



Comparison of Different Kernels of Support Vector Machine for Predicting Stock Prices

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ABSTRACT: In the recent years, Internet has become a storehouse for copious amount of data. A large application of all the data is in prediction of future events like weather forecast or real estate price. Another important sector where concepts of Data Mining and Machine learning are used rigorously, is the stock market. It has been getting simplified to predict future stock prices of companies using the previous data. For such predictions, various parameters come into play like political news or national policy. Some primary models do not take these parameters into consideration; hence the findings are not always effective; whereas some intermediate and advanced level models do take such external parameters into consideration, giving a more precise and accurate prediction of stock prices. This paper is based on analysis of previous stock prices done using real time data for predicting future stock prices using concepts like Support Vector Regression. The accuracy of the algorithms is analyzed by comparing the predicted prices with the actual stock prices.

KEYWORDS: Stock Market Prediction, Support Vector Machine, Kernel, Radial basis function, Polynomial

I. INTRODUCTION

A. Stock Price

The stock price is the most noteworthy or least measure of any company's stock which someone can purchase. Stock costs of any company change each day. There are four estimations of any stock cost. They are opening cost of any stock on a specific day, closing price, highest price and lowest price. We have done examination of past information for Apple organization's opening cost for July 2017. While the forecast is likewise accomplished at the opening price.

B. How prediction can be done

The efficient market hypothesis (EMH) states that stock prices can't be predicted [14]. But these days there are numerous methodologies for predicting stock price. In this paper, AI technique is utilized. AI is an exceptionally huge region. AI is partitioned into 2 types-Supervised learning and Unsupervised learning [13]. In supervised learning, we are fundamentally controlling the machine on how to approach the assignment. While unsupervised AI is grouping where a pack of arbitrary information is tossed to the machine and requested to shape bunches which fit best. We utilized supervised learning for our examination for stock exchange expectation.

One such strategy for supervised AI is Support Vector Machine (SVM) [13]. SVM is fundamentally utilized for classification and regression. We have utilized the methodology of regression in this paper. In straight forward language, regression implies going back in time. In fact, regression is a logical strategy used to discover the connection between at least one independent factor and the dependent variable. Subsequently, here the expectation of the financial exchange is finished utilizing this idea.

C. Support Vector Machine (SVM)

There are many methods which are effective as SVM like Artificial Neural Network (ANN). But there are few advantages of SVM over others [15]:



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- 1) At the point when high-dimensional spaces are there, at that point SVM is effective.
- 2) SVM has a simple geometric translation.
- 3) SVM always finds a global minimum meaning does not miss the bigger picture.
- 4) SVM are non-parametric thus their size is not fixed.
- 5) SVM is memory efficient.

SVM comprises of SVR (it is the strategy) which has numerous pieces incorporated into it. Along these functions, different part works make SVM flexible.

II. LITERATURE SURVEY

In a previous couple of years, numerous speculations, just as models, have been proposed and produced for Stock Market Prediction.

Social media sites like Facebook, Twitter and even articles in papers and web journals affect the change of financial exchange prices [8]. Numerous papers have broadly composed with respect to the effect of data accessible on Web utilizing distinctive information and text mining methods. R.P. Schumacher and H.Chen [8] predicted stock prices and dissected different portrayal of the content written in papers and later contrasted them with Linear Regression. J.Bollen et al. [9] gathered conditions of the state of mind from Twitter channels and dissected its content substance utilizing disposition following apparatuses. They found a precision of 87.6% in expectations of the stock market from the data collected.

Artificial Neural Network (ANN) demonstrate is another well-known procedure to predict the closing prices of stocks. J. T. Yao and C. L. Tan [10] expounded on a neural system expectation display based on seven stages which group and predicts information. T.Hui-Kuang and K. Huarng [11] actualized a time series model to forecast stock costs of Taiwan. Neural networks can deal with nonlinear connections between numerical perceptions.

Md. R. Hassan and B. Nath [16] utilized the Hidden Markov Model (HMM) to figure stock prices. HMM is most appropriate to show dynamic frameworks and thus it is significantly utilized for example acknowledgement and arrangement questions. The model that is chosen is prepared on the past datasets yet it the forecast isn't completely precise and direct.

III. METHODOLOGY

At the point when SVM is applied for just a regression issue then it is named as Support Vector Regression (SVR). The way that SVR just limits the preparation mistake is a myth. It really tries limiting the generalization error.

SVR is a strategy for python at anticipating stock prices. SVR is a technique for library SVM. SVR strategy has numerous parameters. One such parameter is the kernel. The portion in this strategy implies the sort of calculation which is utilized to figure the costs. SVR strategy in python has 5 kinds of Algorithms [16]. The different types are: Radial Basis Function (RBF), Polynomial, Linear, Sigmoid, precomputed or callable. Further, we have performed a comparison among RBF, Polynomial and Linear technique.

A. Radial Basis Function

Radial basis function kernel is the most basic kernel function. It is the default work for SVR strategy in python. It is a non-linear regression. This implies information can't be grouped linearly. RBF is otherwise called the Gaussian kernel. RBF pieces are universally useful it should possibly be utilized when not utilizing for text.

