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Real-Time Stock Price Monitoring and Notification Web Application

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ABSTRACT

The project is aimed at creating a Real-Time Stock Price Monitoring and Notification Web Application to overcome the difficulties that investors experience when they want to monitor stock prices that are rapidly changing. Since the prices of stock are often dynamic and may change over time, unless investors constantly check the prices and provide timely and important alerts, the investments can easily be influenced by those changes, which in turn can affect the investments made by investors and the results of the investments. The proposed system offers convenient web interface enabling users to monitor multiple stocks at once, see real time price changes and follow market trends with interactive dashboards and graphic representations. The platform, to make sure that the data is accurate and reliable, continuously collects, processes, and analyses stock data using financial APIs and Python-based analytics tools. One of the more important features of the application is its customizable alert system that notifies users either via email or notifications when they have reached predefined stock price conditions. This helps investors to be fast in responding to major changes in the market. Generally, the platform improves transparency, accessibility, and efficiency in monitoring stocks, which can be used to make informed and timely investment decisions.

Keywords: Real-Time Stock Monitoring, Stock Market Analysis, Financial Data Analytics, Web-Based Application, Data Visualization, Notification System, Technical Indicators, Investment Decision Support.

1. INTRODUCTION

The project is aimed at the creation of a Real-Time Stock Price Monitoring and Notification Web Application, which is going to be used to overcome the challenges, which investors have to face when tracking the financial markets that change rapidly. Due to the dynamic nature of stock prices, investors often miss important fluctuations without continuous monitoring and timely alerts, which can impact their investment decisions and outcomes. The proposed system offers user-friendly web interface, enabling the user to monitor multiple stocks in real time, see real time price changes, and analyze market trends using interactive dashboards and graphical displays. (Adlakha et al., 2021; Al-Jaroodi & Mohamed, 2009; Edwards, 2021)

To ensure accuracy and reliability, the platform automatically gathers, processes and analyses stock data using financial APIs and Python-based analytics tools. The most important characteristic of the application is that it can be customized to use a specific alert system to notify users when any of a set of predefined stock price conditions are met. This will allow

investors to react efficiently to major market developments. In general, the platform will increase the level of transparency, accessibility, and efficiency in monitoring stock, which will help users make informed and timely investment decisions. The online platform will work to give investors real-time monitoring and analysis of stock prices and help investors navigate the dynamic and rapid financial landscape. It offers a reliable and efficient solution for tracking market movements, analyzing stock trends, and making informed investment decisions. As the significance of digital financial tools has increased, such platforms have become a necessity to investors, traders, and analysts who require constant access to market news. (Chhem et al., 2019)

The system is user-friendly and enables a user to search stock symbols, view real-time price changes and analyze past data using interactive dashboards with charts and graphs. These visualizations allow users to learn more about the behavior of stocks and the market trends. Additionally, the platform enables users to monitor multiple stocks simultaneously, making portfolio management more convenient and efficient.An important feature of the platform is its real-time alert and notification system. Users are able to have predetermined conditions e.g. target prices or percentage changes and be given instant notification via email or web alerts when these conditions are met. This guarantees the responsiveness to market changes in time. The platform can also be an analytical and educational tool by the inclusion of data analytics and visualization features including technical indicators, moving averages and candlestick charts.(Adlakha et al., 2021; Chhem et al., 2019; De Silva et al., 2024)

Such tools can give a more in-depth view of the market behavior and help in making effective decisions. All in all, the system enhances accessibility, transparency, and efficiency in the monitoring of stock markets by incorporating real-time data collection, processing, visualization and automated alerts enabling users make timely and well-informed decisions about investments. (C & Kumara, 2025; Challa, 2025; Dineshkumar et al., 2023; Tools of the Trade, 2012). Under the current stock market systems, investors and traders usually use online trading platforms as a means of tracking stock prices, analyzing market trends and executing trading decisions.

