

# A framework for predictive analysis of Stock market forecasting

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## **Abstract:**

This project is a study on the various applications of neural networks aimed at the complexity of interior and variety of exterior composition of stock pricing system for solving business problems like stock market predictions. It can be concluded from analysis that ANNs are most implemented with Back propagation algorithm as the methodology in forecasting of stock prices, returns and stock modeling. The aim of this project is implementation of neural networks with back propagation algorithm for stock market. It is most often used as training algorithm in current neural network applications, we apply data mining technology to stock market in order to research the trend of price; it aims to predict the future trend of the stock market and the fluctuation of price. This project points out the shortage that exists in current traditional statistical analysis in the stock, then makes use of BP neural network algorithm to predict the stock market by establishing a three-tier structure of the neural network, namely input layer, hidden layer and output layer. Finally, we get a better predictive model to improve forecast accuracy.

**Index Terms**–Stock Market Prediction, AI,BP Neural Network, Mutual Funds.

## **I. INTRODUCTION**

In recent years, monetary markets became additional reticular. The elemental actors have become additional essential for the analysis of monetary market. The analysis in recent past shows that the nonlinear domain with computing technologies may be sculptured additional exactly compared to single market and linear applied math strategies that are the mainstay for technical analysis for past decade[2]. Prediction of stock price level movement is thought to be a difficult task of monetary statistic prediction. Associate degree correct prediction of stock worth movement might yield profits for investors. As a result of the quality of exchange information, development of Economical models for predicting is incredibly troublesome[3]. Statistical strategies and neural networks are usually used for statistic prediction. The stock market is a public market where a company can get itself listed for their stock and can also gather financial resources on an agrees prices for their company stock. The stock holder will get yearly dividend/bonus from the profit of the company[4,5,6]. Along with this, the stock holder can sell the same stock on an agreed price in the stock market to get the profits from price difference while selling. The price of a company's stock depends on a number of financial factors. It keeps on fluctuating and is unpredictable. Because of their ability to deal with uncertain, fuzzy, or insufficient data which fluctuate [7] in very short periods of time, neural networks (NN) have become very important method for stock market predictions. The nature of stock market is volatile and non-linear and is also able to adapt to data pattern in relationship between input and output and hence provides better prediction accuracy than the traditional methods. The remainder of this paper will be as follows. Provides information on working of ANN. describes the general implementation of ANN for stock prices prediction along with advantages and disadvantages. all about the different methodologies used for stock market prediction. Section V lists the benefits and shortcomings of the various methodologies of neural networks. Since stock markets are complicated, nonlinear, dynamic and chaotic [8]. Neural networks among varied computing tools are more and more accustomed the monetary prognostication as neural nets are found to be technologically versatile and powerful, ideally suited to perform monetary market research. Many studies have shown that artificial neural networks have the capability to be told the underlying mechanics of stock

markets. In fact, artificial neural networks are wide used for prognostication monetary markets. Artificial neural network is a mathematical model. It has capability to machine learning and pattern matching. Neuron is basic unit of nervous system such as brain. ANN is borrowed from central nervous system. It is inspired by biological technology. Biological neuron stores knowledge in memory bank, while in an artificial neuron the data or information is distributed through the network and stored in the form of weighted interconnection. Multi layer system is a technology which is entwined with two different technologies to give a better solution for the application result[10]. One technology is not enough to solve a problem then it use another technology to solve a problem. As our project title is showing that we are using two different technologies that are artificial neural network . These technologies belong to two different fields which are embedded which are called Multi layer network technology. Back propagation is the most popular in learning techniques with the multi - layer network. In these techniques the information flows from the direction of the input layer towards output layer. The learning is achieved by adjusting the connection weight in artificial neural network iteratively so that trained. The number of iteration of the training algorithm and the convergence time will vary depending diagnosis problem their various data set. Genetic algorithm is a computational model which is a stochastic general search method. It proceeds in an iterative way by generating new chromosomes to get the best solution and work on the best fit probability[12]. In Mutli layer system the artificial neural network (ANN) is used to create network and the genetic algorithm is used to get the best fit probability to reduce the number of iteration by adjusting the weight. The chest is the most important part of the body for function the respiratory system.

