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Stock Market Price Prediction Using Machine Learning Algorithms

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ABSTRACT: In stock market price prediction, the aim is to predict the future values of the stocks of a company. The recent trend in stock market prediction technologies is the machine learning to predict stock values based on the previous trends using different Machine Learning Algorithms and comparing their results. Factors considered while predicting stocks are open, close, high, low, volume.

I. INTRODUCTION

Stocks are very volatile; this complex nature of stock prices is a significant attraction for researcher and statisticians to find a way to predict them. Despite the numerous amount of research publications in this field, there are still many that claim that stock markets cannot be predicted. This is primarily because of the number of factors that affect stocks prices and those factors themselves depend on some other, potentially unknown factors.

The more commonly used approach for stock market predictions is to use past experiences in price changes to predict future change in prices. "Financial forecasting is an example of a signal processing problem which is challenging due to small sample sizes, high noise, non-stationarity, and non-linear". With stocks, the data is typically the stock values from real-time transactions and hence getting a large sample will depend on a more extended time period. A longer period of time does not always give the right result as the financial markets are not stable at such intervals. However, if the factors that impact stock prices can be understood, then it could be possible to predict the prices without relying on historical prices so much.

II. RELATED WORK

There have been many works done in the area of image segmentation by using different methods. And many are done based on different application of image segmentation. *K*-means algorithm is the one of the simplest clustering algorithm and there are many methods implemented so far with different method to initialize the center . And many researchers are also trying to produce new methods which are more efficient than the existing methods, and shows better segmented result. Some of the existing recent works are discussed here.

Pallavi Purohit and Ritesh Joshi introduced a new efficient approach towards *K*-means clustering algorithm. They proposed a new method for generating the cluster center by reducing the mean square error of the final cluster without large increment in the execution time. It reduced the means square error without sacrificing the execution time. Many comparisons have been done and it can conclude that accuracy is more for dense dataset rather than sparse dataset.

III. PROPOSED SYSTEM ARCHITECTURE

In this paper, we are proposing to develop a web application which can provide prediction result with speedy cacalculations and trying to achieve highest accuracy possible.

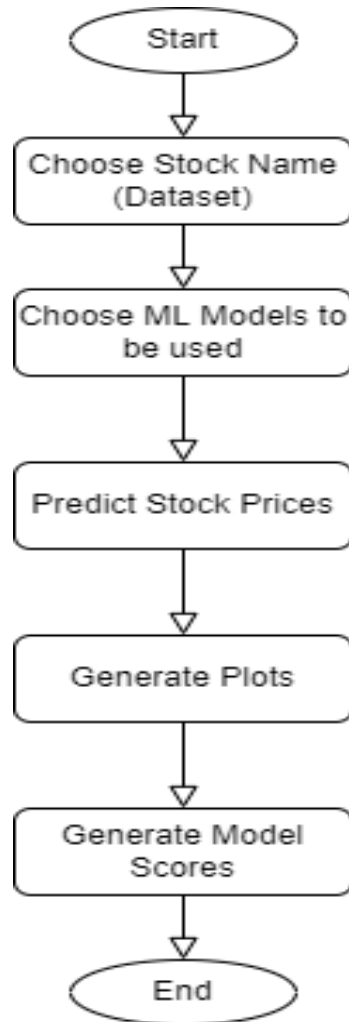To above object the below system architecture is proposed.

Figure 1. Flow Chart

Data Set: The Data set is the collection of related states of information that is composed of seperate elements but can be manipulated as a single unit by a computer. Data set was acquired from Kaggle which contains past stocks data from 2017 to 2021 contains fields like company name, low price, high price, volume, open, close etc.

ML Models: The 7 ML Models are used to predict the the future price of stocks. Following are the 7 Machine Learning models that are used :

I.   SVR (Linear)
II.   SVR (RBF)
III.   Linear Regression
IV.   Randomn Forests
V.   K Nearest Neighbors (KNN)
VI.   Decision Trees
VII.   Elastic Net

Plots: Using Matplotlib - Data Visualization the predicted stock prices in the form of graph is displayed.

Integrator: Integrator work as an intermediate platform Between user interface and trained model or the backend And frontend. "app.py" is the main file in this unit.

Interface: User interface is used to accept the query from the user and display output on the screen of a system.

