

# Implementation of Support Vector Machine Predicts Stock Market

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**Abstract**— A lot of studies provide strong evidence that traditional predictive regression models face significant challenges in out-of sample predictability tests due to model uncertainty and parameter instability. In market so many algorithm are present for stock market prediction such as Artificial Neural Network but the SVM provides the stock value with efficiently within a less amount of time. Recent studies introduce particular strategies that overcome these problems. Support Vector Machine (SVM) is a relatively new learning algorithm that has the desirable characteristics of the control of the decision function, the use of the kernel method, and the sparsity of the solution. In this dissertation, I present a theoretical and empirical framework to apply the Support Vector Machines strategy to predict the stock market. Firstly, four company-specific and six macroeconomic factors that may influence the stock trend are selected for further stock multivariate analysis. Secondly, Support Vector Machine is used in analysing the relationship of these factors and predicting the stock performance. My results suggest that SVM is a powerful predictive tool for stock predictions in the financial market. Also I compare the prediction value by SVM and ANN so we are get concluded which algorithm get efficient to predict the value of stock market. So SVM provides the more efficiency than ANN and SVM predicted result giving is more profitable to the user.

**Keywords**— Stock Classification, Data Mining, Support Vector Machine, Forecasting, Artificial Neural Network, Dataset

## I. INTRODUCTION

The macroeconomic environment and the financial market are complex, evolutionary, and non-linear dynamical systems. Before we study the historic volatile days of the ten years, let us first know what are:

- a) Stock Markets
- b) Stock exchanges

### a) Stock Markets:

Stock Market is a market where the trading of company stock, both listed securities and unlisted takes place. It is different from stock exchange because it includes all the national stock exchanges of the country. For example, we use the term, "the stock market was up today" or "the stock market bubble."

**b) Stock Exchanges:** Stock Exchanges are an organized marketplace, either corporation or mutual organization, where members of the organization gather to trade company stocks or other securities. The members may act either as agents for their customers, or as principals for their own accounts.

Stock exchanges also facilitates for the issue and redemption of securities and other financial instruments including the payment of income and dividends. The record keeping is

central but trade is linked to such physical place because modern markets are computerized. The trade on an exchange is only by members and stock broker do have a seat on the exchange.

In the middle of the 13th century, Venetian bankers began to trade in government securities. In 1351 the Venetian government outlawed spreading rumors intended to lower the price of government funds. Bankers in Pisa, Verona, Genoa and Florence also began trading in government securities during the 14th century. This was only possible because these were independent city states not ruled by a duke but a council of influential citizens. Italian companies were also the first to issue shares. Companies in England and the Low Countries followed in the 16th century.

The Dutch East India Company (founded in 1602) was the first joint-stock company to get a fixed capital stock and as a result, continuous trade in company stock occurred on the Amsterdam Exchange. Soon thereafter, a lively trade in various derivatives, among which options and repos, emerged on the Amsterdam market. Dutch traders also pioneered short selling a practice which was banned by the Dutch authorities as early as 1610. There are now stock markets in virtually every developed and most developing economies, with the world's largest markets being in the United States, United Kingdom, Japan, India, Pakistan, China, Canada, Germany (Frankfurt Stock Exchange), France, South Korea and the Netherlands.

The stock market is one of the most important ways for companies to raise money, along with debt markets which are generally more imposing but do not trade publicly. This allows businesses to be publicly traded, and raise additional financial capital for expansion by selling shares of ownership of the company in a public market. The liquidity that an exchange affords the investors enables their holders to quickly and easily sell securities.

The smooth functioning of all these activities facilitates economic growth in that lower costs and enterprise risks promote the production of goods and services as well as possibly employment. In this way the financial system is assumed to contribute to increased prosperity, although some controversy exists as to whether the optimal financial system is bank-based or market-based. Recent events such as the Global Financial Crisis have prompted a heightened degree of scrutiny of the impact of the structure of stock markets (called market microstructure), in particular to the stability of the financial system and the transmission of systemic risk.

