transparency and accountability, as users can track the performance of their portfolios and compare them to others.

However, the value of these platforms is not limited to social interactions and learning opportunities. With the rise of artificial intelligence and machine learning, stock social media platforms are increasingly using advanced algorithms to predict and analyse the performance of stocks. One type of machine learning algorithm that has gained popularity in this field is the Recurrent Neural Network (RNN), which is particularly suited for sequential data such as stock prices over time. RNNs are able to learn from past data points and use that information to make predictions about future trends. Another powerful algorithm used in stock prediction is the Long Short-Term Memory (LSTM) network, which is a type of RNN. LSTMs are particularly effective at handling long-term dependencies in sequential data and can be used to identify patterns and trends in stock prices. The use of RNN and LSTM networks in stock prediction is not a new concept, but the incorporation of these algorithms into stock social media platforms represents an exciting development for individual investors. By leveraging the collective data and insights of a large community of users, these platforms can potentially provide more accurate and reliable predictions about stock performance. It is important to note that predicting stock performance is inherently complex and involves many factors, both economic and non-economic. No algorithm or model can provide a guarantee of success in the stock market, and users should always exercise caution and do their own research before making any investment decisions. However, the integration of RNN and LSTM networks into stock social media platforms represents a significant step forward in democratizing access to advanced tools and technologies for individual investors. By providing users with more accurate and data-driven insights, these platforms have the potential to level the playing field and empower individuals to make more informed investment decisions. In conclusion, the emergence of stock social media platforms represents an exciting development for individual investors, offering opportunities for social learning, collaboration, and potentially more

accurate stock predictions through the use of RNN and LSTM networks. While these platforms should be used with caution, they have the potential to provide a valuable resource for individuals seeking to make informed investment decisions in an increasingly complex and competitive market.

II. LITERATURE SURVEY

PAPER TITLE WITH PUBLISHED INFORMATION	METHODOOGY	PERFORMANCE ANALYSIS	LIMITATIONS
Predicting Stock Market Trends Using Machine Learning and Deep Learning Algorithms Via Continuous and Binary Data; a Comparative Analysis. Date of publication August 12, 2020	Compares 9 ML models and 2 DL methods on four stock market groups, namely diversified financials, petroleum, non-metallic minerals, and basic metals.	Deep learning algorithms, specifically RNN and LSTM, outperformed other models in both binary and continuous data approaches.	1.No consideration for external factors that may influence stock market trends. 2.Evaluation metrics used may not fully represent model performance in all real-world scenarios.
Stock Market Forecasting Using Deep Learning and Technical Analysis: A Systematic Review Date of publication October 12, 2020	The paper reviews the use of deep learning models for stock market forecasting using technical analysis, focusing on predictor techniques, trading strategies, profitability metrics, and risk management.	The review finds that the LSTM technique is widely applied in this scenario (73.5%), and that only 35.3% of studies analyzed profitability, and only two articles implemented risk management.	Only 35.3% of the studies analyzed profitability, and only two articles implemented risk management. Additionally, there is still an open problem of identifying an adequate set of technical indicators to use in the models.
Deep Stock Predictions Date of publication 8 Jun 2020	Long Short-Term Memory (LSTM) neural networks to forecast stock prices, and proposes a trading strategy that uses LSTM stock price predictions to optimize portfolios.	LSTM outperformed the ARIMA model on most datasets, but did not perform well on highly volatile stocks.	The proposed algorithm may also be sensitive to Highly Volatile Stocks.