IV. IMPLEMENTATION

When it comes to web application development, there are a ton of architectural patterns one can follow. In order to develop a dynamic application that does a fair amount of computing, a separate implementation for backend is recommended. One of the most popular web application architecture is the client-server architecture. In this type of architecture, we can have the frontend and backend separate codebase or in the same codebase. If both backend and frontend are in the same codebase then that type of application is called a monolithic application. One major advantage of using monolithic client-server architecture is that we can use Server Rendered Web Pages. In our case as we are using Flask, instead of using a separate UI library (such as ReactJS or Angular) we can use the html templates to implement the user interface efficiently.

The flow of the application is as follows:
1. The user goes to the login page, logs in successfully.
2. The user then goes to the main application page.
3. The user chooses Machine Learning algorithms and the Stocks from given selection, and submits.
4. The backend receives user selection data, it predicts the stock prices using the predefined algorithms, by reading from CSV files.
5. The backend renders the html according to the results sends it to the frontend.
6. Then the user is presented with the visualization of the comparison between predicted prices of various stocks.

Following are the important part of the application architecture which are explained further in respective sections:
1. Frontend / User Interface: The user facing web pages.
2. Backend: The application that lives on a http port and serves the requests. The backend flask application has routes which serves the specific client requests.
3. Http Routing: The way frontend and backend communicate with each other.
4. Dataset: The huge collection of data required to train the machine learning algorithms. The data is in CSV (Comma Separated Values) files. We have used CSV files because the easy availability.

Then we calcualted the Mean Square Error of each model and the lower the value of mean square error the greater the efficiency of Algorithms/Models.
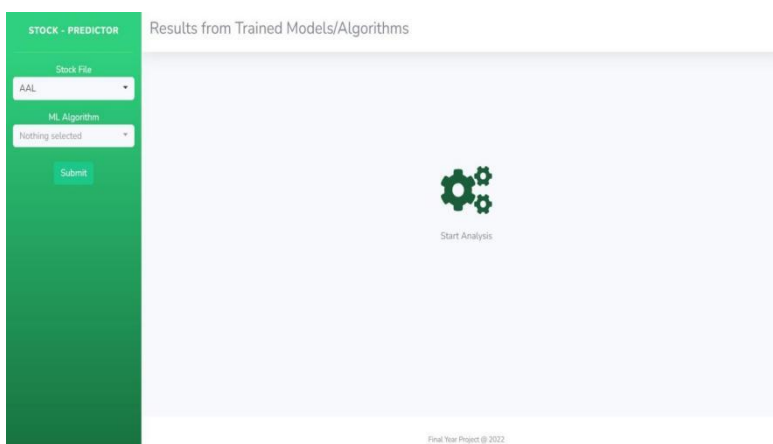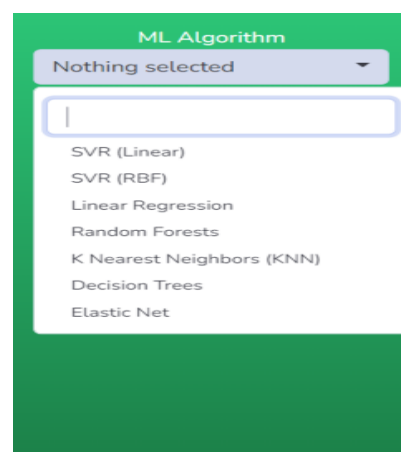
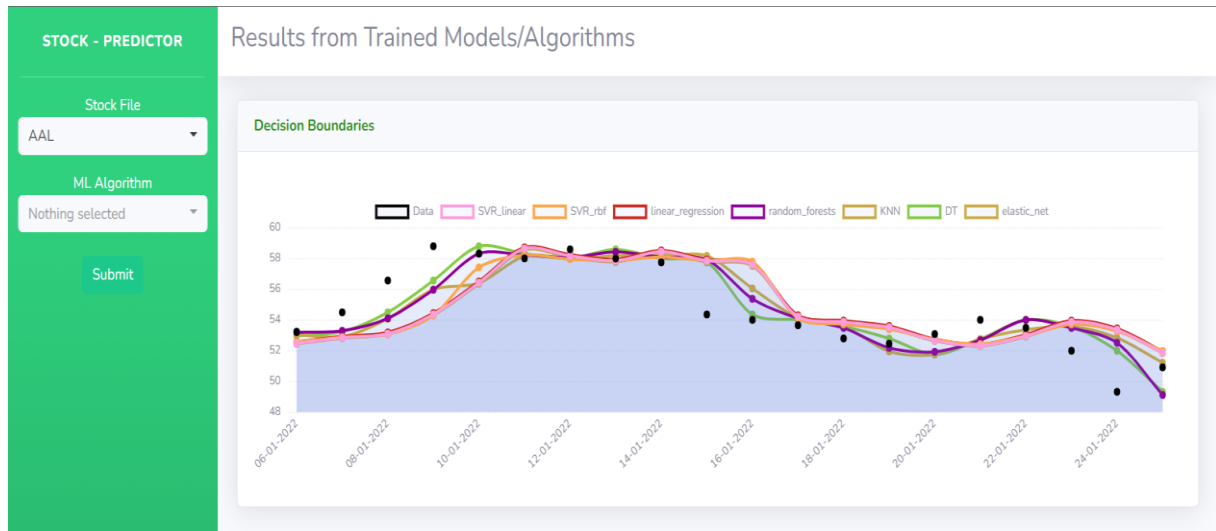

