AGRI EXPERT SYSTEM- MARKET INTELLIGENCE AND PRICE PREDICTION SYSTEM

Geetha C[1], Suwethikaa G[2], Tulasi S S[3], Ashforn Hermina J M[4]

STUDENT, COMPUTER SCIENCE AND ENGINEERING, BANNARI AMMAN INSTITUTE OF TECHNOLOGY, TAMILNADU, INDIA

STUDENT, INFORMATION TECHNOLOGY, BANNARI AMMAN INSTITUTE OF TECHNOLOGY, TAMILNADU, INDIA

STUDENT, INFORMATION TECHNOLOGY, BANNARI AMMAN INSTITUTE OFTECHNOLOGY, TAMILNADU, INDIA

ASSISTANT PROFESSOR, ARTIFICIAL INTELLIGENCE AND DATA SCIENCE, BANNARI AMMAN INSTITUTE OF TECHNOLOGY, TAMILNADU, INDIA

ABSTRACT

The project titled "market intelligence and price prediction system " address Price Prediction System Using SVM (Support Vector Machine) Algorithm is a cutting-edge program designed to offer insightful analyses of the financial markets and highly accurate asset price forecasts. For well-informed investment decisions in today's competitive and dynamic financial environment, fast and accurate market information is essential. By integrating sophisticated data analytics, machine learning techniques, and the tried-and-true abilities of the Support Vector Machine algorithm, this solution is specifically created to fulfill this demand. Market intelligence and price forecasting system Trading, portfolio management, investment analysis, and financial advice are just a few of the professionals and organizations who use the SVM algorithm as a vital tool. This system empowers users to make well- informed and potentially successful investment decisions in the dynamic world of finance by combining data-driven insights, sentiment analysis, technical analysis, and the powerful SVM algorithm.

Keyword: *Data preprocessing, Model selection and implementation, Deployment*

I.INTRODUCTION

Market intelligence and price prediction systems leverage machine learning algorithms to analyze historical market data and make predictions about future prices or market trends. These systems play a vital role in various industries, including finance, trading, real estate, and commodities, by providing valuable insights to investors, traders, and decision-makers. market intelligence and price prediction system are to enable data-driven decision-making by utilizing historical price data, economic indicators, and other relevant factors. By processing large volumes of data and identifying patterns, machine learning models can capture complex relationships and make informed predictions, aiding stakeholders in optimizing their strategies and minimizing risks. Various machine learning algorithms are employed for price prediction tasks, such as Support Vector Machines (SVM), Random Forest, Gradient Boosting, Long Short-Term Memory (LSTM) networks, or Prophet. These models are trained on historical data to learn patterns and relationships. Once the models are trained and evaluated, they are deployed to make real-time predictions and generate market intelligence insights. The system provides predictions on future prices, identifies potential trends, and highlights relevant patterns in the data. Data visualization techniques are used to present the results and insights in a user-friendly and interpretable format. Charts, graphs, and dashboards help stakeholders understand the predictions and trends. As new data becomes available and the system gains feedback, it should be continuously updated and refined to adapt to changing market conditions and improve predictive accuracy. In conclusion, a market intelligence and price prediction system using machine learning is a powerful tool for investors and decision-makers, allowing them to make informed choices based on data-driven insights. By combining historical market data and sophisticated machine learning algorithms, these systems can

provide valuable predictions and help users navigate the complexities of financial markets and other economic sectors. The complexity, volatility, and constant change of the financial markets are its defining characteristics. Making informed investing decisions in this volatile climate requires immediate access to reliable market intelligence. The Market Intelligence and Price Prediction System is a ground- breaking application that makes use of state-of-the-art technologies, such as advanced data analytics, machine learning, and artificial intelligence, to give investors, traders, and financial professionals a complete toolkit for navigating these complex markets.

II. BACKGROUND

A. Machine learning

Support Vector Machines (SVM): SVM can be employed for both regression and classification tasks, depending on the problem formulation. Back testing and Evaluation: After developing the prediction models, back testing techniques are used to evaluate their performance using historical data. Proper evaluation metrics such as mean squared error (MSE), mean absolute error (MAE), or Sharpe ratio are employed to assess the model's effectiveness'-trained DL models are employed to extract image features, providing better accuracy performances than conventional models and enhancing interpretability, understandability, and data.