Table 1

DP-LSTM: Differential Privacy-inspired LSTM for Stock Prediction Using Financial News. Date : 20 Dec 2019	DP-LSTM model is designed to address the potential bias in news articles by enhancing the robustness of the prediction model.	The experiment results based on the S&P 500 stocks show that the proposed DP-LSTM network can predict the stock price accurately with robust performance, especially for the S&P 500 index that reflects the general trend of the market.	There may be limitations in the implementation and scalability of the proposed DP-LSTM model in real-world applications.
Stock Price Prediction Using Machine Learning and LSTM-Based Deep Learning Models. Date: 20 Sept 2020	A hybrid approach using machine learning & deep learning-based regression models, including LSTM networks, to predict stock prices on a weekly forecast horizon using NIFTY 50 index values.	LSTM-based deep learning regression models outperformed the machine learning models, and were more accurate and faster than ML models.	Scalability of the LSTM model.
Stock Price Prediction Based on Natural Language Processing. Date : 6 May 2022	Prediction using NLP techniques such as BERT and NEZHA to expand the set of predictive variables, and an LSTM prediction model to forecast the CSI 300 stock index.	NLP methods based on BERT and NEZHA models showed a significant improvement in the prediction accuracy of the CSI 300 stock index.	Method requires a large amount of high-quality training data to achieve better performance, and that future research can consider more analysis angles to achieve more high-quality keyword extension.

Table 2

III. SYSTEM IMPLEMENTATION

A. EXISTING SYSTEM

In the world of stock investing, there are several existing systems that investors can use to manage their portfolios, connect with other investors, and make informed investment decisions. These systems vary in their complexity and the level of expertise required to use them effectively. In this article, we will discuss three such systems: traditional stock portfolio management tools, social media platforms for stock market investors, and machine learning algorithms for stock price prediction.

Traditional stock portfolio management tools such as spreadsheets or financial software are widely used by individual investors to track their investments and view historical data. These tools are often customizable, allowing investors to input their own data and analyze it in a variety of ways. For example, investors can track the performance of individual stocks, compare the performance of different sectors, or view charts and graphs that display historical trends.

While traditional portfolio management tools are useful for tracking and analyzing investments, they do not provide advanced analysis or prediction capabilities. As a result, many investors turn to social media platforms to connect with other investors and share information about stocks and investment strategies. These platforms can be valuable sources of information and insights, as they allow investors to tap into the collective wisdom of a community of investors. However, social media platforms do have limitations. For example, the information shared on these platforms may be biased or unreliable, and investors may not have the expertise to distinguish between good and bad information.

To address the limitations of traditional portfolio management tools and social media platforms, some investors turn to machine learning algorithms for stock price prediction. These algorithms use complex mathematical models and large datasets to identify patterns and make predictions about future stock prices. While these algorithms are typically used by financial institutions and hedge funds, there are also some tools available to individual investors. However, these tools can be expensive and require a significant amount of technical expertise to use effectively.

In summary, there are several existing systems available to individual investors for managing their stock portfolios and making informed investment decisions. Traditional stock portfolio management tools such as spreadsheets or financial software are useful for tracking and analyzing investments, while social media platforms allow investors to connect with other investors and share information. For more advanced analysis and prediction capabilities, some investors turn to machine learning algorithms for stock price prediction. At the end the choice of which system to use will depend on the investor's level of expertise and investment goals.

B. PROPOSED SYSTEM

In response to the increasing demand for a reliable, user-friendly platform for stock market investors, we propose the development of a web-based social media platform. This platform will not only allow investors to connect with others and share information, but it will also provide advanced analysis and prediction capabilities.

The Linear Regression algorithm is a widely used technique for predicting stock prices. It works by identifying the linear relationship between two variables, in this case, historical stock prices and other relevant factors such as market trends and economic indicators. Using this algorithm, our platform

will provide investors with predictions of future stock prices based on historical data.

The Long Short Term Memory algorithm is a kind of recurrent neural network that is particularly useful for sequential time data such as stock prices. Unlike traditional neural networks, LSTM can remember past data points and use them to make predictions. This algorithm will be used to complement the Linear Regression algorithm, providing more accurate and reliable predictions of future stock prices.

The platform will also provide users with the ability to upload and view their portfolios, making it easier for them to track their investments and monitor their performance over time. Users will be able to input information about individual stocks, including the quantity and purchase price, and the platform will automatically calculate the portfolio value based on current stock prices. This functionality will help users make informed investment decisions by providing them with a clear understanding of their portfolio's performance.