## II. LITERATURE SURVEY

**Lew and Zhang** present a multi-objective portfolio optimization problem for choosing the best matching portfolios in non-deterministic trading environments. The risk of the market and the available liquidities are measured using probabilistic semi-variant models. The proposed multi objective models are transformed with the aid of fuzzy techniques.

**B. Rabiasz**, is proposed a new method for the efficient portfolio selection construction in situations in which the parameters used for the efficacy calculation are expressed as distribution probabilities and interactive fuzzy numbers. The selection process of the investment strategies takes into accounts the economical dependencies and statistics.

**A. Barbulescu, I. Ilie**, is presented two techniques for the analysis and modeling of financial time series: Dow-Jones Industrial Average and Stock Index Open values. The development of the models for time series prediction is based on methods from Artificial Intelligence, Genetic Programming and Neural Networks.

**K. Vaisla, A. Bhatt** is presented the Neural Networks technique of the Artificial Intelligence and its use in forecasting daily prices in market. This technique is based on the concept "learn by example". The results of the prediction are compared with the results of statistical techniques achieved on the daily stock market prices.

**B. Wanjawa, L. Muchemi**The same technique is also analyzed in, where there is an Artificial Neural Network using a multi-layer and feed-forward perceptron. It was developed a model configured for some volume of training data and a number of training cycles. The prototype is tested on data from some stock markets between the years 2008 to 2012, Nairobi Security Exchange and New York Stock Exchange.

**Y. Wang, C. Choi** A machine learning framework that uses the techniques of Principal Component Analysis and Support Vector Machines is proposed in. It concerns a study of this framework on the Korean and Hong Kong Stock markets in trying to predict the direction (upward or downward) of the indexes and prices of the market.

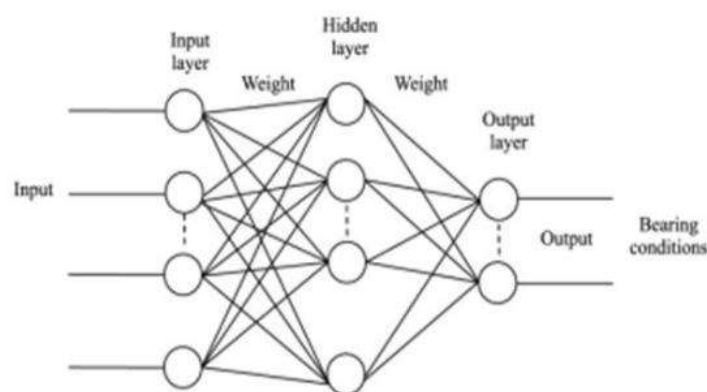
**P. Yoo, M. Kim, T. Jan** surveys the machine learning techniques used in stock market predictions. It was observed that including event information in the prediction models, the accuracy of the stock forecast is improved. A method for accurate event weighting and a system for automated event extraction is used in order to provide better prediction in financial time series.

### III. BACKPROPAGATIONALGORITHM

**Backpropagation** is a method used in artificial neural networks to calculate a gradient that is needed in the calculation of the weights to be used in the network.[1] Backpropagation is shorthand for "the backward propagation of errors," since an error is computed at the output and distributed backwards throughout the network's layers.[2] It is commonly used to train deep neural networks,[3] a term referring to neural networks with more than one hidden layer.[4]

Backpropagation is a special case of a more general technique called automatic differentiation. In the context of learning, backpropagation is commonly used by the gradient descent optimization algorithm to adjust the weight of neurons by calculating the gradient of the loss function. This technique is also sometimes called backward propagation of errors, because the error is calculated at the output and distributed back through the network layers.

Backpropagation requires the derivative of the loss function with respect to the network output to be known, which typically (but not necessarily) means that a desired target value is known. For this reason it is considered to be a supervised learning method, although it is used in some unsupervised networks such as auto encoders. Backpropagation is also a generalization of the delta rule to multi-layered feedforward networks, made possible by using the chain rule to iteratively compute gradients for each layer. It is closely related to the Gauss–Newton algorithm, and is part of continuing research in neural backpropagation.



### IV. PROPOSED FRAMEWORK

BP network is that the back-propagation network. It's a multi-layer forward network, learning by minimum mean sq. error. It may be employed in the sphere of language integration, identification and adaptation management, etc. BP network is semi supervised learning. Initial of all, artificial neural network has to learn an exact learning criteria, so it will work. Tips for e-learning (Electronic Learning) may be listed as below. If the result yielded by network is wrong, then the network ought to scale back the chance of creating identical mistake next time through learning. This project uses data processing technique to check historical information concerning share market in order that it will predict the desired values a lot of accurately.

