



Market Timeline Visualizer

¹PRAJWAL B,

¹Student

¹Department of Information Science and Engineering,

¹Don Bosco Institute of Technology,
Bengaluru, India

Abstract: The volatile and non-linear nature of commercial markets makes accurate forecasting of monetary instruments a challenging task. However, with advances in intelligent systems and computational power, programmable Forecasting techniques have grown more effective in anticipating the behavior of tradable assets. This project leverages three deep learning models to enhance prediction accuracy: a neural network-based regressor model, an ANN that combines prediction data to aid in developing strong, reliable conclusions, and a network of recurrent neurons (RNN) model that analyzes historical asset behavior. The RNN model employs a LSTM layer to capture temporal dependencies effectively. This research explores the practical applications of the prediction system in real-world scenarios and addresses challenges in achieving reliable accuracy, complemented by necessary data visualizations.

Index Terms - Artificial Neural Network, Long-Short Term Memory, Support Vector Machine.

I. INTRODUCTION

Financial market modeling and forecasting have long attracted scholars from diverse academic fields. The financial market is a virtual space where buyers and sellers exchange commodities like stocks, bonds, precious metals, and cryptocurrency. Predicting trends and prices, especially in the stock market, using machine learning and neural networks is a prominent research challenge today. In this project, we use financial data instead of daily data to reduce noise and provide a larger sample over shorter periods, improving the prediction accuracy. Financial market fluctuations are closely tied to current events and economic news, as investors make decisions based on current events rather than just relying on past data or strategies. However, cognitive biases frequently influence human judgments, which can result in losses, particularly for retail investors without access to sophisticated data-analysis tools. Institutional investors, in contrast, use sophisticated models and technology to gain an edge. Inspired by the potential of deep learning algorithms to uncover hidden patterns in asset trajectories, this project aims to assist individual financiers in creating better choices. Our objective is to investigate the efficiency of computer vision in predicting stock prices and to make these tools accessible to a broader audience by offering a user- friendly interface with intuitive data visualization.

II. VIEW OF THE LITERATURE

Numerous investigations have explored the application of expert system models in forecasting financial market prices, particularly for cryptocurrencies and stock indices. McNally et al. (Paper 1) focused on predicting Bitcoin prices by employing network of recurrent neurons (RNN) and LSTM models, with the Boruta algorithm used to enhance feature engineering. They optimized the LSTM parameters through Bayesian techniques, making their approach robust to the non-linear and volatile nature of Bitcoin prices. Despite its strengths, the model faced issues with over-fitting, particularly due to hidden features and noise within the price data, a common challenge in financial forecasting.

Computer vision techniques has been used by other researcher to stock market indices. Fischer and Krauss (Paper 2) employed LSTM networks to predict financial market movements using the S&P 500 index. They carefully addressed survivor bias by compiling month-end constituent lists, covering a period from December 1989 to September 2015, and used RMSprop as an optimizer. While the LSTM outperformed conventional deep neural networks (DNN) and logistic regression, their research did not entirely address the significant model training time that handle long-term dependencies. Similarly, Long et al. (Paper 3) introduced a multi- filter neural network (MFNN) for the Chinese CSI 300 index, utilizing a model of a mixed neural network that has been tuned using back propagation and stochastic gradient descent (SGD). Their approach illustrates the potential of frameworks for hybrid deep learning for improving prediction accuracy.

Additional studies highlight the utility of SVM's and ANN in stock prediction. Kara et al.(Paper 4) explored stock index movement prediction on the Istanbul Stock Exchange using SVM and ANN, documenting parameter adjustments in detail. While lacking innovation in technical indicators or model structure, their work emphasized the further validation across datasets is required.Ni et al. (Paper 5) also used SVM combined with fractal feature selection to predict stock trends on the shanghai stock exchange composite index, relying on 19 technical indicators and k-fold cross-validation for optimal parameter tuning. Their study's approach provides insightful information for financial forecasting models, especially with similar datasets.

III. PROPOSED SYSTEM

The proposed system is designed to elevate current functionalities by significantly enhancing data security,streamlining processes, and ensuring exceptional data accuracy. By minimizing manual data entry, it accelerates processing times and maximizes efficiency, enabling simultaneous transactions through parallel processing. Additionally, an automated retraining mechanism maintains the model's high accuracy over time, further reducing operational time compared to manual workflows. This upgraded system addresses previous model limitations, delivering a more secure, efficient, and reliable solution for robust data management and transaction processing.

