

Stock Price Prediction based on Financial Ratios using Support Vector Algorithm

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Abstract: *Stock markets are without any doubt, an integral and indispensable part of a country's economy. There is a growing realization amongst the booming middle class and its rise in disposable income, that investment in Fixed Deposits with 5-6% per year returns is cut down by inflation. On the other hand, returns in stock market provide up to 15% CAGR returns. With this, we see a rise in amateur investors and retail money flooding the market; especially during pandemic that saw a rise of digital trading platform like Sharekhan, Zerodha, and Espresso in their number of active users. Unfortunately, as much as 95 per cent retail investors to consistently lose money in stock market, due to absence of poor core fundamentals in the company invested. While there are many ways of impulsive buying and selling, here we rather focus on long term investment. This includes holding different assets like mutual funds, securities, shares and stocks for more than a year, preferably for more than 5-10 years. The proposed approach for our system to predict forward stock prices based on the company fundamentals and financial ratios using support vector algorithm*

Keywords: Support Vector Algorithm, SVR, Financial Indicators/ratios, Stock price prediction, Regression Feature Extraction, Machine Learning, Artificial intelligence

I. INTRODUCTION

The people's living standards gradually increased, in addition to food and clothing problems, more and more people began to focus on the stock market investment, which also provides for development of the stock market is a necessary condition. The stock market is not only the focus of investors, but also a valuable place for scholars to study and research. Stock price forecasting is an important issue and interesting topic in financial markets. Because reasonable and accurate forecasts have the potential to generate high economic benefits, many researchers have been involved in the study of stock price forecasts. Several technologies have been developed for stock market prediction for upcoming days, however, they are highly unreliable due to the dynamic nature of stock market.

This paper's remainder is categorized as follows: The first section consists of the Abstract and Introduction after that the second Section presents the other pieces of literature that we referred to before working on this project.. In Section three, we define the problem statement we were solving and in Section four the system methodology and workflow that we followed in given. Section 5 has the results of the model and Section 6 concludes our research.

II. LITERATURE SURVEY

[1] Xianghui Yuan , Jin Yuan , Tianzhao Jiang , and Qurat Ul Ain “Integrated Long-Term Stock Selection Models Based on Feature Selection and Machine Learning Algorithms for China Stock Market”, IEEE Access,2020

[2] Naliniprava Tripathy, “Stocks Market Prediction Using Support Vector Machine Approach”, IACME,2019

[3] Zhen Hu , Jie Zhu and Ken Tse ,” Stocks Market Prediction Using Support Vector Machine”, 6th International Conference on Information Management,2013

[1] provides analysis and comparison between Random Forest Algorithm, Artificial Neural Networks, Support Vector Algorithm to predict stock price. It is our base paper from where we determined the type of algorithm to be SVM due to its better accuracy in comparison to Random Forest and Artificial Neural Network.

[2] This paper tests different combinations of feature set to find efficient combination. The prediction performance of SVM outperforms other models used. The SVM model is beneficial in highly volatile market like Indian stock market. It analyses the strength of SVM model for market return of investors when subject to variety of indicators like volatility and momentum indicators of index and stock price, and concludes that the hit ratio of SVM is highly efficient in analyzing the direction of price movement.

[3] mentions SVM as an algorithm with desirable characteristics and also suggests that SVM is a powerful predictive tool for stock predictions in the financial market. It summarizes that SVM shows pretty good effect with an accuracy of 96.15%. It uses four company specific indicators namely net revenue, net income, diluted earnings per share, price per earnings ratio of stock, hence it inspired us to choose fundamental indicators of company for long-term investment.

III. SYSTEM ARCHITECTURE

A Web application is considered to manage the user interaction with the system. User needs to register himself to the application, initially required data needs to be submitted by the user Data of users will be stored in FireBase.

Database will be mainly divided into two partitions, namely Training and Testing :

(a) On training dataset we use Linear kernel function for SVR. For training the model we provide input as financial parameters for ex. Sales revenue, PBT, EPS, Net Profit. From the data we extract important parameters. The feature scaled data is passed to support vector algorithm, and the stock prices are predicted.