The field of financial forecasting is characterized by data intensity, noise, non-stationary, unstructured nature, and hidden relationships. Predicting financial indicators is therefore a difficult task. However, forecasting is important in the sense that it provides concrete data for investment decisions. How can we predict whether the price of a

particular stock will go up or down in the upcoming year? In the modern techniques, one way is to develop a predictor based on the information in the historical data. First of all, we should select some major factors that may influence the performance of the stocks; we can further discover an interesting model from our dataset to predict the future performance of any stocks. That is to say, we need to learn a model that can map those factors into the class attribute which indicates the whole performance of stocks.

Support vector machine (SVM) is a machine learning technique that can be used for this purpose of classification. Established on the unique theory of the structural risk minimization principle to estimate a function by minimizing an upper bound of the generalization error, SVM is shown to be very resistant to the over-fitting problem, eventually achieving a high generalization performance. Another key property of SVM is that training SVM is equivalent to solving a linearly constrained quadratic programming problem.

**Following are the objective:**

1. The main objective of implementation of this project is to predict the stock market current condition with reference of last day's stock market value. It is beneficial to the use who can predict the value of the any company share value using this algorithm so it will guess that the financial condition of that company whether the share of company is satisfactory or not how it goes in increasing range or going to the decreasing. So it is forecast the stock exchange. In market so many algorithm are present for stock market prediction but the SVM provides the stock value with efficiently within a less amount of time.
2. The Second main objective of the project is that it will work on the big data value. This algorithm takes the data from the global networking financial site with specified attribute. These attribute have, Last-day opening Stock Price, Last-day high Value of Stock Price, Last-day low, Value of Stock Price, Last-day stock Volume, Last-day closing price. Etc. these value is available in the financial data after that these data is covert in to the .CSV (Comma Separate Value) .xlsx (Excel file). These file contain large amount of data that database at the time of prediction these value are executed by algorithm and get the prediction of given stock in the market.
3. Third objective is that in given project we have to compare the prediction value by SVM and ANN so we are get concluded which algorithm get efficient to predict the value of stock market.

In the project, we proposed the use of data collected from different global financial markets with machine learning algorithms to predict the stock index movements. Our conclusion can be summarized into following aspects:

- SVM algorithm work on the large dataset value which collected from different global financial markets. Also SVM does not give a problem of over-fitting.
- Correlation analysis indicates strong interconnection between the Market stock index and global markets that close right before or at the very beginning of trading time.

- Various machine learning based models are proposed for predicting daily trend of Market stocks. Numerical results suggests high efficiency
- A practical trading model is built upon our well trained predictor. The model generates higher profit compared to selected benchmarks.

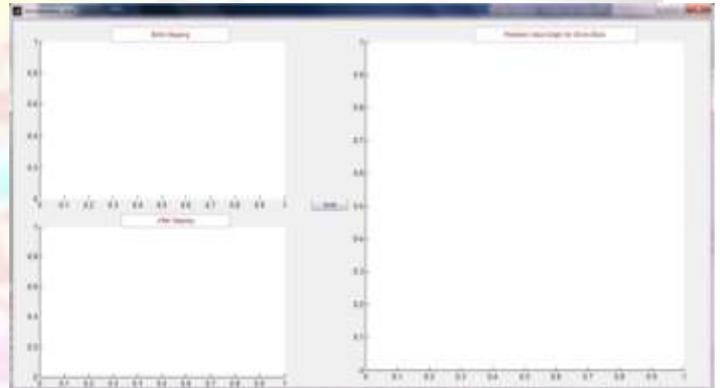
In the last we compare the same dataset with SVM and ANN and we concluded that SVM provides the More efficiency than ANN. So SVM predicted result giving is more profitable to the user.

**II. FUTURE SCOPE**

This In future there is lot of scope to improve the Efficiency of Stock Market Prediction. Lots of research is going on this topic to predict stock value of next day. but SVM is the new advance technology that gives result with very efficient manner. This is the latest topic for research work in prediction of stock market using SVM. Actually there are various application of SVM in different domain. But, in data mining the SVM provides tremendous scope in future. In future SVM provide the predicted output of any stock with efficiently and accurately.