IV. SYSTEM ARCHITECTURE

The system architecture of our project is mainly divided in some parts like fetching data, pre-processing data, splitting data into prediction models for feeding into selected prediction technique.

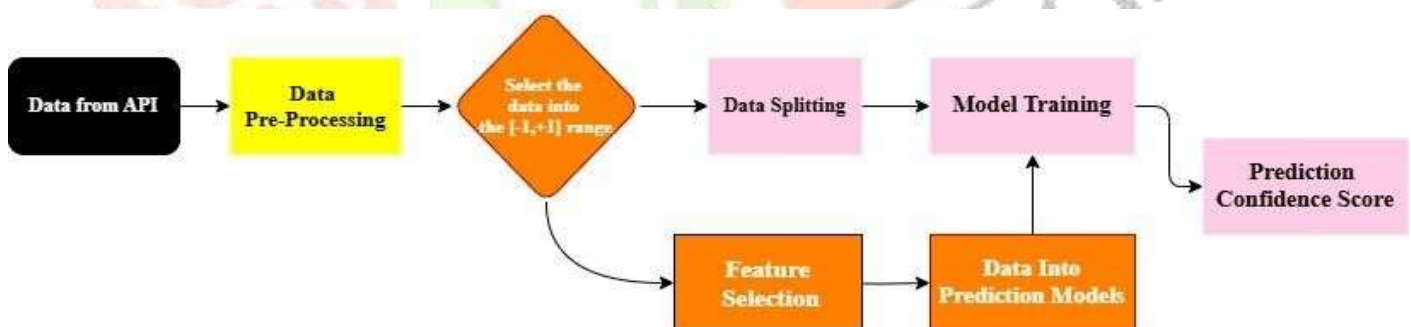


figure 1. architecture of project

1. Problem Statement : it is the initial stage where we find out the most problems faced by stock investors and especially new people who wanted to invest their money didn't know which stock to invest.
2. Requirement gathering: After finding the problems, we research about this problem and go through related research papers. Implement related topics on our project to enhance the scales of prediction.
3. Finalize the model: numerous strategies and many algorithms implemented upon this problem but, they tend to stick to a particular model for prediction, here we have used many regression techniques and algorithms (SVR ,linear regression, polynomial regression) to get the result.
4. Data collection : The live data is fetched from Yfinance of a particular stock which is selected.
5. Model Training : In this setup is to train the selected model with the pre-processed data.
6. Web app development : We use Streamlit framework of python while the online application is being developed.

