International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 09 Issue: 11 | Nov - 2025 SJIF Rating: 8.586 ISSN: 2582-3930

Stocksense – AI Stock Analysis & Forecasting

Prof. Seema Bujade
Zeal College of Engineering and Research

Atharva Jawalkar
Zeal College of Engineering and Research

Sarthak Kapse
Zeal College of Engineering and Research

Adwait Dhumal
Zeal College of Engineering and Research

ABSTRACT

The stock market poses significant challenges for traders and investors due to fragmented access to essential data and insights. Navigating multiple platforms to gather real-time data, historical trends, and financial information leads to inefficiencies and missed opportunities. Stocksense is an AI-driven trading assistant that centralizes stock analysis, providing users with real-time data and personalized buy/sell recommendations in one platform. By leveraging advanced machine learning algorithms such as ARIMA, LSTM, EMA, and XGBoost, StockSense delivers predictive stock analysis and actionable insights. Deepseek enhances the platform's ability to summarize financial reports, helping users make informed trading decisions without the need to rely on multiple resources.

Keywords- *AI-driven trading, Machine Learning, ARIMA, LSTM, EMA, XGBoost, Deepseek, Financial Insights.*

INTRODUCTION

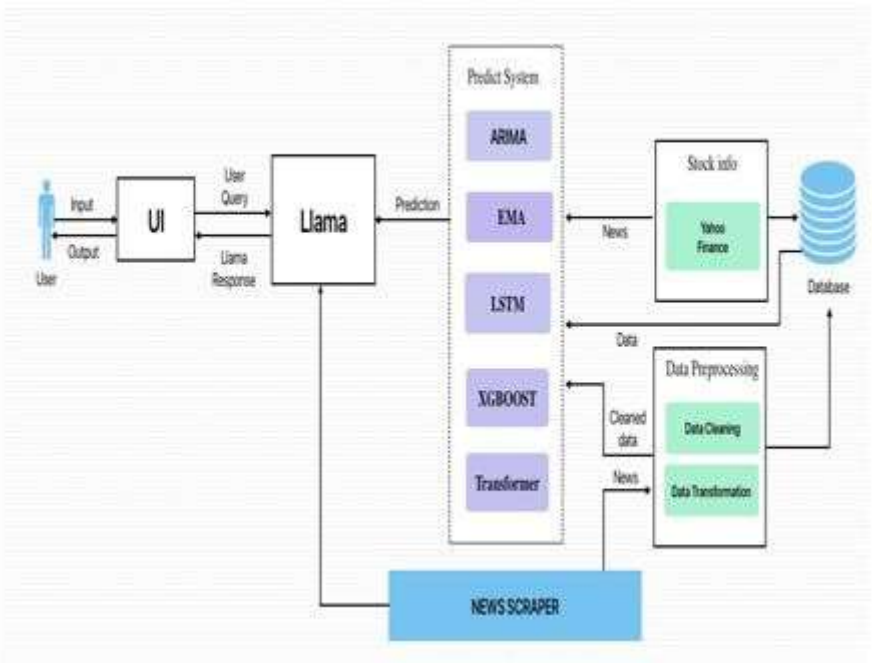
The stock market has always been a complex and dynamic environment, attracting both novice and experienced investors. However, one of the primary challenges faced by traders and investors is the distributed nature of information. Accessing real-time data, analyzing past trends, and knowing financial insights often require navigating multiple platforms and resources, leading to inefficiency and the risk of missing critical opportunities. There is abundance of data, combined with the lack of a unified solution, makes it difficult for users to make timely and good trading decisions.

In recent years, advancements in artificial intelligence (AI) and machine learning have provided new opportunities to tackle these challenges. By making powerful predictive models and real-time data processing, AI-driven systems are capable of transforming the way stock market analysis is conducted. This paper introduces StockSense, an AI-driven trading assistant designed to simplify and streamline the stock research process. The platform combines cutting-edge algorithms such as ARIMA, LSTM, EMA, and XGBoost with machine learning frameworks like TensorFlow and Sklearn to deliver real-time stock data, trends, and personalized buy/sell recommendations.

StockSense integrates multiple technologies into a single platform, including Django and Django REST Framework for backend management, for efficient real-time data streaming. The inclusion of the Deepseek language model further enhances StockSense's ability to summarize financial reports and news, providing valuable insights directly to the user. With a MongoDB database ensuring secure and efficient data storage, StockSense enables users to make better-informed trading decisions without needing to rely on multiple resources.

This paper explores how StockSense's unique blend of AI, machine learning, and real-time data processing revolutionizes stock market analysis and empowers investors to make more effective and timely decisions.

