

Stock Market Prediction using the ARIMA Model

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Abstract— In the recent times it has been seen that stock market prediction is becoming an important field of financial forecasting. The people such as stock sellers & buyers, policy makers, the ones who keep interest in investing in the stock market and many others involved in this financial market are attracted to it. The aim of this paper is to come up with an efficient & effective model for stock market prediction. Over the years it is observed that stock market data is nonlinear, chaotic & dynamic. This paper is going to present a predictive model for prices of the stocks with the help of ARIMA model. The stock data which is published from the Bombay Stock Exchange (BSE) & National Stock Exchange (NSE) has been used with the model developed for the prediction of stock price. From the results which are obtained, we come to the conclusion that for short-term prediction the ARIMA model has a great potential & also it shows competence with the already present methods for stock price prediction.

Key words: ARIMA Model, Stock Market, Artificial Neural Network, Stock Prices Prediction

I. INTRODUCTION

Investors in stock market wish to maximise their returns by buying or selling their investments at an acceptable time. Since stock market information is extremely time-variant and ordinary during a nonlinear pattern, predicting the longer term value of a stock is extremely difficult. With the rise of economic globalisation and analysis of knowledge technology, analyzing stock market information for predicting the longer term of the stock has become more and more difficult, vital and profitable.

Information concerning the daily stock market worth values is important for domestic-foreign stock investors whose area to understand numerous options and characteristics of stock market to enhance their investment performances, buyers or sellers whose success rely upon the future values of stock, policy makers who are concentrated to form wise money policies. Thus, modelling the behaviour of indicant values has drawn sizable attention in applied and theoretical literatures. Predicting stock worth is generally believed to be an awfully troublesome task even for professional players conjointly, as a result of stock market knowledge observed in are chaotic and non-linear. Predictions of stock market movements are stricken by many factors together with political or economic conditions, and investors' expectations.

II. PATENT SEARCH

- In literature, completely different sets of input variables are used to predict stock returns. In fact, totally different input variables are used to predict a similar set of stock return data.
- Chan, Wong and Lam enforced a neural network model victimisation the technical analysis variables for listed corporations in Shanghai stock market. During this

paper performance of 2 learning algorithmic program and 2 weight low-level formatting ways square measure compared.

- Other outstanding literatures square measure that of Siekmann et al. (2001) World Health Organization used fuzzy rules to separate inputs into increasing, stable, and decreasing trend variables.
- Kim and Han (2000) used a genetic algorithm to remodel continuous input values into distinct ones. The genetic algorithmic program was accustomed cut back the quality of the feature area

III. ARCHITECTURES & LEARNING

A. ANN (Artificial Neural Network)

It consists of basic process parts referred to as neurons. These neurons are distributed in few layers. The neural networks have 3 layers input, middle or hidden and output. There may be more than one middle layers. These hidden layers have all the quality resides and therefore the computations are done. The information is distributed through the network and keeps within the form of interconnections. These interconnections between artificial neurons are referred to as weights. A neuron, like alternative linear or polynomial approximation, relates a set of input variables, $i=1, \dots, n$ to line of 1 or additional output variables, $j=1, \dots, m$. But, in case of ANN, the input variables are mapped to the output set by squashing or reworking by a special operate f , called activation operate. Every neuron additionally incorporates a bias assigned to that. Each neuron receives ANN sign that transmits through an association that multiplies its strength by the scalar weight w . ANN models can be thought of alongside the target application. As an example, stock exchange trend prediction and stock exchange prediction might need completely different ANN models and information. Targets available market is also predicting market indices, market trend, market volatility, buy-hold-sell alarm, poker risk-return classification, triaging best to worst stock for commerce strategy so on. The prognostication might be for future, short term, given amount, or instant. It's going to be for a stock or a sector. The most appropriate ANN model and information for a specific prediction target can enhance the accuracy.