Figure 2. User Interface

Figure 3. List of ML Algo
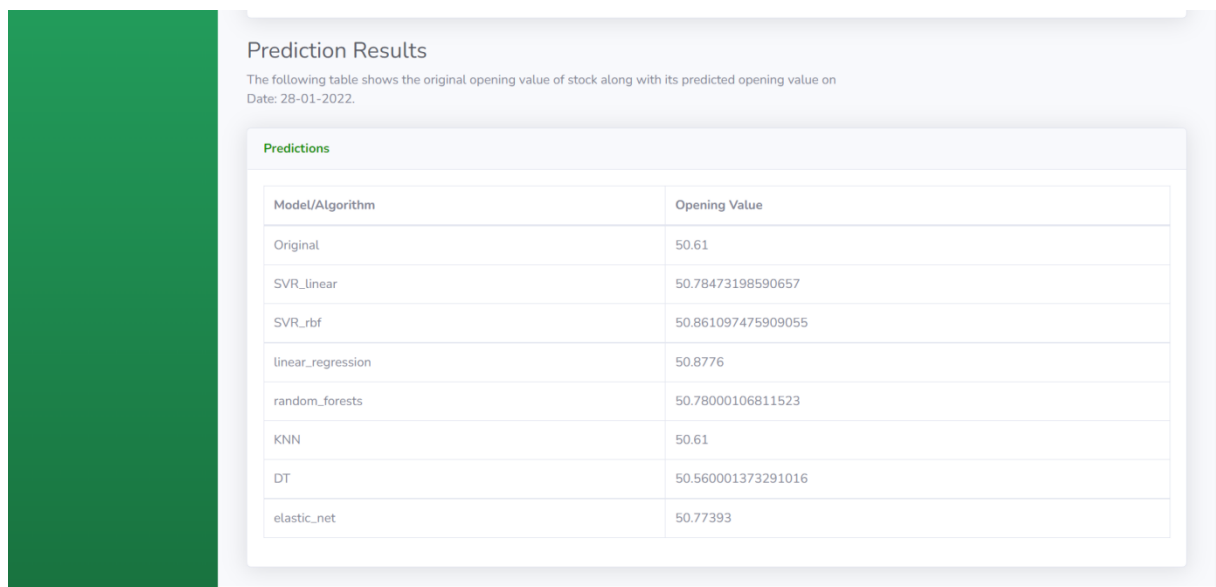
Figure 4. Data Visualization

Figure 5. Prediction

V. CONCLUSION AND FUTURE WORK

Stock market prediction is a very sought after field in the modern world. Many researchers have built many models to try to achieve very high accuracy on stock price predictions. Since the stock market is affected by various factors, most researchers focus on different features to make a prediction, but only a few try to incorporate more than one such factor. A more commonly used approach for stock predictions is using a trend-based approach, which uses a company's historical stock prices to predict its future value. This is a tried and trusted approach, mainly because investors or traders as a whole have the most impact on the value of a company, and if everyone uses the same approach, which gives the same result, then people follow this approach, thereby giving the expected result. Hence the investors themselves are the cause of that final value of a company.

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