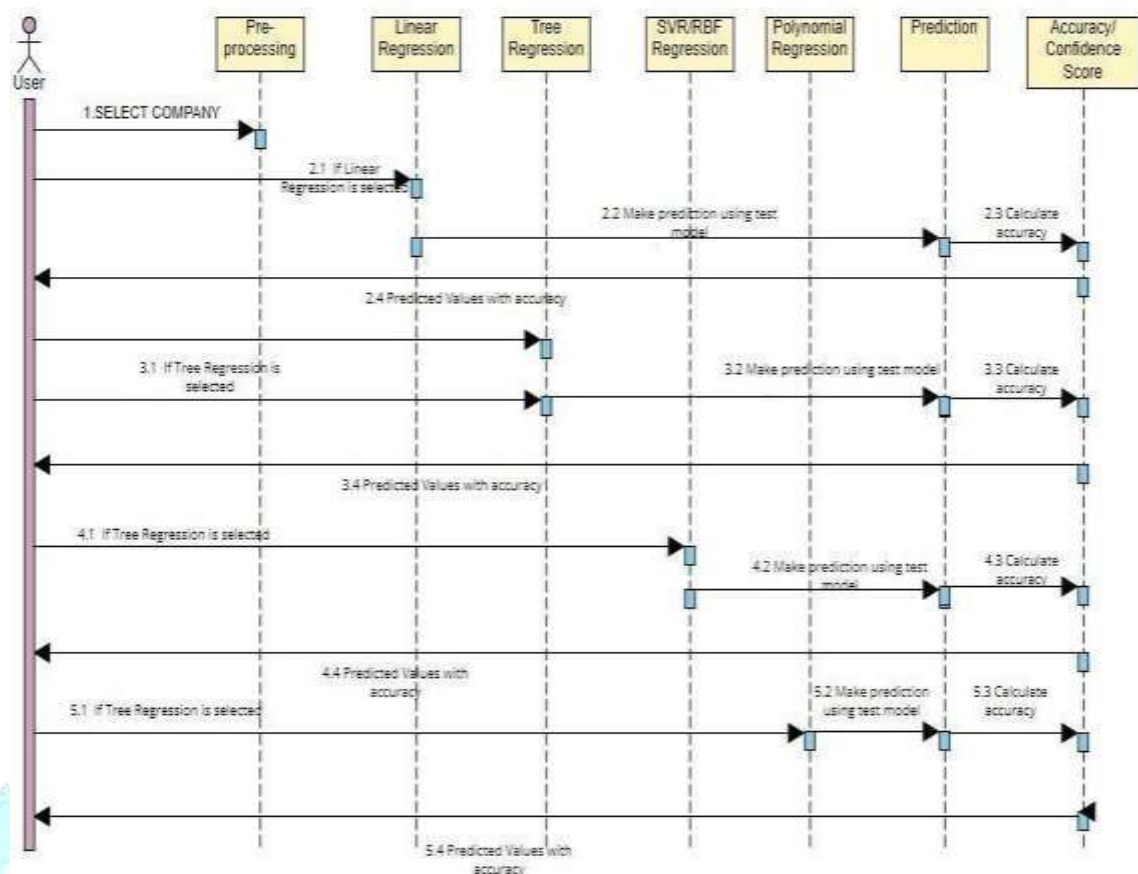
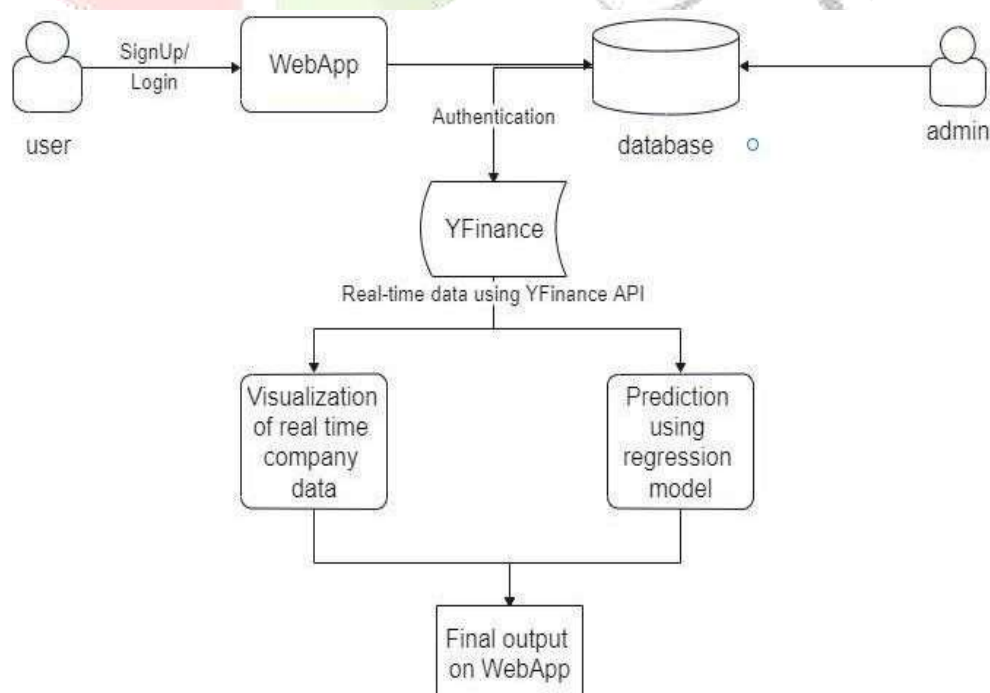


figure 2. sequence of system diagram

This diagram specifies the timeline and selection of different actors and objects and the sequence of steps undertaken to complete the functionality of the module.

V. SOFTWARE APPLICATION

In order to assess design and operating specifications and serve as the foundation for additional modification, this stage of the systems development life cycle improves hardware and software qualifications, creates programming plans, instructs users, and conducts comprehensive testing procedures.



Sign up:

First, interested users register by choosing their preferred username, password, and other required information. A database will then be used to keep each user profile, which the user can modify as needed. Every individual will need to register once, and login with credentials to log in. Each person's information is saved for later use, along with their username and password.