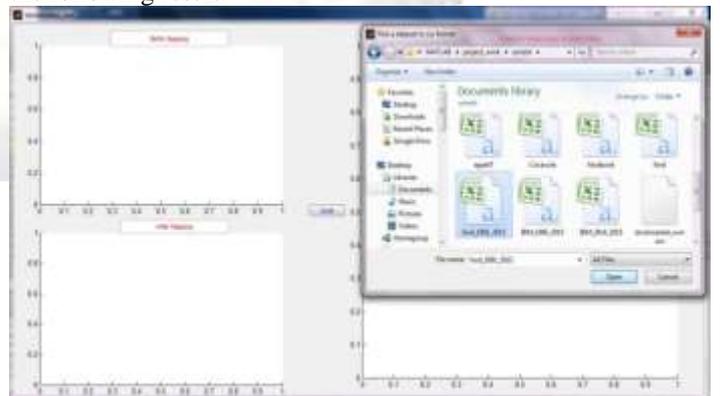
**III. SCREEN SHOTS FOR PREDICTING STOCK VALUE USING STM**

The When the project is run to predict the stock value using SVM it shows the window as shown in screen shot. It mention all the term. Here a button is shown if we click on that button.



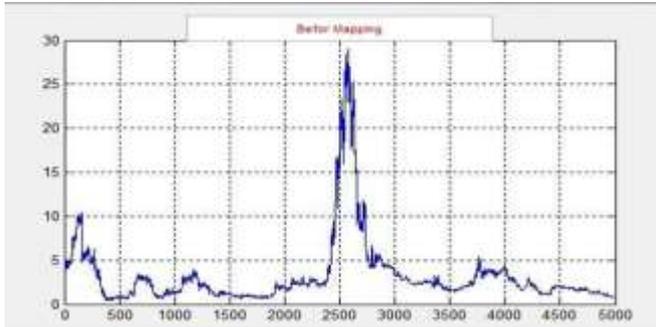
**Fig-1:** GUI of the first page of the Project

The above window screenshot there is on button on which SVM is written. When we click on that button it will shows the following result.



**Fig-2:** Selecting dataset file from the dataset in SVM

After click in on the SVM button the algorithm asked for the input dataset. Now select the appropriate path when the dataset is to be stored. In above screenshot window we are selecting path MATLAB/ Project Work/umesh/ford\_1991\_2015 data set file which going to predict the FORD stock value in year from 01/01/1991 to the 20/04/20154.



**Fig-3:** Stock value before mapping



**Fig-4:** Stock value after mapping

When we predict the stock value using SVM firstly it can calculate the errors and algorithm are recursively executed for minimizing the error. Actually it can minimize the mean square error to plotting the predicted graph with the help of  $\log_2 c$  and  $\log_2 g$  function. Screenshots shown the result for minimize the mean square error in given stock value.

Next Screenshot: 5.5 window show the minimize error after calculating the mean square error which is more correct with amount of error i.e. it have minimum error value. Finally the algorithm predicts the stock market value for the stock „Ford“ in year from 1991. The graph shows the original value as well as the predicted value for the stock. The red line shows the predicted value and blue line shows the original value. It graph shows very efficient result.

#### IV. RESULT ANALYSIS

The data we use in this analysis comes from the Allegiant Travel Company(ALGT), Alliance Fiber Optic Products,(AFOP), AT & T Inc. (T), Bank of New York Mellon Corpora(BK), eBay, Inc(EBAY), EXCO TECH(XTC.TO), Facebook, Inc(FB), FORD, Inc(FORD), IBM, Inc(IBM), Kofax Limited(KFX), Old Second Bancorp, Inc(OSBC), SLM Corporation(SLM), Xilinx, Inc(XLNX).

Also, we label each stock in a specific year in our data set as a good or a poor investment. Although there is no definitive method for defining a market investment as “good” or “poor”, we use a method that is simple and objective: if the

price of a company’s stock over a given year rose, it is classified as a good investment; otherwise it is classified as a poor investment. Our training sample was based on a random selection of 13 companies, for all years from 2004-2015, where data was provided in their annual reports.

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