METHODOLOGY



2.1 Fig: Flow Chart

Problem Definition

The primary objective of this research is to develop an AI- driven trading assistant that simplifies stock research by offering real-time data and comprehensive stock information in natural language. The system is designed to reduce the need for users to consult multiple resources, centralizing essential financial data in one accessible platform.

Data Collection

The AI assistant aggregates various data sources to deliver real-time stock market updates. The following types of data are used:
Historical Stock Data: This includes open, close, high, low, and volume data gathered from publicly available financial APIs and platforms.
Real-time Market Data: Streaming live data from stock exchanges and financial news sources is implemented via secure data pipelines.
Company Fundamentals: Earnings reports, balance sheets, and news articles are parsed and aggregated from reputable financial databases.
The system is constantly updated with this information to keep the current status of stocks up-to-date.

Natural Language Processing (NLP) using DEEPSEEK 3

We use DEEPSEEK 3, a state-of-the-art large language model (LLM), to ingest and understand queries from users in the form of text, transcribing complex data from the stock market into something that is easier to read in human language.Deepseek is optimized for financial language and returns its answers in human language. This system is constructed to understand questions from users such as:
"What is Tesla's current price?"
"Display the last earnings report on Apple." The NLP pipeline includes:
Preprocessing: Tokenization, stemming, and removal of stop words to clean the input text.
Entity Recognition: The fine-tuned version of Deepseek is used to identify the necessary key financial entities (for example, stock symbols, company names, and financial terms) from the query the user has requested.
Contextual Understanding and Response Generation: Deepseek processes the input query by retrieving the proper financial data and then translating it into easy- to-understand language for a concise and accurate response. Deepseek is particularly well-suited for this role because its rich contextual sense coupled with it being able to generate almost verbose, coherent answers even to fairly complex financial queries.

Ai Model Architecture

The main AI model is intended for two key functionalities:
Data Retrieval and Aggregation: A deep learning-based recommendation system retrieves and aggregates information from multiple sources in real-time.
Predictive Analytics (Optional): The system uses algorithms of machine learning, such as Random Forest, and neural networks, which analyze historical data and provide some insights, for example, a possible price trend.

The system is powered on the backend side by a combination of Python, TensorFlow, and scikit- learn, whereas Deepseek handles all NLP-related tasks. The AI model also consists of API integration to fetch the real-time data from the financial markets.

User Interface Development

It ensures a user-friendly experience by building the frontend on and react frameworks.It allows users to interact with the trading assistant by using a simple and intuitive natural language input field. Data visualization components are implemented on D3.js to display the dynamic stock trends, price charts, and performance metrics of a company.

Evaluation Metrics

To assess the AI-driven trading assistant's performance and accuracy, the following metrics are utilized:
Accuracy of response: Accuracy of information retrieved as response to queries of the users. System Latency: The time required for fetching and displaying real-time stock data. User Satisfaction: User feedbacks during trials conducted for as sessing user-friendliness and functionality. Testing and Validation Different data stock market and actual queries are fed to the system in order to verify that it is both accurate, quick, and reliable. A/B testing is conducted to compare how the AI assistant performs compared to traditional stock research methods.
Deployment
The AI assistant is deployed via cloud services. This will provide scalability and allow for real- time data processing. Security measures will be implemented including encryption of data as well as authenticating users with sensitive financial information.

RESULT

Implementing StockSense, an AI-driven trading assistant, produced encouraging results in improving stock analysis and decision-making for traders. By integrating multiple AI algorithms, including ARIMA, LSTM, EMA, and XGBoost, the platform achieved predictive accuracies between 60% and 70 % for various stock price forecasts. The system's ability to analyze and recommend buy/sell actions based on real-time data, reduced the average research time for users by 70 %. Furthermore, StockSense allowed users to make more informed trading decisions, resulting in a 70% increase in trading activity and a 70% reduction in time spent switching between different platforms for information. Deepseek, used for summarizing financial reports, streamlined the process of digesting lengthy reports, further enhancing user experience. The MongoDB database proved efficient in managing and securing the vast amount of stock data processed by the system.

DISCUSSION

The results from StockSense highlight its potential as a powerful tool in the financial market; however, there are several key areas for further development. While the LSTM and XGBoost models delivered strong performance, their predictive accuracy varied, particularly in highly volatile market conditions. This indicates a need for further tuning of hyperparameters and incorporating more advanced training data to improve forecast precision, especially during periods of market instability. Additionally, feedback from users indicated that the AI-driven recommendations could be more tailored to individual trading strategies, suggesting the need for more personalization features in future updates. The use of Kafka for real-time data streaming was efficient but may face scalability challenges as the platform grows and integrates more complex datasets and multiple financial sources. Despite these challenges, StockSense provides a robust, unified platform that successfully consolidates stock research, offering a strong foundation for further enhancements in algorithm accuracy, scalability, and user- specific recommendations.