Algorithm:-

1. Accept input sample
2. Perform its weighted summation.
3. Apply it to input layer neurons.
4. Process all inputs at each neuron by transfer function to get individual.
5. Hidden laall neurons of for hidden layer neurons.
6. Pass output of hidden layer neurons to all output layers and repeat 1,2,3,4 steps to get final output.

7. Display the final output.yer and repeat 1,2,3,4 steps pass it as an input to

#### ADVANTAGES

- Artificial Neural Networks has ability to deal with uncertain, fuzzy or insufficient data, which fluctuate in short period of time, robust that helps to predict stock prices and returns.
- Accuracy mostly ranges 70 to 80%.
- Helps to classify the stocks into 3 classes:-
- Stocks with either positive or negative returns which gives valuable support in making decisions, but do not specify the amount of expected and expected profit.
- System tries to predict the stock prices for one or more days in advance, based on the previous stock prices and on related financial ratios.
- Concerned with modeling stock performance and forecasting. Predicts future values, but also have significance estimation, sensitivity analysis and other analysis of mutual dependencies.

#### IV. SYSTEM MODULES

##### 1.Data Collection

This project attempts to predict the stock value with respect to the stock's previous value and trends. It requires historic data of stock market as the project also emphasizes on data mining techniques. So, it is necessary to have a trusted source having relevant and necessary data required for the prediction.

##### 2.Data Normalization

The data is normalized before being input to the FLETPN. The input vectors of the training data are normalized such that all the features are zero-mean and unit variance.

##### 3. Data Mining Stage

The data mining stage was divided into three phases. At each phase all the algorithms were used to analyze the meteorological datasets. The testing method adopted for this research was percentage split that train on a percentage of the dataset, cross validate on it and test on the remaining percentage. Thereafter interesting patterns representing knowledge were identified.

##### 4. Back-Propagation Training

The back-propagation algorithm can be employed effectively to train neural networks; it is widely recognized for applications to layered feed-forward networks, or multi-layer perceptrons. The back-propagation learning algorithm can be divided into two phases: propagation and weight update

Phase 1: Propagation

- 1) Forward propagation of a training pattern's input through the neural network in order to generate the propagation's output activations.
- 2) Back propagation of the propagation's output activations through the neural network using the training pattern's target in order to generate the deltas of all output and hidden neurons.

Phase 2: Weight update

For each weight-synapse:

- 1) Multiply its output delta and input activation to get the gradient of the weight.
- 2) Bring the weight in the opposite direction of the gradient by subtracting a ratio of it from the weight. Repeat the phase 1 and 2 until the performance of the network is good enough.

## 5. Fuzzy Rules

Fuzzy places are finite sets of places that model the fuzzy production rules. It carries information to describe fuzzy variable and the fuzzy set of fuzzy conditions. The strength of connections between places and transitions is represented by an arc labeled associated with fuzzy weights.

## 6. Backpropagation Algorithm

The marking function of the FEHLPN indicates the uncertainty for each corresponding situations that has occurred or is occurring. A fuzzy set and a fuzzy truth values are attached to an uncertain fuzzy token to model imprecision and uncertainty with greater flexibility and ease of development.

## 7. Forecasting

Proposed a new kind of model tuned by GA that is capable to forecast the variations of chosen values of the markets. The experiments show that the predicted results are close to the real data for one day, but the results of the tests are less accurate for longer periods of time. The model should be improved for ten-day tuning to expect better forecast.

## CONCLUSION

In this project we tried to sum up the application of Artificial Neural Networks (ANN) for predicting stockmarket. There are major differences between the forecasting methods, in terms of their complexity, restrictions, requirements and precision. ANN have shown to be an effective, general purpose approach for pattern recognition, classification, clustering and especially time series prediction with a great degree of accuracy. Back propagation algorithm is the best algorithm to be used in Feed forward neural network because it reduces an error between the actual output and desired output in a gradient descent manner. Especially, the prediction of the direction of the market with fairly high accuracy will guide the investors and the regulators. We believe that neural network tool gives a promising direction to the study of prediction of the markets and other economic time series

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