B. PROPOSED TRAINING MODULE

To gather financial data from diverse sources, create reliable data integration pipelines. To assure data accuracy and consistency, use data cleansing and preprocessing processes. Apply cutting-edge NLP methods to sentiment analysis of news articles and social media posts. To extract valuable insights from unstructured textual data, this comprises sentiment categorization, entity recognition, and topic modeling. Implement SVM models with an impassion on parameter adjustment and optimization for price prediction. Train SVM models using historical price data and pertinent attributes for a variety of financial instruments. To construct hybrid models, combine SVM with other machine learning techniques like recurrent neural networks (RNNs) or long short-term memory (LSTM) networks. Through the capture of intricate temporal correlations in financial data, this can improve forecast accuracy. Create a system interface that is simple and easy to use. Make sure users can easily establish preferences, customize dashboards, and receive notifications. Give data and predictions clear representations and explanations. Create a system for ongoing learning and model modification. To retrain machine learning models and make sure they remain accurate and relevant, regularly update the system with new market data. Enable user cooperation by integrating system-wide tools for exchanging knowledge, tactics, and research. Promote debates and knowledge exchange among the user base. Enable user cooperation by integrating system-wide tools for exchanging knowledge, tactics, and research. Promote debates and knowledge exchange among the user base. Create a scalable system design to handle increasing data volumes and user loads. To assure real-time or nearly real-time data processing, use performance enhancement approaches. The Market Intelligence and Price Prediction System utilizing the SVM Algorithm can successfully address the issues mentioned in the problem statement by putting these suggested solutions into practice, giving users a strong and trustworthy set of tools for making educated financial market decisions. thorough back testing to evaluate the effectiveness of the SVM-based prediction models. Benchmark the models against other forecasting techniques and validate them using historical data.

III. LITERATURE SURVEY

All of the characteristics that have long been in the status quo are taken into account when predicting agricultural prices. The prognosis and forecasting of crop prices and the markets will be of tremendous benefit to the farmers as well as the nation in an economy like India where the market is open to all and is mostly based on agriculture. The farmers in India's traditional agriculture are unable to profit from their harvests. With the aid of machine learning techniques, we suggest a price prediction model that enables farmers to make informed choices both before to planting and while selling their harvest. In comparison to monthly price movement over a four- decade period, the proposed model's robustness is assessed. They suggest an intelligent system that can forecast the best crops based just on a farmer's current location, general instructions for crop preparation and yield, and a systemic strategy for selling crops from grower to customer. For the purpose of predicting crop yield, we employed the Random Forest Regression, Support Vector Regression, and Voting Regression methodologies and made use of current information on the local climate, weather, and soil. The ability of

current technologies to create an automated advanced application for a variety of objectives has also been proved. In the proposed work, decision tree and neuro-evolutionary algorithms are employed as machine learning models to produce an improved estimate of agricultural productivity and cost. The study offers a thorough examination of the machine learning-based methods and algorithms applied in the agricultural sector. All of the characteristics that have long been in the status quo are taken into account when predicting agricultural prices. The prognosis and forecasting of crop prices and the markets will be of tremendous benefit to the farmers as well as the nation in an economy like India where the market is open to all and is mostly based on agriculture. This study makes the assertion that machine learning algorithms should be used to forecast agriculture price changes and to apply the newest ML trends to the task. To help the cause, a variety of data mining techniques are employed, including K-Means, K-Nearest Neighbor (KNN), Artificial Neural Networks (ANN), and Support Vector Machines (SVM). The farmers in India's traditional agriculture are unable to profit from their harvests. With the aid of machine learning techniques, we suggest a price prediction model that enables farmers to make informed choices both before to planting and while selling their harvest. In comparison to monthly price movement over a four-decade period ,the proposed model's robustness is assessed. India's traditional agriculture farmers struggle to profit from harvests. A machine learning model using cardamom data combines ARIMA and multivariate linear regression for informed decisions. The robustness of the proposed model is assessed over a four-decade period.

IV.PROBLEM STATEMENT

Investors, traders, and financial professionals have tremendous difficulties in making wise investment decisions and managing their portfolios in the continuously changing environment of the financial markets. The demand for trustworthy market intelligence and price prediction tools is greater than ever in the context of financial markets that exhibit continuous fluctuations and complex dynamics. To address these issues head-on, the suggested Market Intelligence and Price Prediction System use the SVM algorithm. To give users accurate market intelligence, sentiment analysis, price predictions, risk assessments, and an intuitive interface, it intends to leverage the power of advanced data analytics, natural language processing, machine learning, and SVM. By doing this, it hopes to equip traders and investors with the knowledge they need to make wise choices, effectively manage risk, and increase profitability in the extremely dynamic and competitive financial market environment.