These websites give users access to a host of financial data such as current stock prices, historical performance, trading volume and company financial data. Users have the option of browsing the various stocks listed in the market or search a particular company using the search option available on the site. (C & Kumara, 2025; Joseph et al., 2024; S et al., 2025). As a result of browsing, investors are able to explore various sectors like technology, healthcare, banking and energy, and as a result they are able to identify potential investment opportunities. Stocks listed typically include a plethora of information including price movements, highs and lows, market capitalization, and history of trading. (Huang et al., 2014; Kamath, 2019; Liang, 2021; Putcha et al., 2024)

This assists investors to compare more than one stock and make well-informed financial decisions. These systems gather financial information in the stock markets and financial institutions and present them in the form of dashboards, charts, and graphs. The real-time monitoring will allow investors to monitor price changes in real-time and respond promptly to market fluctuations. Also, data analytics and algorithm-based insights are incorporated in many platforms to predict the possible market trends. These analytical methods assist traders to assess risk, find profitable investments, and enhance decision-making in a rapidly evolving financial situation.

2. PROPOSED SYSTEM

The suggested methodology to use in this project would involve the development of a real time stock price monitoring and notification web application that would assist in helping the user track the movement of stocks within the stock exchange effectively and make informed investment decisions. Since the stock market is an extremely volatile market, investors will usually find it challenging to constantly check stock prices and to respond to sudden fluctuations.

To overcome this, the proposed system offers a user-friendly web interface that allows users to track stock prices, trends, and get notified when certain conditions are met. It takes the real time stock data of financial APIs such as Yahoo Finance and analyzes it using Python libraries, including Pandas and TA-Lib. Once the stock price is at the established level, the system sends alerts automatically either through web or email notifications.

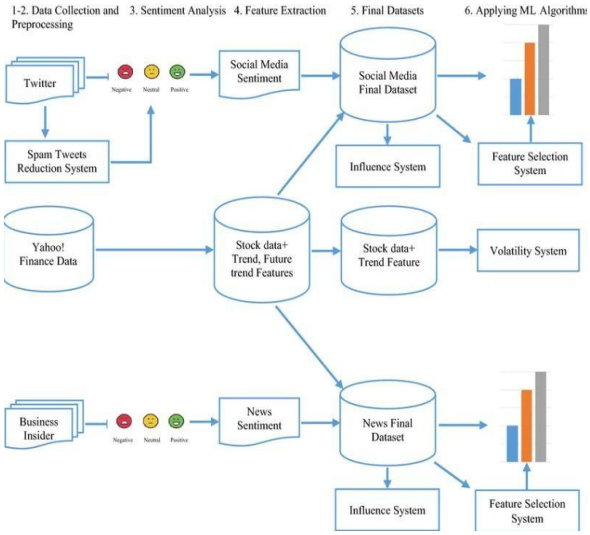

Fig 1: Architecture of Proposed System

The system is also equipped with data analytics and technical indicators like moving averages, and trend analysis to enable users to comprehend market behaviour. An interactive dashboard is provided to display charts, stock performance, and key insights in an easy to-understand format. Also, the platform is capable of tracking various stocks at a time, which means that users can easily track and monitor their investments. The combination of real time data processing, visualization and alert mechanisms enhances the decision-making process and minimizes the risks of missing any important market opportunities.

2.1 Proposed Architecture

The system will start by gathering data through various sources including twitter, Yahoo Finance and news outlets. The data obtained are preprocessed such as spam removal and cleaning. Sentiment analysis is then done on the social media and news data to categorize it as positive, negative, or neutral. The data that is processed is subsequently integrated with stock data and trend characteristics to create final datasets. The feature extraction and selection are used to find out the important characteristics that affect the stock prices. The other elements such as influence and volatility systems examine the behaviour of the market. Lastly, the ready-made data is utilized to use machine learning algorithms to forecast stock movement and aid in decision making.

2.2 Proposed Block Diagram

The proposed structure of the Real-Time Stock Price Monitoring and Notification System is developed in the framework of a layered approach to the problem in order to be able to efficiently process data and interact with the user. The system is categorized into three major layers: Display Layer, Business Layer and Data Layer. The Display Layer is the front-end interface that users like investors, analysts, and administrators, interact with the system.

It offers functions such as real-time stock prices, chart analysis, and price alerts in an interactive dashboard. Business Layer deals with the main functionalities of the system. It has modules of stock data management, real time monitoring, data analysis, and alert generation. This layer takes the data retrieved by external APIs, applies technical indicators, and verifies user-defined conditions to send notifications.