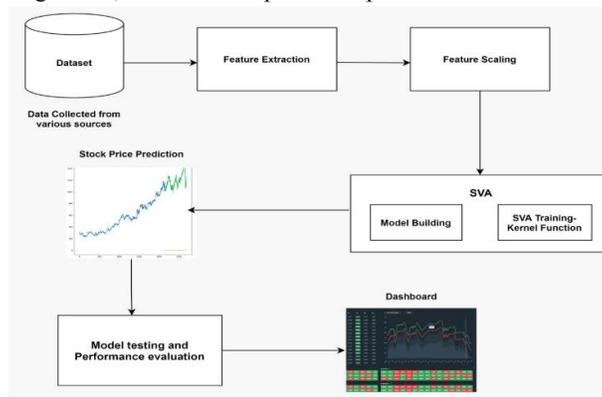


Fig 1: Architectural Daigram

(b) On testing dataset, we record the accuracy of the predicted mean value and range provided.

IV. OBJECTIVE

The core idea is to develop stock price prediction system on basis of financial ratios which will be deployed on web to reduce hardware dependency. Identify the financial factor that contribute to long term stock price appreciation. Predict and visualize the stock price. Provide Algorithmic trading system for intraday trading.

V. METHODOLOGIES

Feature Extraction is the process of selecting a subset of relevant features for use in model construction which impact the stock price by ignoring the redundant or irrelevant data. After data preprocessing, feature extraction and scaling, we split the training and testing data

Financial ratios such as EPS, Revenue, Net Income, EBITDA, PBT create huge impact on stock price.

They are used for training the model where we provide input as financial parameters. From the data we extract important parameters. The feature scaled data is passed to support vector algorithm, and the stock prices are predicted.

Support Vector Regression is a supervised learning algorithm that is used to predict discrete values. Support Vector Regression uses the same principle as the SVMs. The basic idea behind SVR is to find the best fit line. In SVR, the best fit line is the hyperplane that has the maximum number of points.

After modeling the data after using the appropriate kernel function, we use the testing data for checking the accuracy. Apart from the predicted price a range is provided to the user above and below the price ($\pm \epsilon$), to give a general idea about the direction of the price movement.

VI. BENEFITS

1. The Air quality standard devised by CPCB, WHO, OSHA or Govt. of India helps us to determine air quality data of an area.
2. The data displayed by the app would help us to determine polluted areas, level of pollution and AQI.
3. This app would help us to determine whether the government programmes for pollution control are working efficiently or not.
4. This app will make the users aware of any health-related issues caused due to the air pollution in their localities.
5. After collecting the data, proper measures can be taken to control the pollution and take care of the environment and living organisms.

VII. FUTURE SCOPE

1. To predict Indian stock prices for upcoming years based on financial ratios.
2. Predict stock prices for major companies.
3. Providing Automated trading system for intraday trading.
4. Creating a dashboard for stock prices for few a major companies

VIII. RESULT & CONCLUSION

In this proposed system, we provide users with valuable information to take long-term investment decisions. This is to encourage substantive earnings through stock market, rather than impulsive buying and selling of the stock. The core idea is to not get affected by momentary bearish or bullish position in market, rather a consistent performance of the stock over a long period of time in its core fundamentals. The use of various indicators helps to capture this trend. The dataset has adequate number of stocks of NIFTY over which support vector algorithm helps to predict with the use of convenient kernel solution function. In the future, we are planning to extend our dataset even further to get correct predictions even in worst cases like sudden economic breakdown

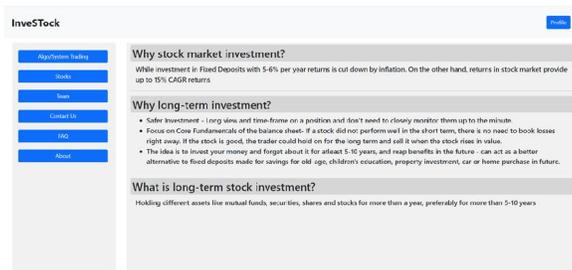


Fig 2: Landing Page of the application.



Fig 3: Stock List Page

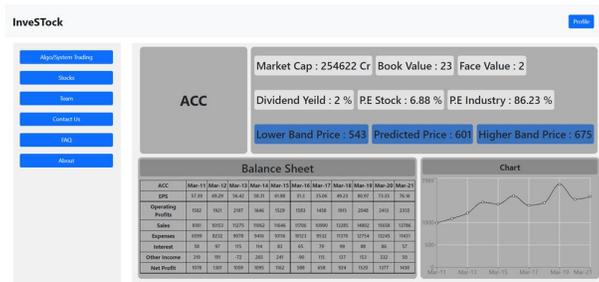


Fig 4: Stock Dashboard

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