To further enhance the platform's capabilities, users will be able to predict future stock prices based on their portfolio holdings. The algorithms used for these predictions will take into account the historical performance of the user's portfolio, as well as other relevant factors such as market trends and economic indicators. Users will be able to adjust their portfolios and see how these changes affect the predicted future prices of the stocks in their portfolio.

The platform will also provide users with a social media component, allowing them to connect with other investors and share information. Users will be able to create profiles, follow other users, and participate in discussion forums. The platform will also provide users with the ability to share their portfolios and predictions with other users, facilitating the exchange of information and ideas.

Overall, the proposed web-based social media platform for stock market investors will provide users with a comprehensive set of tools for managing their investments and making informed investment decisions. The use of machine learning algorithms for stock price prediction will provide users with accurate and reliable predictions of future stock prices, while the ability to upload and view portfolios will allow users to track their investments and monitor their performance. The social media component of the platform will provide users with the opportunity to connect with other investors and share information, further enhancing the platform's value.

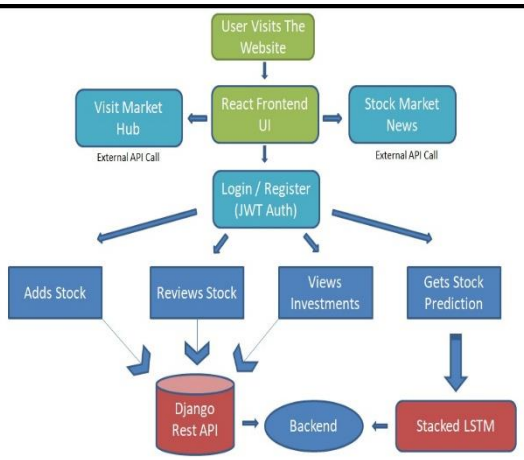

Fig 3.1: System Architecture

IV. MODULES

Module 1: User

The User module is a fundamental component of any web-based application that requires user authentication and authorization. This module will contain information about the user, including their username, email address, and password.

The username field will be used to uniquely identify each user in the system. It should be a string value that is at least 3 characters in length and no longer than 30 characters. The username must be unique across all users in the system, and the system should prevent the creation of duplicate usernames.

The email field will be used as a primary means of communication with the user. It should be a valid email address in the format user@example.com. The system should validate the email address to ensure that it is a valid format and that it does not already exist in the system.

The password field will be used to authenticate the user when they log in to the system. It should be a string value that is a minimum of 8 characters in length and should include at least 1 uppercase letter, 1 lowercase letter, 1 numeric digit, and 1 special character. The system should store the password securely using a strong hashing technique (JWT) to prevent unauthorized access to user accounts.

The User module should provide functionality for creating, updating, and deleting user accounts. When a new user account is created, the system should validate the input fields to ensure that they meet the requirements described above. The system should also provide feedback to the user if any errors are encountered during the validation process.

The User module should also provide functionality for authenticating users when they log in to the system. The system should compare the provided username and password to the stored values in the system and grant access if the values match.

In summary, the User module is a critical component of any web-based application that requires user authentication and authorization. It should include fields for the user's username, email address, and password. It should also provide functionality for creating, updating, and deleting user accounts, authenticating users when they log in to the system, and resetting passwords. By implementing these features, the User module will provide a secure and reliable authentication system for the web-based application.

Module 2: Stocks

The Stock module is a key component of any web-based platform for stock market investors. This module will contain information about each stock available on the platform, including its name, platform, description, rating, and creation date.

The Name field will be used to uniquely identify each stock in the system. It should be a string value that is at least 3 characters in length and no longer than 100 characters. The name should be unique across all stocks in the system, and the system should prevent the creation of duplicate names.

The Platform field will identify the exchange or trading platform on which the stock is listed. It should be a string value that is at least 3 characters in length and no longer than 50 characters. The platform should be chosen from a pre-defined list of available options to ensure consistency and accuracy in the system.

The Description field will provide additional information about the stock, such as its sector, industry, and business model. It should be a string value that is at least 10 characters in length and no longer than 1000 characters. The description should be concise and informative, providing investors with a clear understanding of the stock and its potential.