Login:

The user logs in to the homepage after entering the right username and password. The user can see the project's basic premise and subject there. Users are denied access to the main page if they input their login or password incorrectly. If the user forgets the password they can reset by clicking the forgot your password button.

Homepage:

Once the user enters their login and password correctly, the web application allows them to visit the homepage.

Data Analysis :

Displays the live share price evolution where the user is able to choose the time frame of the business analysis. It also contains the volume of the stocks, opening prices of the stock, the stock's high price, low cost of the assets as well as its closing price for the day.

Prediction :

Displays all the predicted values using a graph from ployLy python module. The user can choose between the following regression models :

1. **Linear Regression:** The most extensively used modelling technique is linear regression, which assumes a linear connection between a dependent variable (Y) and an independent variable (X). It employs a regression line, also known as a best-fit line. The linear connection is defined as $Y = c + m * X + e$, where 'c' denotes the intercept, 'm' denotes the slope of the line, and 'e' is the error term.
2. **Polynomial Regression :** is a type of linear regression in which the association between the independent variable X and dependent variable Y is modeled as an nth degree polynomial. Polynomial regression fits a nonlinear relationship between the value of C and the corresponding conditional mean of Y, denoted $E(Y|X)$.
3. **Decision Tree Regression :** is a plan for generating decisions that models actions and all of their probable results, comprising benefit , input costs, and outcomes, alternatively it implements a tree structure analogous to a flowchart. The decision-tree algorithm belongs to the class of algorithms used in supervised learning. It is used in both categorical and continuous output variables.
4. **Support Vector Regression : SVM,** is the foundation upon which SVR is constructed. SVM retains all of the main characteristics that define the algorithm (maximal margin) and can also be utilized as a regression technique. With only a few small variations, the SVR classification algorithm follows the same concepts as the SVM.

Result

Here the user is presented with confidence score of the selected regression model and the respective company. Confidence score's meaning for Conversational AI can be classified as follows:

- Over 0.7: the prediction is a strong candidate for answering the user query.
- Between 0.3 and 0.7: the prediction can partially answer the request.
- Below 0.3: the prediction is probably not a good choice.

VI. RESULT and CONCLUSION :

Sign up and Login

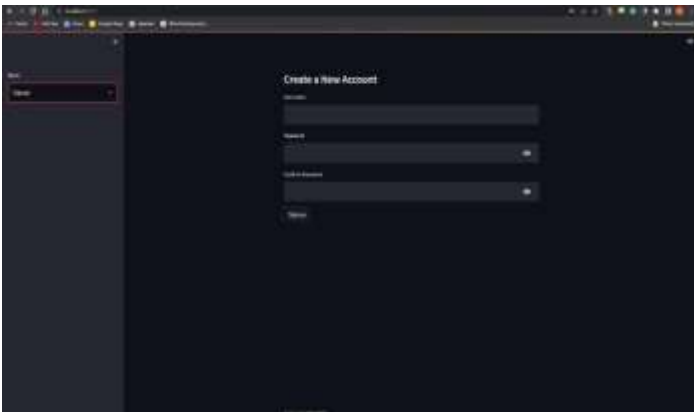


figure 3. sign up

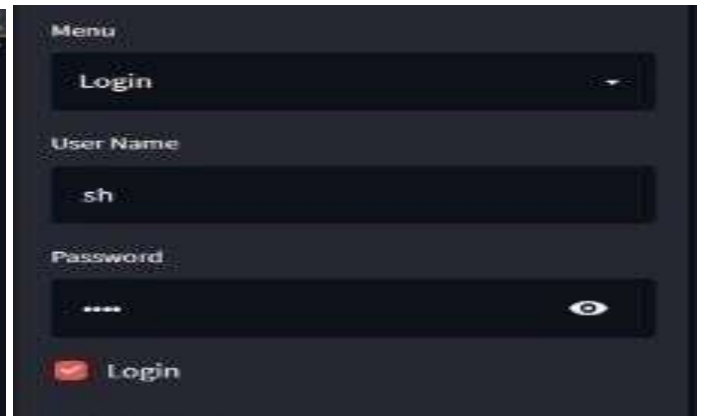


figure 4. login

Homepage and Courses :