The Data Layer is responsible for storing all relevant information, including user details, stock market data, and analytical results. It ensures proper data management and supports historical data analysis. The system integrates APIs such as Yahoo Finance to fetch real-time stock data. Overall, this architecture enables smooth data flow, real-time updates, and efficient decision-making for users.

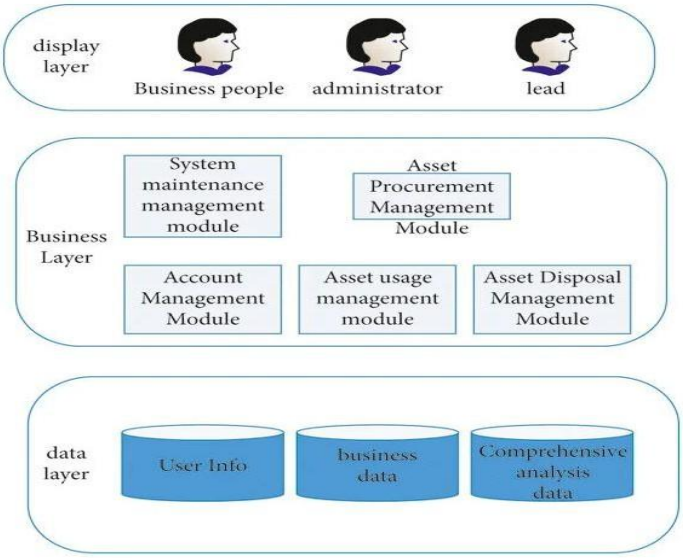

Fig 2: Block Diagram of Proposed System

3. METHODOLOGY

3.1 MODULE DESCRIPTION

The following modules are present in the project
Web Application Module
Data Collection and Preparation

1. Preprocessing
2. Segmentation
3. Feature Extraction
4. Analysis / Classification

Stock Analysis and Prediction Module

3.2 WEB APPLICATION

The Web Application module plays a crucial role in providing a real-time interactive platform for monitoring stock market data. In this module, a dynamic and user-friendly environment is developed to simulate real-world stock tracking and analysis. It enables users to view live stock prices, analyze trends, and make informed financial decisions efficiently.

Admin Module

The admin module plays a vital role in managing and maintaining the stock monitoring system.
It provides administrators with full control over system operations, ensuring smooth performance, data accuracy, and security.

Stock Data Management

One of the key responsibilities of administrators is managing stock-related data. This includes integrating APIs (like Yahoo Finance), updating datasets, and ensuring that real-time and historical data are accurate and up to date.
Portfolio and Watchlist Management.Admins over see how users interact with stock portfolios and watchlists. They ensure users can add, remove, and track selected stocks efficiently, while maintaining system performance and data consistency.

Alert and Notification Management
Admins manage alert systems that notify users about significant stock price changes, trends, or thresholds. This helps users take timely action based on market movements
Data Visualization and Dashboard Management

Admins ensure that charts, graphs, and dashboards function correctly. They manage visualization tools like Matplotlib or Streamlit to provide clear insights into stock performance and trends.

1. 4. DATA COLLECTION AND PREPARATION

4.1 Preprocessing

Preprocessing module is key in the processing of raw data in the stock market to be analyzed. Because information gathered through sources such as Yahoo Finance, CSV files, or other data formats might undergo inconsistencies, missing values, noise, or inconsistent formats, this module will clean, structure, and transform the data into a reliable format.

The quality of preprocessing has a direct influence on the performance of the stock monitoring system in terms of accuracy, efficiency, and overall performance. This module minimizes errors and boosts the trustworthiness of analytical outcomes by executing such operations as data cleaning, transformation, normalization, and validation. It also sets up the data to be sent through more complex software such as feature extraction, technical analysis and predictive modelling.

4.2 Segmentation

The Segmentation module separates the preprocessed stock market data into a smaller set of meaningful data that can be easily analyzed. Given that stock data is continuous and large, segmentation can be used to help in the organization of the stock data based on its time intervals, kind of stock and level of performance. Segmentation increases the clarity of the data, decreases the complexity and increases the efficiency of the processing. It also assists in visualizing the data better and prepares the data to be used in other steps, such as feature extraction and analysis.

4.3 Feature Extraction

The Feature Extraction module concentrates on the identification and derive important attributes of the segmented stock data to analyze. This module does not make use of raw data per se, but rather derives significant features that are useful in interpreting market trends and patterns.