The Number Rating field will represent the total number of ratings that the stock has received from users of the platform. It should be an integer value that is greater than or equal to zero. The system should update this field each time a user rates the stock to reflect the total number of ratings received.

The Average Rating field will represent the average rating that the stock has received from users of the platform. It should be a float value that ranges from 0 to 5, representing a rating scale from poor to excellent. The system should update this field each time a user rates the stock to reflect the new average rating.

The Created field will indicate the date and time at which the stock was added to the system. It should be a timestamp value that records the exact moment when the stock was added.

The Stock module should provide functionality for creating, updating, and deleting stocks. When a new stock is created, the system should validate the input fields to ensure that they meet the requirements described above. The system should also provide feedback to the user if any errors are encountered during the validation process.

The Stock module should also provide functionality for searching and filtering stocks based on various criteria, such as name, platform, sector, industry, and rating. Users of the platform should be able to find stocks that match their specific investment goals and criteria.

In summary, the Stock module is a crucial component of any web-based platform for stock market investors. It should include fields for the stock's name, platform, description, number rating, average rating, and creation date. It should also provide functionality for creating, updating, and deleting stocks, searching and filtering stocks based on various criteria, and displaying historical data and performance charts. By implementing these features, the Stock module will provide a comprehensive and informative stock market experience for users of the platform.

Module 3:Review

The Review module is an important component of any web-based platform for stock market investors. This module will allow users of the platform to rate and review different stocks, providing valuable feedback to other investors and helping them make informed decisions about their investments.

The Review_user field will store the username of the user who is leaving the review. It should be a string value that is at least 3 characters in length and no longer than 100 characters. The system should validate the username to ensure that it is a unique value and that it corresponds to a valid user account in the system.

The Rating field will represent the score that the user assigns to the stock being reviewed. It should be an integer value that ranges from 1 to 5, representing a rating scale from poor to excellent. The system should validate the rating to ensure that it falls within the specified range.

The Description field will provide additional information about the review, such as the user's experience with the stock, its strengths and weaknesses, and any other comments or suggestions. It should be a string value that is at least 10 characters in length and no longer than 1000 characters. The description should be concise and informative, providing other investors with a clear understanding of the user's opinion and feedback.

The Created field will indicate the date and time at which the review was created. It should be a timestamp value that records the exact moment when the review was added.

The Update field will allow users to edit or update their reviews at a later time. It should be a timestamp value that records the most recent moment when the review was updated.

The Review module should provide functionality for creating, updating, and deleting reviews. When a new review is created, the system should validate the input fields to ensure that they meet the requirements described above. The system should also provide feedback to the user if any errors are encountered during the validation process.

The Review module should also provide functionality for searching and filtering reviews based on various criteria, such as stock name, reviewer username, and rating. Users of the platform should be able to find reviews that match their specific investment goals and criteria.

To provide additional information about the user leaving the review, the Review module should also include functionality for displaying the user's profile picture, bio, and other relevant details. Users should be able to view the reviewer's past reviews and ratings to gain a better understanding of their expertise and experience in the stock market.

In summary, the Review module is an essential component of any web-based platform for stock market investors. It should include fields for the reviewer's username, rating, description, created date, and update date. It should also provide functionality for creating, updating, and deleting reviews, searching and filtering reviews based on various criteria, and displaying user profiles and past reviews. By implementing

these features, the Review module will enable users of the platform to make informed decisions about their investments and share valuable feedback with other investors.

System Modules

● **Vite:** A tool to easily launch a project provided by a basic starter template.

● **React18** : Open Source Front-end JavaScript library for building UI using components easily.

● **React-router-dom :** NPM package for handling the routing in the web application.

● **React-typed :** A customizable React typing animation component.

● **Dotenv :** NPM package for storing private keys and sensitive information in the project.

● **Tailwind CSS:** An utility-first CSS framework.

● **React-Axios :** A library that helps to make http requests to external sites and resources.

● **React-icons :** SVG React icons of popular icon packs.

