LSTM - Introduction

Neural networks are used to mimic the basic functioning of the human brain and are inspired by how the human brain interprets information. It is used to solve various real-time tasks because of its ability to perform computations quickly and its fast responses.

A neural network consists of three important layers:

* Input Layer: As the name suggests, this layer accepts all the inputs provided by the programmer.
* Hidden Layer: Between the input and the output layer is a set of layers known as Hidden layers. In this layer, computations are performed which result in the output.
* Output Layer: The inputs go through a series of transformations via the hidden layer which finally results in the output that is delivered via this layer.

This part aims to build a model using Recurrent Neural Networks (RNN) and especially Long-Short Term Memory model (LSTM) to predict future stock market values. Recurrent neural network is a type of neural network in which the output form the previous step is fed as input to the current step. Long Short Term Memory Networks is an advanced RNN, a sequential network, that allows information to persist. It is capable of handling the vanishing gradient problem faced by RNN.

In a NN, the relation between every two nodes from (input to the hidden layer), has a coefficient called weight, which is the decision maker for signals. The hidden layer nodes apply a sigmoid or tangent hyperbolic (tanh) function on the sum of weights coming from the input layer which is called the activation function, this transformation will generate values, with a minimized error rate between the train and test data using the SoftMax function. The values obtained after this transformation constitute the output layer of our NN, these value may not be the best output, in this case a back propagation process will be applied to target the optimal value of error, the back propagation process connect the output layer to the hidden layer, sending a signal conforming the best weight with the optimal error for the number of epochs decided. This process will be repeated trying to improve our predictions and minimize the prediction error. After completing this process, the model will be trained. The classes of NN that predict future value base on passed sequence of observations is called Recurrent Neural Network (RNN) this type of NN make use of earlier stages to learn of data and forecast futures trends. The earlier stages of data should be remembered to predict and guess future values, in this case the hidden layer act like a stock for the past information from the sequential data. The term recurrent is used to describe the process of using elements of earlier sequences to forecast future data. In a LSTM the memorization of earlier stages can be performed trough gates with along memory line incorporated.

Methodology

There is a need to extract the feature which is required for data analysis, then divide it as testing and training data, training the algorithm to predict the price and the final step is to visualize the data.

* Data

The data in this paper consist of the daily opening and closing prices of BHARAT FORGE in the BOMBAY STOCK EXCHANGE BSE (BHARATFORG.BO) extracted from yahoo finance with a period of 25 years. To build our model we are going to use the LSTM RNN, our model uses 70% of data for training and the other 30% of data for testing. For training we use mean squared error to optimize our model.

* Proposed System



always a challenge. Stock market prices estimation is not only an interesting but also

challenging area of research. Predicting the stock market with full accuracy is very

difﬁcult as external entities such as social, psychological, political and economic have a

great and substantial inﬂuence on it. The main characteristic of the data associated with

stock market is usually time variant and nonlinear. Prediction of stock market plays a

vital role in stock business [1]. If investors lack sufﬁcient information and knowledge

then their investment can suffer the greatest loss.

Investors must predict the future stock value of companies in order to obtain high

proﬁts. Various prediction techniques have been developed to do predictions on the

stock market accurately. There were two methods widely known as conventional

methods at the time when there were no computational methods for risk analysis. There