V.TECHNIQUES USED (SVM ALGORITHM):

Programming languages: Python is Widely used for data analysis, machine learning, and web development.
Data Collection and Integration: Libraries like Beautiful Soup and Scrapy in Python for extracting data from websites. Utilize APIs to fetch real-time data from sources like market exchanges, weather services, and news agencies. ETL (Extract, Transform, Load). Tools like Apache Nifi or Talend for data extraction, transformation, and loading tasks.
Data Storage: MySQL, PostgreSQL, or SQLite for structured data storage. Like MongoDB or Cassandra for handling unstructured or semi-structured data. Such as Amazon Redshift or Google Big Query for large-scale data storage and analysis.
Data Preprocessing and Cleaning: A Python library for data manipulation and cleaning. For numerical operations on data arrays. Like Open Refine or Trifacta for data cleansing.
Feature Engineering: Such as Pandas and NumPy for creating new features.
Machine Learning and SVM Implementation: A comprehensive machine learning library in Python that includes SVM implementations. A library for SVM implementation. You might implement custom kernels for SVM, depending on your data and problem.
Real-time Data Feeds: To establish real-time connections for data updates. For fetching live market data and news feeds.
User Interface Development: Such as Django or Flask for backend development. Like React, Angular, or Vue.js for building dynamic friends. D3.js, Plotly, or Matplotlib for creating interactive charts.
Performance Monitoring and Logging: Like Log4j (Java), Winston (Node.js), or Python's built- in logging module. Such as Prometheus and Grafana for tracking system performance and issues.
Deployment and Containerization: For containerizing application components. For container orchestration and scaling.
Project Management and Documentation: Project management tools for tracking tasks and milestones. For documenting project details, requirements, and user stories.
Security and Data Privacy: Such as OAuth for user access control. For handling sensitive data in compliance
with regulations like GDPR.
Cloud Services: For cloud-based data storage, computing resources, and serverless computing.

VI.PROPOSED SOLUTIONS

To gather financial data from diverse sources, create reliable data integration pipelines. To assure data accuracy and consistency, use data cleansing and preprocessing processes. Apply cutting-edge NLP methods to sentiment analysis of news articles and social media posts. To extract valuable insights from unstructured textual data, this comprises sentiment categorization, entity recognition, and topic modeling. Implement SVM models with an emphasis on parameter adjustment and optimization for price prediction. Train SVM models using historical price data and pertinent attributes for a variety of financial instruments. To construct hybrid models, combine SVM with other machine learning techniques like recurrent neural networks (RNNs) or long short-term memory (LSTM) networks. Through the capture of intricate temporal correlations in financial data, this can improve forecast accuracy. Create a system interface that is simple and easy to use. Make sure users can easily establish preferences, customize dashboards, and receive notifications. Give data and predictions clear representations and explanations. Create a system for ongoing learning and model modification. To retrain machine learning models and make sure they remain accurate and relevant, regularly update the system with new market data. Enable user cooperation by integrating system-wide tools for exchanging knowledge, tactics, and research. Promote debates and knowledge exchange among the user base. Enable user cooperation by integrating system-wide tools for exchanging knowledge, tactics, and research. Promote debates and knowledge exchange among the user base. Create a scalable system design to handle increasing data volumes and user loads. To assure real time or nearly real-time data processing, use performance enhancement approaches. The Market Intelligence and Price Prediction System utilizing the SVM Algorithm can successfully address the issues mentioned in the problem statement by putting these suggested solutions into practice, giving users a strong and trustworthy set of tools for making educated financial market decisions. thorough back testing to evaluate the effectiveness of the SVM-based prediction models. Benchmark the models against other forecasting techniques and validate them using historical data.