● **JWT Auth :** JSON Web Tokens (JWT) for secure user authentication and authorization.

● **SQLite :** SQLite is a free, open-source, serverless, lightweight and self-contained relational database management system that stores data in a single file, making it easy to deploy and maintain.

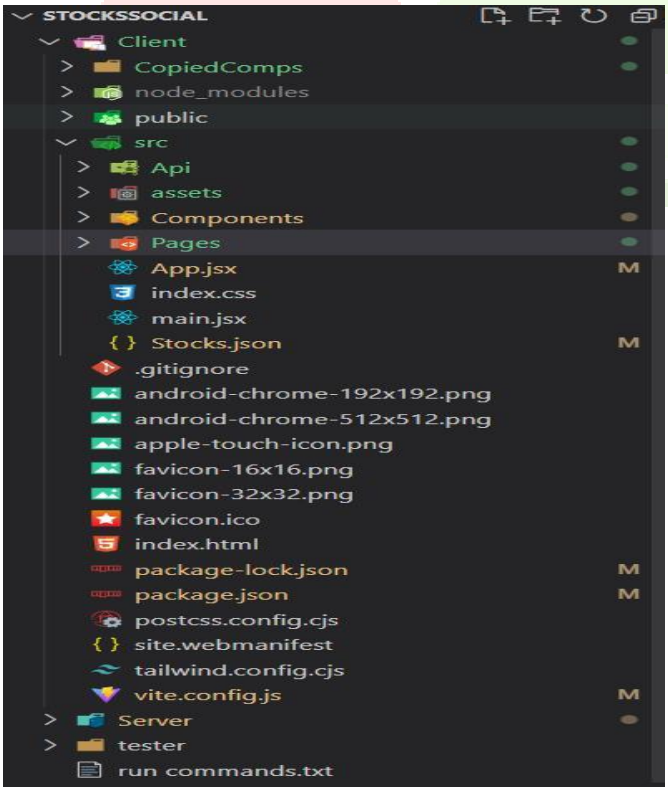

Fig 3.2: Folder Structure

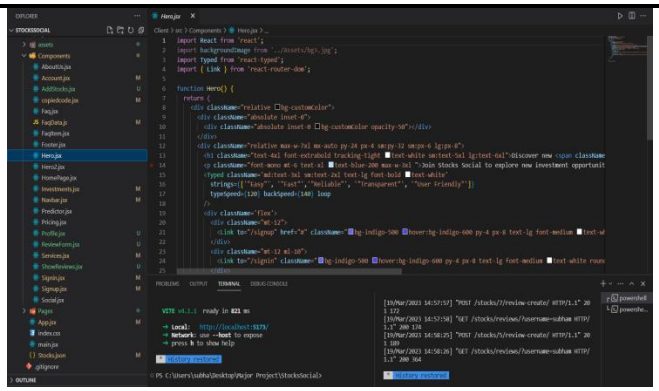

Fig 3.3: Server Side Code

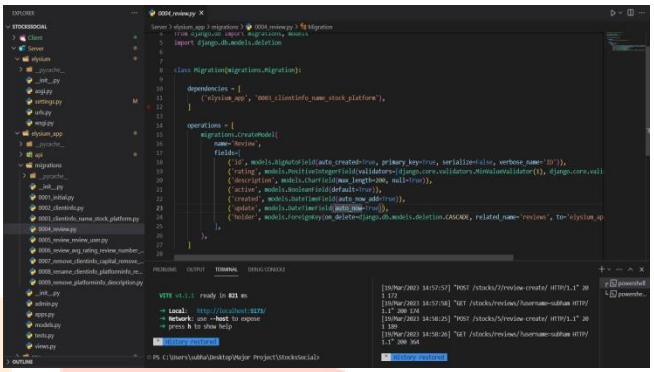

Fig 3.4: Jupyter Notebook Code

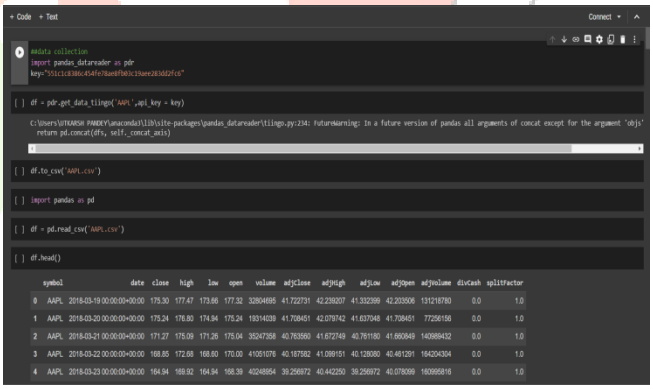

Fig 3.5: Jupyter Notebook Code

V. RESULTS

The development of a web-based application that makes use of machine learning algorithms like linear regression and stacked LSTM to ease & enhance the process of managing and tracking stock portfolios in the world of finance. This advancement allows investors to make informed decisions, stay ahead of market trends, and connect with others to share insights and collaborate on investment strategies. The application offers a user-friendly interface, secure data storage, and revenue generation opportunities through advertising, sponsored content, and premium services. This ensures that the platform remains up-to-date and continues to meet the evolving needs of investors. Overall, the project is a valuable solution for portfolio management and investment decision-making. It provides a collaborative environment for investors to share their insights, connect with like-minded

individuals, and work together to achieve better investment outcomes. The platform's user-friendly interface, secure data storage, and revenue generation opportunities make it a sustainable business model, ensuring its continued growth and development.

VI. CONCLUSION

In conclusion, the development of a web-based application that leverages machine learning algorithms, like linear regression ,stacked LSTM, to simplify the process of managing and tracking stock portfolios represents a significant step forward in the world of finance. By utilizing cutting-edge technologies and data analytics, investors can make informed decisions, stay ahead of the curve, and connect with like-minded individuals to share insights and collaborate on investment strategies. The proposed platform offers a user friendly interface, secure data storage, and revenue generation opportunities through advertising, sponsored content, and premium services. The research paper provides a comprehensive review of the latest advancements in machine learning algorithms and predictive models, as well as the technologies utilized to develop the platform. Overall, the project represents a promising solution to the challenges investors face in today's fast-paced and ever-changing market.