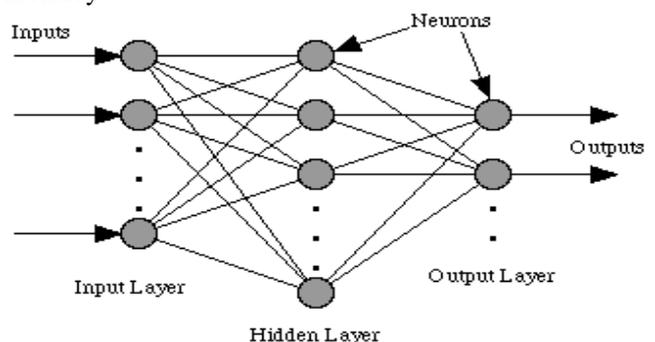


Fig. 1: Architecture of ANN

B. ARIMA Model

With the event of ANN, researchers hope to clear up the exchange attributable to its nice capability in pattern recognition and machine learning issues like classification and prediction. The most often used techniques are ARIMA MODEL. The ARIMA stands for Auto Regressive Integrated Moving Average model. Random-walk and random trend models exponential smoothing and, auto regressive models are all special cases of ARIMA models. It's a statistical prediction technique that must follow some assumption on autocorrelation, linearity, and assumption on normality of error terms. In addition to those basic statistical assumptions, there's the belief on the model specification, i.e., for foretelling ARIMA, this would be the amount of lags within the informative freelance variables and within the moving average part of the model, and therefore the seasonality within the model.

IV. METHODOLOGY USED

The neural network is employed to use the homogeneous input data set that in this case is that the daily returns and the data set encompassed the trading days from sixth November, 1991 to 31st March, 2007. The Daily come of the index is calculated from the daily closing costs of peachy fifty Index. Information is collected from the historical data on the market on the web site of National stock market. The complete information set is split in 2 elements. The daily come for the amount from sixth November, 1991 to thirty first March 2006 is employed for coaching the neural network. The opposite set containing 249 information points goes to be used for validation of the model and isn't bestowed to the network as coaching information set. Here, totally different network structure is going to be designed having different numbers of Neurons within the input and also the hidden layer. The output layer has just one somatic cell which gives the forecasted index worth. The input to the first node are going to be today's daily come worth, the second node can have yesterday's come worth and the output will be tomorrow's forecasted daily come. A back propagation neural network learning methodology will be used to acquire the output. A set of obtainable daily stock come information are going to be went to construct the neural network. The network thus created is going to be trained exploitation the training information set. Training of a back propagation network involves getting optimal values for the learning rate. The training of the network will be done using totally different combos of learning algorithmic rule and transfer functions. The error is tracked till a minima is obtained by altering the fore mentioned parameters. Result thus obtained with minimum error is saved and this trained network will then be utilized in predicting future returns. Predicted value of the neural network is matched with the traditional prediction technique.

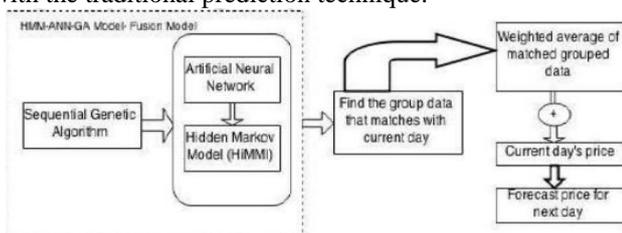


Fig. 2: Block Diagram for fusion model

V. CONCLUSION

ANN plays a vital role in stock Market Prediction. ANN models have outperformed different ancient models. There are variations in ANN model. It's necessary to decide on the suitable ANN model considering the matter target. Varied applied math techniques could also be accustomed pre-process the information for improving performance. Also, special algorithms like ARIMA could also be combined with ANN to boost accuracy. There are many challenges associated with accuracy of expected information; however using ARIMA model the prediction for six to eight months can be done.

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