B. Polynomial

Polynomial is a kernel function for support vector machines. The polynomial kernel is a non-linear regression. This regression is utilized just when information focuses are non-linearly divisible. As the name recommends this kernel will have a polynomial equation. In python when we utilize polynomial kernel then another parameter should be set for example degree. This parameter determines that what number of degrees of the condition will be. By default, the 3-degree polynomial condition would be utilized if not mention. The space of polynomial kernel is same

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as polynomial regression. Polynomial regression is a kind of regression analysis which is very same as a assortment of different linear regressions.

C. Linear

The Linear kernel is most commonly used for text. The Linear kernel is basically an equation which is defined as:

$$y = ax + b$$

where,

y = dependent variable a = slope intercept

x = independent variable

b = constant $y = ax + b$ Here 'x' is variable which represents date and 'y' means stock price. Using x and y for past data 'a' and 'b' are obtained. After generating the equation, prediction can be made for any date by changing the value of 'x'.

Linear regression is concerned with only one independent variable. As the value of 'x' changes, we will get our value for 'y'.

D. Comparison

Fig. 1 represents to examination for 3 different kinds of parts of Support Vector Regression. The graph is for the opening price of the Apple Company. The dark spots represent the opening stock cost of Apple Company for various dates of July 2017. The red line represents the RBF piece line utilized for expectation while green line speaks to the straight part of SVR and finally, the blue line represents the polynomial kernel line. The red, green, blue dots speak to the forecast made for 28th July utilizing RBF, linear, polynomial kernel individually to opening stock price.

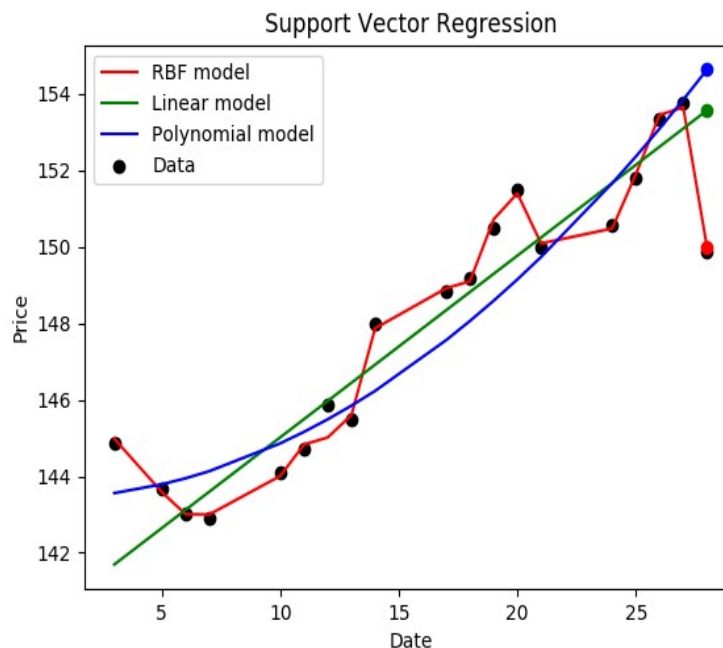


Fig.1.Graphcomparing3differentmethodsonasinglesetofdata.

It tends to be closed from the graph(Fig. 1) that the prediction made for 28th July 2017 is increasingly precise to real information for RBF kernel. The stock price for 28th July 2017 utilizing RBF kernel is 149 which is close to the genuine value which is 149.89(opening cost). While utilizing straight and polynomial the opening stock cost is roughly 153 and 154 individually.



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To conclude, as RBF kernel is non-linear this implies it is non-parametric. Subsequently, the multifaceted nature of the model is infinite. This implies more information utilized better and complex connections could be resolved. RBF is commonly progressively adaptable. Presently as observed from the chart that information isn't directly distinguishable in this manner higher exactness couldn't be accomplished. Regardless of being the most straightforward classifiers, linear kernels are better and quicker in preparing and testing datasets when contrasted with RBF kernel. As indicated by research linear kernel is for the most part utilized when we need to enhance stock market prediction problem.

IV.CONCLUSION

Stock prices prediction has dependably been prominent among specialists just as speculators in view of the measure of money related hazard involved. We presume that for amateur experts and agents, bolster vector relapse is a viable strategy to anticipate stock prices. But the stock market is dynamic in nature. In this way, in the event that a development level precise prediction is to make, at that point outside parameters like catastrophic events, political atmosphere, financial conditions and so on must be considered. Innovative work has been accomplished for usage of a few distinct strategies like Artificial Neural Network, Autoregressive Models, and prediction of stock prices utilizing social media and news stories. Notwithstanding, for each situation, there remains a degree for vulnerability and vagueness as no procedure is found to give a careful development of stock prices. Henceforth these systems can be utilized to diminish the misfortunes brought about in stock market ventures, however, none of them ensures an enormous measure of benefit for the equivalent.

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