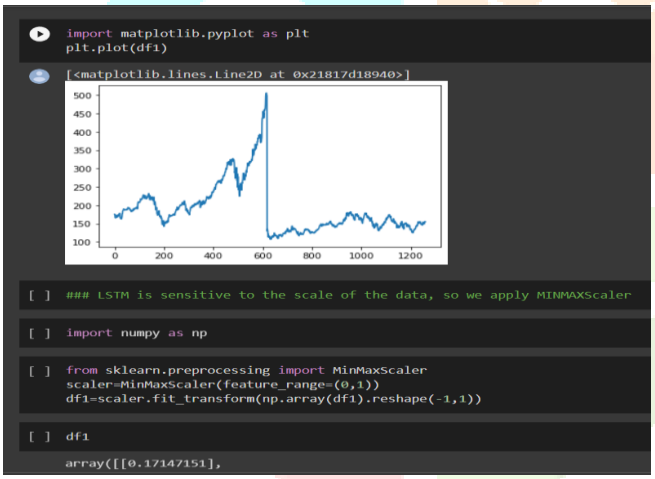

Fig 3.6: Output graph

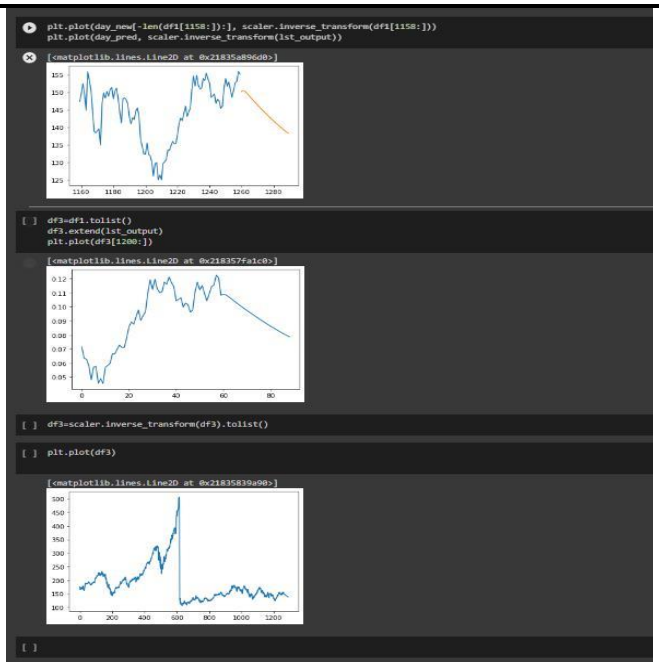

Fig 3.7: Output graph

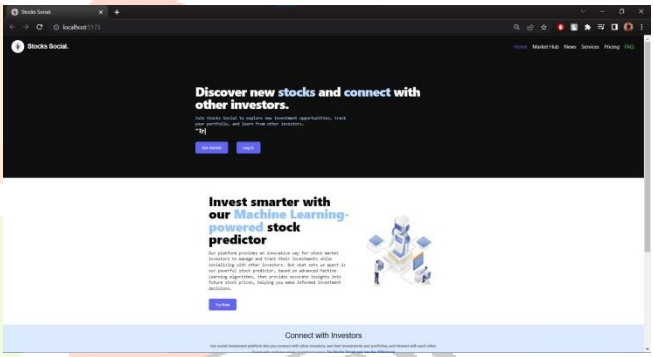

Fig 3.8: Sample site Output

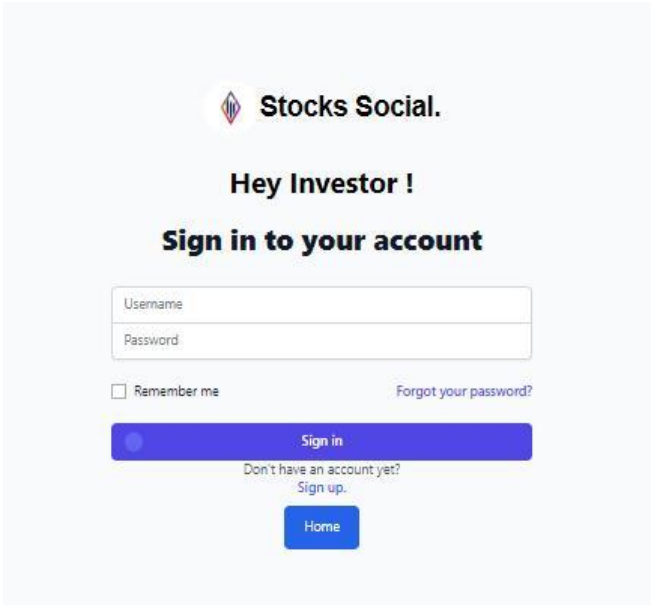

Fig 3.9: Login Page

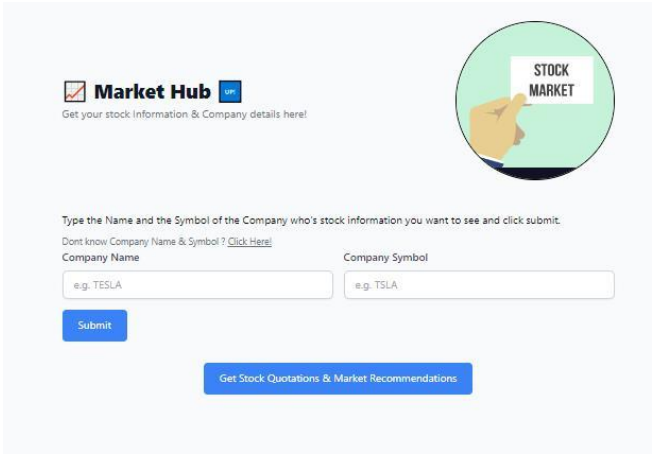

Fig 4.0: Stock information page

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