VII.OBJECTIVES

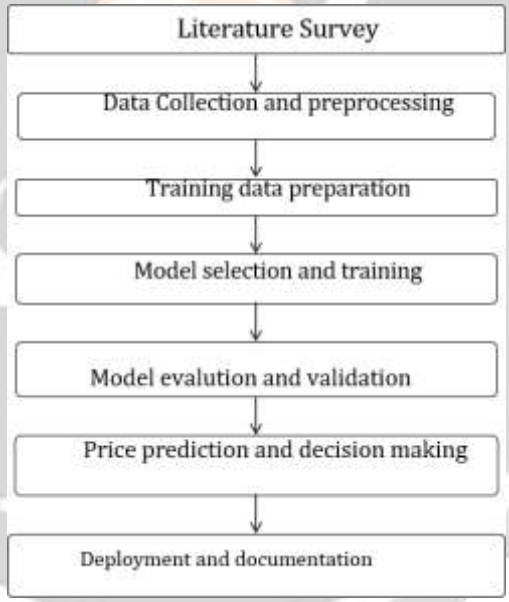
The first objective of this project is to collect and integrate relevant data sources. This includes historical price data, weather information, crop yield data, and market news. The system will use APIs, web scraping, and data warehouses to gather this information. High-quality data is crucial for accurate predictions. The project will involve data preprocessing steps such as handling missing values outlier detection, and data normalization to ensure data reliability. Feature engineering will be performed to create meaningful variables that can enhance prediction accuracy. This may include generating lag features, sentiment analysis of market news, and aggregating data on a regional level. The heart of the system will be the machine learning models, particularly Support Vector Machines (SVM), which will be used for price prediction. These models will be trained on historical data to learn patterns and relationships between various factors and commodity prices. Real-time Market Intelligence: To provide users with up-to-date information, the system will include a real-time market intelligence component. This can involve live market feeds, news sentiment analysis, and weather updates that can impact crop production. The system will have a user-friendly web or mobile interface. Users can access historical price trends, market news, and price forecasts. The interface will allow users to input specific parameters for customized predictions. Price Prediction: Users will be able to make price predictions for specific agricultural commodities based on the latest data and machine learning models. The system will provide price range forecasts and confidence levels. Performance Evaluation: Continuous monitoring and evaluation of the prediction models will be conducted to ensure their accuracy and reliability. This includes metrics like Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE). The system will be designed to accommodate additional features, data sources, and commodities. It will be scalable to handle increasing data volumes and extensible to include advanced machine learning techniques if needed. Security and Data security and user privacy will be a top priority. Encryption and access controls will be implemented to safeguard sensitive information. In conclusion, this project aims to create a powerful tool that empowers stakeholders in the agricultural sector with valuable market intelligence and price predictions. By leveraging data, machine learning, and real-time updates, this system will contribute to better decision-making and more efficient operations within the agricultural industry.

VIII. METHODOLOGY

Identify and access various data sources, including public database. Extract relevant data such as historical commodity prices, weather conditions, crop production statistics, and market news. Develop data pipelines to

preprocess, clean, and integrate data from diverse sources into a unified dataset Explore the integrated dataset to identify potential features that can influence commodity prices. Create additional features, including lag features, moving averages, and sentiment scores from news articles. Perform data transformations and aggregations to make data suitable for modeling. Choose appropriate machine learning algorithms, such as Support Vector Machines (SVM), time-series models, or ensemble methods. Split the dataset into training and testing sets to evaluate model performance. Train the selected models on historical data, fine-tuning hyperparameters as necessary. Implement real-time data feeds and APIs to continuously update market information, including current commodity prices, weather forecasts, and news sentiment. Develop automated processes for data ingestion and update. Design an intuitive user interface that allows users to explore historical data trends, access real-time market intelligence, and input custom parameters for price predictions. Implement interactive visualization tools to present data insights effectively. Continuously monitor model performance and data quality. Use metrics like MAE and RMSE to evaluate the accuracy of price predictions. Implement alert systems for users when significant market changes occur. Design the system architecture to be scalable, considering future data volume and feature expansion. Implement strong security measures, including encryption, authentication, and authorization, to protect user data and system integrity. Gather user feedback and suggestions for system improvements. Iteratively enhance the system based on user input and changing market conditions. By following this methodology and objectives, the Market Intelligence and Price Prediction System project can provide valuable insights and predictions to stakeholders in the agricultural industry, assisting them in making informed decisions and optimizing their operations.

IX. FLOWCHART



X. RESULT

The results of a Market Intelligence and Price Prediction System project using SVM (Support Vector Machine) algorithm can have significant implications for stakeholders in the agricultural sector and other related industries. Here are some of the key results and benefits that can be expected from such a project. The SVM algorithm, when trained with historical data and relevant features, can provide accurate price predictions for agricultural commodities. This can help farmers traders, and investors make informed decisions regarding buying, selling, or holding commodities. Stakeholders in the agricultural sector can use the system's predictions to optimize their operations. For example, farmers can decide when to harvest crops or plant new ones based on price forecasts and weather conditions. Price prediction models can assist in risk management by identifying potential price fluctuations. This allows stakeholders to implement risk mitigation strategies such as futures contracts or diversification. Real-time market intelligence, including live price updates and news sentiment analysis, enables users to stay informed about current market trends and events that can impact prices. Users can customize their analysis by inputting specific parameters and preferences, allowing for tailored price predictions and market insights by making data-driven decisions based on accurate predictions, stakeholders can potentially increase their profitability and reduce losses. Farmers can optimize resource allocation, including water, fertilizers, and labor, based on price predictions and expected crop yields. The system can provide data-driven insights into the