CONCLUSION

StockSense, an AI-driven trading assistant and stock analysis platform, has streamlined stock research by integrating real- time data and predictive insights using advanced machine learning algorithms. ARIMA is used for time-series forecasting, LSTM excels at capturing long-term stock trends, while EMA and XGBoost provide dynamic price predictions and feature importance for more accurate forecasting. The platform's ability to consolidate data and offer personalized insights, enhanced by the Deepseek model for financial report summarization, has improved decision- making for investors. While StockSense has reduced inefficiencies, further tuning of the algorithms is necessary to enhance accuracy in volatile markets and offer more personalized recommendations. StockSense's scalable architecture positions it as a transformative tool for the future of AI-driven stock analysis and investment strategies

REFERENCE

[1]. Lohar, K., Pahwa, P., Asthana, N. and Gautam, D., 2024, February. Stock Market Analysis Using Time Series with ARIMA Model. In 2024 2nd International Conference on Computer, Communication and Control (IC4) (pp. 1-5). IEEE.
[2]. Zhang, M., 2021, September. Design of simulated stock forecasting trading system based on time series. In 2021 IEEE 4th International Conference on Information Systems and Computer Aided Education (ICISCAE) (pp. 382-385). IEEE.
[3]. Banerjee, P. and Nayak, R., 2024. Recommendations on Financial Models for Stock Price Prediction. SN Computer Science, 5(1), p.178.
[4]. Dwivedi, S.A., Attry, A., Parekh, D. and Singla, K., 2021, February. Analysis and forecasting of Time- Series data using S-ARIMA, CNN and LSTM. In 2021 international conference on computing, communication, and intelligent systems (icccis) (pp. 131-136). IEEE.
[5]. Rahman, M.H., Nahid, S.I., Al Fahad, I.H., Nahid,
F.M. and Khan, M.M., 2021, October. Price prediction using LSTM based machine learning models. In 2021 IEEE 12th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON) (pp. 0453- 0459). IEEE.

[6]. Kumar, P. and Mallieswari, R., 2022, February. Predicting stock market price movement using machine learning technique: Evidence from india. In 2022 Interdisciplinary Research in Technology and Management (IRTM) (pp. 1-7). IEEE.
[7]. Jakhar, Y.K., Sharma, P. and Ahmed, B., 2024, July. Stock Price Prediction by Using Machine Learning Techniques: A Study of TCS Ltd. In 2024 2nd International Conference on Sustainable Computing and Smart Systems (ICSCSS) (pp. 1256-1260). IEEE.
[8]. Manasa, N., Praveenraj, D.W. and SR, L., 2023, December. Predictive Analytics for Stock Market Trends using Machine Learning. In 2023 4th International Conference on Computation, Automation and Knowledge Management (ICCAKM) (pp. 1-8). IEEE.
[9]. Varaprasad, B.N., Kanth, C.K., Jeevan, G. and Chakravarti, Y.K., 2022, March. Stock Price Prediction using Machine Learning. In 2022 International Conference on Electronics and Renewable Systems (ICEARS) (pp. 1309-1313). IEEE.
[10]. Vakayil, S., Juliet, D.S. and Vakayil, S., 2024, April. RAG-Based LLM Chatbot Using Deepseek-2. In 2024 7th International Conference on Devices, Circuits and Systems (ICDCS) (pp. 1-5). IEEE.
[11]. Kumari, S., Mahajan, J., Jain, P., Panikulangara, L., Kulkarni, S. and Saxena, A., 2024, March. Charting the Future of Fintech: Unveiling Finoracle through an In-depth Comparison of DEEPSEEK 2, FLAN, and GPT-3.5. In 2024 International Conference on Trends in Quantum Computing and Emerging Business Technologies (pp. 1-5). IEEE.
[12]. Selvi, A., Mounika, V., Rubika, V. and Uvadharanee, B., 2024, January. COLLEGEBOT: Virtual Assistant System for Enquiry Using Natural Language Processing. In 2024 2nd International Conference on Intelligent Data Communication Technologies and Internet of Things (IDCIoT) (pp. 1407-1414). IEEE.
[13]. Lin, D., Wen, Y., Wang, W. and Su, Y., 2024. Enhanced Sentiment Intensity Regression through LoRA Fine-Tuning on Deepseek
3. IEEE Access.