Some typical characteristics are moving averages, price fluctuations, percentage returns, volatility, RSI, and MACD. Such tools offer information on the stock performance, momentum, and possible buy or sell indicators. The feature extraction will simplify the data and indicate the most pertinent information, thus simplifying the analysis. It also cleanses the data to be used in sophisticated procedures such as classification and prediction. So, this module is critical in converting raw stock data to beneficial information to aid in decision-making.

4.4 Classification

The Analysis / Classification module processes the resulting features to gain an insight into stock behaviour and to classify stocks in terms of performance. It assists to determine the trends and classify the stocks as bullish, bearish, or stable. This module simplifies complex data into clear insights, helping users make quick and informed decisions.

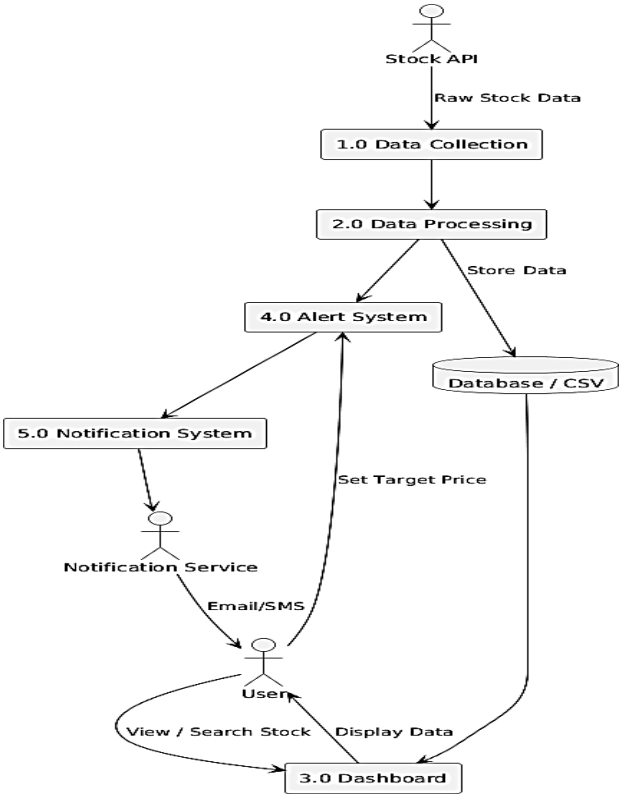

Fig 3: Data Flow Diagram

4.5 Stock Analysis and Prediction Module

The Stock Analysis and Prediction module is one of the most important modules that analyzes the stock market data, and predicts the future price movements. It makes use of historical stock data as well as extracted features to discover patterns, trends, and overall market behaviour. This module assists in converting raw numerical data into valuable information that could be used in the decision-making process.In this module, different types of technical indicators and other techniques of analysis like moving averages, RSI, and MACD are applied to comprehend price movements and market momentum.

These indicators help in detecting trends, reversals, and potential entry or exit points in the market. Also, simple predictive schemes and statistical techniques can be employed to predict the future stock price based on the previous stock performance. The system can make rough projections based on historical trends and patterns that help the system users to know the most likely future trends and patterns. It is also represented using visualization tools like charts and graphs, where a user can easily understand and interpret complex data.

This enhances the knowledge of the users and allows the analysis of the situation on the market quickly.The module is also able to issue alerts or signals according to the predefined conditions like sudden price changes or reverses in the trend that helps the users make timely decisions.

Moreover, it helps to compare two or more stocks, enabling users to compare performance across various companies or industries and make superior investment decisions.

On the whole, this module helps to simplify complex stock information and provide clear and actionable information. It aids in making sensible investment choices, mitigating risks, and enhancing the effectiveness of real-time systems of stock monitoring.

5.RESULTS

The proposed system implementation led to an interactive dashboard that will allow a detailed understanding of the customer satisfaction.

Key Findings

- High and low satisfaction areas identified.
- Patterns in customer ratings with time.
- The effect of service quality on customer satisfaction.

  Distribution of customer feedback

The findings indicate that data visualization is a very effective tool in the interpretation of customer data.

With the help of the dashboard, users can easily detect problems and implement corrective measures. The system delivers quicker and more precise insights compared to the conventional approaches.