factors affecting price fluctuations, helping users understand the market dynamics better. Continuous monitoring of model performance and user feedback can lead to iterative improvements in the system's accuracy and usability. Users who have access to reliable price predictions and market intelligence gain a competitive edge in the agricultural market The system can generate reports and documentation that can be valuable for compliance with regulations and auditing purposes. Implementing robust security measures ensures the confidentiality and integrity of user data, building trust among users. The system can be designed to scale and adapt to changing market conditions and additional commodities or data sources. The project can contribute to research in the field of Agricultural economics and machine learning while also serving as an educational resource for students and researchers. Policymakers can use the system to gain insights into the Agricultural market, helping them formulate policies that support the industry. In summary, the results of a Market Intelligence and Price Prediction System project using SVM algorithm are expected to provide valuable tool sand insights that benefit a wide range of stakeholders in the agricultural sector. These results can lead to improved decision-making, increased profitability, and enhanced competitiveness in the market.

XI. DISCUSSIONS IN IMPORTANT FINDINGS

A discussion on a Market Intelligence and Price Prediction System project using the Support Vector Machine (SVM) algorithm involves considering the significance, challenges, and implications of such a project. Here's a detailed discussion: This project is highly significant, particularly in the context of the agricultural sector. Agriculture is influenced by numerous factors, and accurate price predictions are crucial for farmers, traders, and policymakers. By leveraging SVM and data- driven insights, this system can bring about transformative changes. SVM is a powerful machine learning algorithm known for its ability to handle both linear and non-linear data. In this project, SVM plays a pivotal role in accurately predicting commodity prices, helping users make informed decisions One of the primary challenges is sourcing and handling data. Agricultural data can be diverse, unstructured, and subject to quality issues. The project's success depends on effective data collection, preprocessing, and integration. Effective feature engineering is critical. Creating relevant features that capture the nuances of the agricultural market can significantly impact the accuracy of price predictions. Providing real-time market intelligence is a game-changer. Users need access to the latest market data, and integrating live data feeds and sentiment analysis of news articles adds immense value. A user- friendly interface is essential. Customization features and intuitive data visualization tools make the system accessible and cater to users with varying levels of expertise. While SVM is known for its predictive power, it can be less interpretable than some other algorithms. Balancing predictive accuracy with model interpretability is a consideration. The iterative nature of the project, including monitoring and user feedback integration, is crucial for its long-term success. It ensures that the system remains relevant and reliable. Ethics and regulatory compliance are paramount. Handling sensitive data and making predictions that impact livelihoods require strict adherence to privacy regulations and ethical standards. Beyond practical applications, this project can serve as a valuable resource for academic research in agricultural economics, machine learning, and data science. It has the potential to advance knowledge in these fields. The project has the potential to revolutionize decision-making in the agricultural sector. Stakeholders can optimize their operations, reduce risks, and increase profitability, ultimately contributing to the industry's growth. Scalability ensures the system can handle growth, while robust security measures protect user data and maintain trust. In conclusion, a Market Intelligence and Price Prediction System project using SVM algorithm represents a pivotal step toward leveraging data and machine learning for the betterment of the agricultural sector. Its significance lies in its ability to provide actionable insights, mitigate risks, and drive informed decision-making, ultimately contributing to the sector's sustainability and growth. However, it also comes with challenges related to data, model interpretability, and ethical considerations that must be carefully addressed.

XII. CONCUSION

In conclusion, a Market Intelligence and Price Prediction System project using the Support Vector Machine (SVM) algorithm holds immense promise for transforming decision-making in the agricultural industry and related sectors. This project, through its integrated approach to data analysis, modeling, and real-time market insights, has the potential to deliver significant value to a wide range of stakeholders. In summary, the Market Intelligence and Price Prediction System project using SVM algorithm represents a valuable tool for stakeholders in the agricultural industry, providing them with actionable insights and predictions to navigate the dynamic and often unpredictable agricultural market. Its potential to enhance decision-making, mitigate risks, and increase profitability positions it as a transformative solution in the agricultural sector.[30]

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