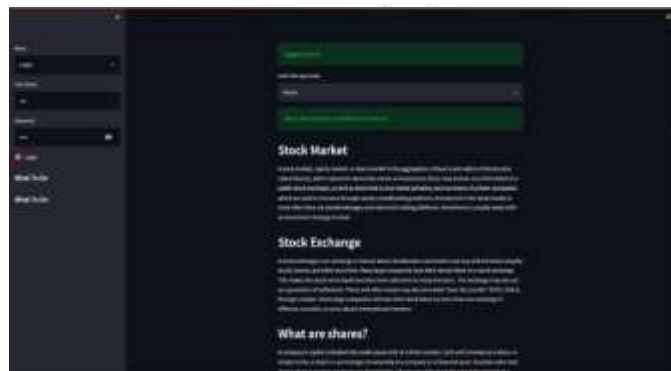


figure 5. homepage



figure 6. selecting company

Result:

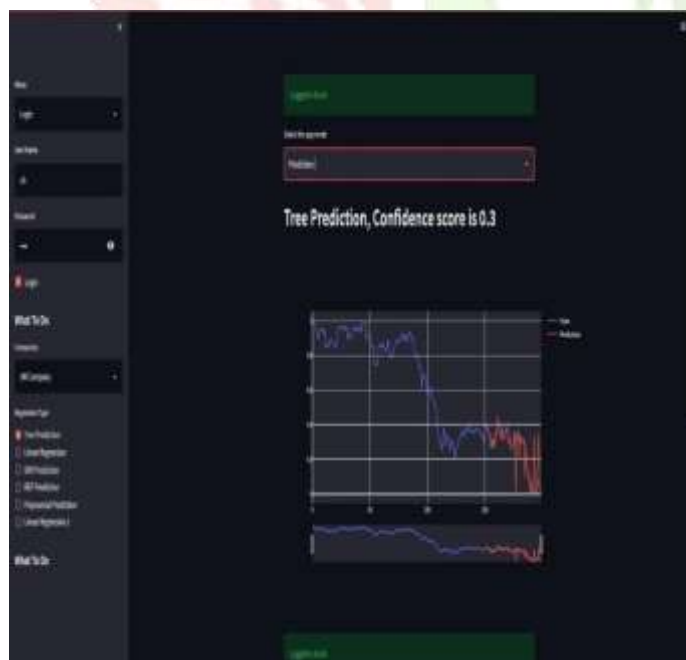


figure 7. prediction 1

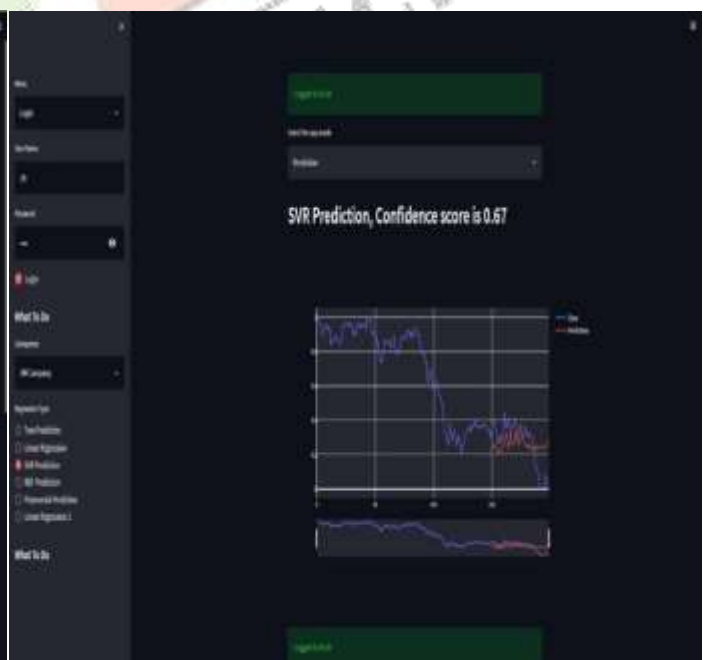


figure 8. prediction 2

CONCLUSION

As assets prediction model implement ML algorithms that were developed recently, there has been a possibility of integrating this into profitable trading systems. This has led to the inference that ML techniques are capable of enhancing the accuracy and efficiency of the predictions made about certain events. However, this will help our prediction models become more accurate, as a much larger data-set than current one will in the future be used to improve the prediction system of the associated asset. Other intelligent system models could be examined as well to establish the precision rate they achieve.

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