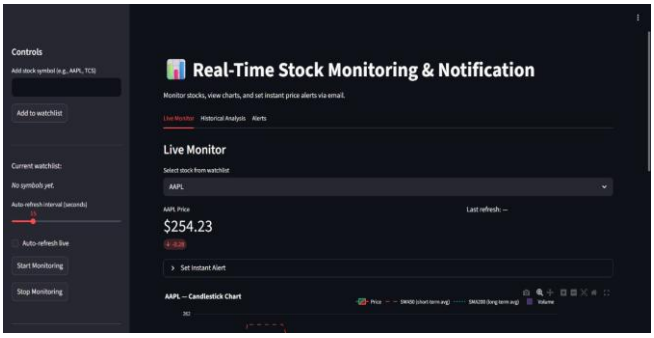

Fig 4: Home page of website

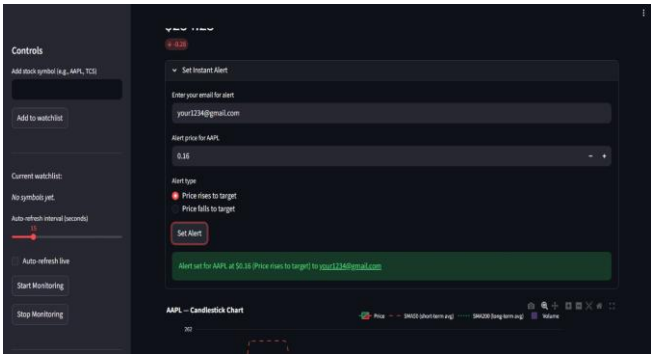

Fig 5: Live monitoring of Stock

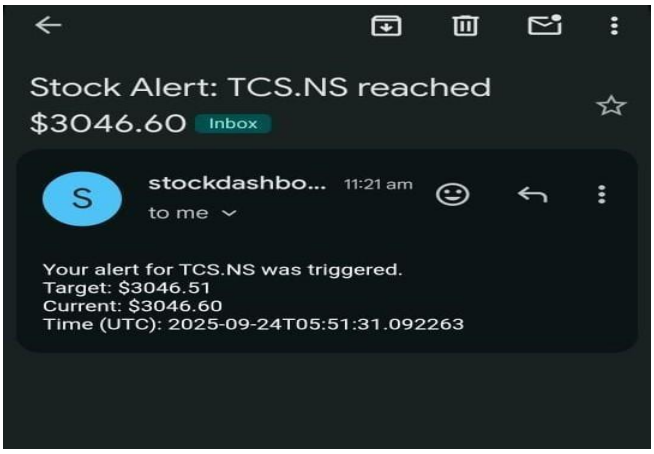

Fig 6: Alert Received in Email

The use of Power BI enhances the presentation of data, making it more accessible to non-technical users. The system can be further improved by integrating advanced analytics techniques such as predictive modeling.

6. CONCLUSION

Finally, the Real Time Stock Market Monitoring system offers a more efficient reliable platform in tracking, analyzing and interpreting stock market data.The system can provide relevant and current financial information in an easy-to-use format by integrating Python, yahoo finance, csv data processing, ta-lib, and streamlit. Different modules like data collection, preprocessing, segmentation, feature extraction and analysis were carried out throughout the project to ensure that raw stock data is converted into meaningful data. These procedures enhance the quality of data, the precision of analytical results, and assist in visualising the trends of the stocks better.

6.1 FUTURE ENHANCEMENT

The Real-Time Stock Market Monitoring System can be further developed incorporating the latest technologies and other functionalities to enhance its effectiveness and usefulness. One major enhancement is the integration of machine learning and deep learning models to provide more accurate stock price predictions based on historical data and market trends. Cloud deployment is another significant improvement that allows scaling, multi-user access as well as real-time data updates without any performance issues. This is so that the system is able to manage a lot of data effectively. Further, sentiment analysis of news articles and social media can also be used to enhance the accuracy of predictions by taking into account the market emotions and investor behaviour. It is also possible to enhance the system by including support of mobile applications, enhanced visualization and dashboards to provide enhanced accessibility and user experience. All these improvements will make the system smarter, scalable and user-friendly, making it more effective in its real-world stock market applications.

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