Case Study: Predicting of Stock Trends using Neuro Fuzzy based Techniques

Introduction

Stock market prediction is the act of trying to determine the future value of a company stock or other financial instrument traded on a financial exchange. The successful prediction of a stock's future price could yield significant profit. The psychology of the stock market is believed to follow certain trends which make it possible to predict.

Neuro Fuzzy based System

Every fuzzy system has a membership functions and the rules that determine the Fuzzy model. The neuro fuzzy is an adaptive network that learns from the data. It is an adaptive network, which has nodes and directional links that have parameters which affect the output of the node.

This case study deals with how the stock market data can be modeled using the neuro fuzzy technique which can be used for prediction purposes.

Data

The stock market closing data was taken from BSE Sensex through Yahoo Finance from 17th September 2007 to 9th March 2012. A period of 3 years and 6 months data, the closing prices data set was comprised of day closing prices we extracted 2542 records.

Data Pre-Processing

While training the neural network, the stock data with different scales can lead to the instability of the network constructed. Financial time series is a non-linear time series process and often changes sharply at some points which can be considered as noise which is harmful to the network and hampers the output. The noise is reduced through the process of normalization.

Design

The prediction has two stages. The first part is the training using a neural network and then predicting using the Fuzzy system with the trained data.
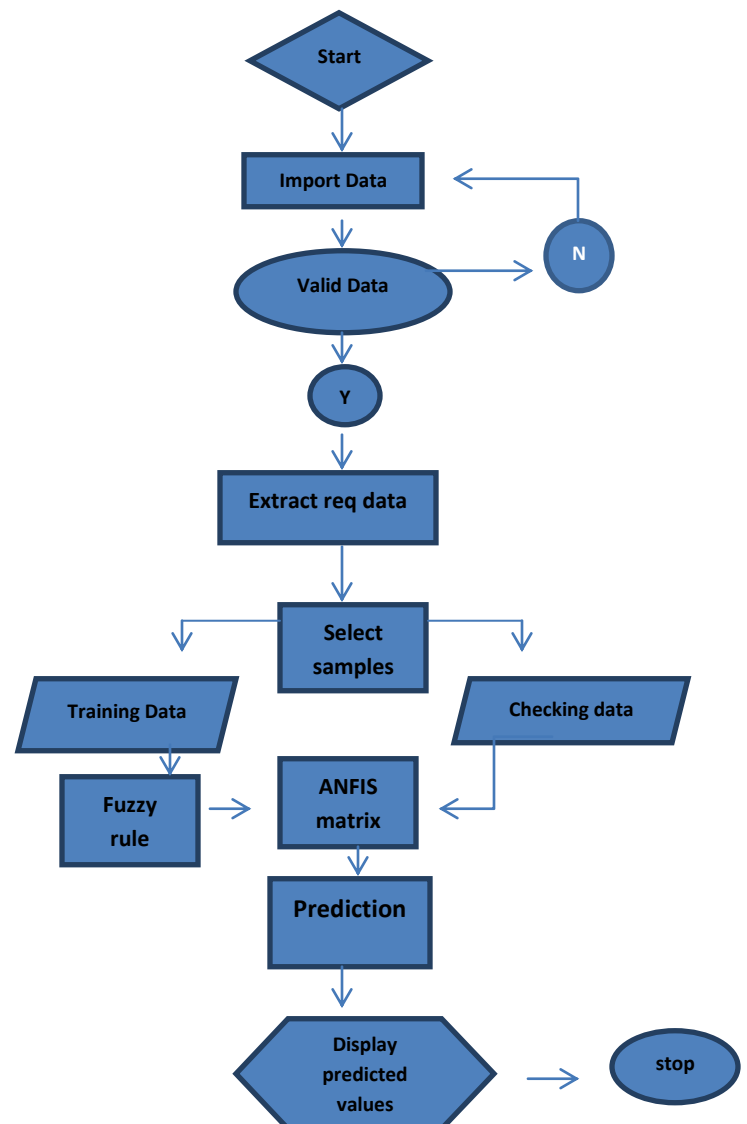
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Training

The normalized data, training is done using the adaptive neural networks based techniques. During training process sharp changes which are usually referred as noise are eliminated.

Prediction

The data can be predicted as per user requirement i.e. it can be predicted for next 10, 20,30… 100 future values.

Algorithm

Step 1. Import the Stock data from database, extract the stock data into variable

Step 2. The neuro Fuzzy system is trained with stock market data in propagation process, assign some data for checking data.

Step 3. Generate the Fuzzy rules using the training data.

Step 4. Create a Neuro Fuzzy based matrix using Fuzzy rules.

Step 5. Predict the next possible stock market values using Neuro Fuzzy rule.

Results

Using the Adaptive Neural Network Fuzzy based Technique, one is capable of predict the next 10-15 days data in advance from the historical data.

The comparison is done using the statistical techniques like moving average, regression and by simple analysis stock market trends. The input data and Neuro Fuzzy output and predicted data are plotted as shown in figures.

Conclusion

Prediction of stock market is a crucial issue for any stock investor as well in finance. Artificial neural networks have been used in stock market prediction during the past decade. Predictions were done for the stock index values as well as the daily direction of change in the index.

Even though the artificial neural networks have limitations learning the data patterns or that they may perform inconsistently and unpredictable because of the complex financial data used.

This case study succinctly proves the low level of errors in the long and short- term modeling into account and that "ANFIS" is capable of forecasting stock price behavior.