IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

STOCK PRICE PREDICTION USING LONG SHORT-TERM MEMORY

Sharrath M[1] , Jerome Francis D[2] , Ilam Tamil Keeran kM[3] , Kulasai Muthu Raman M[4]

1 Assistant Professor, Department of CSE, Jansons Institute of Technology, Coimbatore, India

2,3,4 UG Students, Department of CSE, Jansons Institute of Technology, Coimbatore, India

ABSTRACT

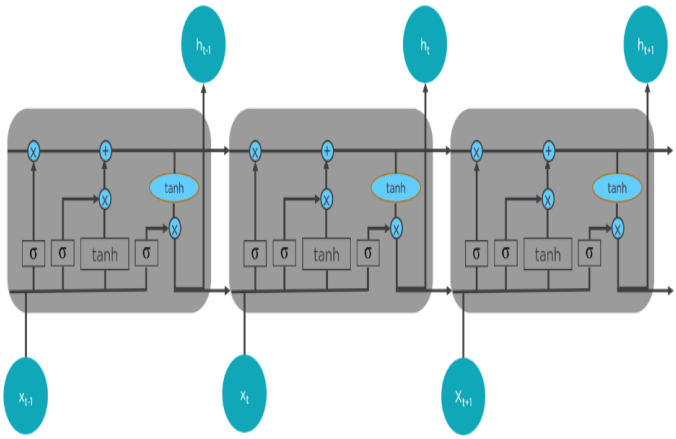
In the finance world stock trading is one of the most important activities. Stock market prediction is an act of trying to determine the future value of a stock other financial instrument traded on a financial exchange. This paper explains the prediction of a stock using Machine Learning. The technical and fundamental or the time series analysis is used by the most of the stockbrokers while making the stock predictions. The programming language is used to predict the stock market using machine learning is Python. In this paper, we propose a Machine Learning approach that will be trained from the available stocks data and gain intelligence and then uses the acquired knowledge for an accurate prediction. In this context this study uses a machine learning technique called Long Short-Term Memory (LSTM) to predict stock prices for the large and small capitalizations.

INTRODUCTION

Basically, quantitative traders with a lot of money from stock markets buy stocks derivatives and equities at a cheap price and later on selling them at high price. The trend in a stock market prediction is not a new thing and yet this issue is kept being discussed by various organizations. There are two types to analyse stocks which investors perform before investing in a stock, first is the fundamental analysis, in this analysis investors look at the intrinsic value of stocks, and performance of the industry, economy, political climate etc. to decide that whether to invest or not. On the other hand, the technical analysis it is an evolution of stocks by the means of studying the statistics generated by market activity, such as past prices and volumes. In the recent years, increasing prominence of machine learning in various industries have enlightened many traders to apply machine learning techniques to the field, and some of them have produced quite promising results.

Machine learning (ML) is a field of inquiry devoted to understanding and building methods that 'learn', that is, methods that leverage data to improve performance on some set of tasks. It is seen as a part of artificial intelligence. Machine learning algorithms build a model based on sample data, known as training data, in order to make predictions or decisions without being explicitly programmed to do so. Machine learning algorithms are used in a wide variety of applications, such as in medicine, email filtering, speech recognition, and computer vision, where it is difficult or unfeasible to develop conventional algorithms to perform the needed tasks.

LSTM networks are well-suited to classifying, processing and making predictions based on time series data, since there can be lags of unknown duration between important events in a time series. LSTMs were developed to deal with the vanishing gradient problem that can be encountered when training traditional RNNs. Relative insensitivity to gap length is an advantage of LSTM over RNNs, hidden Markov models and other sequence learning methods in numerous applications.



This paper will develop a financial data predictor program in which there will be a dataset storing all historical stock prices and data will be treated as training sets for the program. The main purpose of the prediction is to reduce uncertainty associated to investment decision making.

Stock Market follows the random walk, which implies that the best prediction you can have about tomorrow's value is today's value. Indisputably, the forecasting stock indices is very difficult because of the market volatility that needs accurate forecast model. The stock market indices are highly fluctuating and it effects the investor's belief. Stock prices are considered to be a very dynamic and susceptible to quick changes because of underlying nature of the financial domain and in part because of the mix of a known parameters (Previous day's closing price, P/E ratio etc.) and the unknown factors (like Election Results, Rumors etc.). There has been numerous attempts to predict stock price with Machine Learning. The focus of each research projects varies a lot in three ways. (1) The targeting price change can be near-term (less than a minute), short-term (tomorrow to a few days later), and a long-term (months later), (2) The set of stocks can be in limited to less than 10 particular stock, to stocks in particular industry, to generally all stocks. (3) The predictors used can range from a global news and economy trend, to particular characteristics of the company, to purely time series data of the stock price.

Computational advances have led to introduction of machine learning techniques for the predictive systems in financial markets. In this paper we are using a Machine Learning technique i.e., Long Short Term Memory(LSTM) in order to predict the stock market and we are using Python language for programming.

OBJECTIVE:

The objective of the paper is to train the system with present data in stocks using long short term memory. So, with the trained data the system will predict the future stock prices according to the time and all constraints. Thus, we use machine learning to predict the stock market prices.

LITERATURE SURVEY

S. Amanulla, B. Kamaiah Using the principle that market integration refutes market efficiency, an attempt is made in this paper to examine the Indian stock market efficiency by using two market integration approaches, viz., the Ravallion, and Cointegration and error correction approaches. The data used are the RBI monthly aggregate share indices relating to the all India, and five selected regional stock exchanges, viz., Bombay, Calcutta, Madras, Delhi and Ahmedabad, during the period 1980-1993. The results show that there is no evidence in favour of market efficiency of Bombay, Madras and Calcutta stock exchanges while contrary evidence is found in case of Delhi and Ahmedabad.

G. C. Nath, S. Verma The relationship between the stock markets of the developed countries has been examined extensively in the literature. This study examines the interdependence of the three major stock markets in South Asia. Using daily stock market data from January 1994 to November 2002, we examine the stock market indices of India (NSE NIFTY), Singapore (STI) and Taiwan (Taiex). The index level series are non-stationary and so we employ bi-variate and multivariate cointegration analysis to model the linkages among these stock markets. We found no cointegration between the stock market indices for the entire period and hence no long run equilibrium. We found mild causality for some years in the study though most of the time these markets have not been interlinked. The study has used. It should be borne in mind that the tests carried out only tests for presence or absence of linear relationships.

T. P. Madhusoodanan This paper by Madhusoodanan applies the variance ratio tests under the null hypotheses of homoscedasticity as well as heteroscedasticity, to the Indian stock market. The tests are conducted at the aggregate level of market indices and disaggregate level of individual stocks. The results indicate that random walk hypothesis cannot be accepted in the Indian market. Both the market indices the author tested showed persistent behaviour, while most of the individual stocks also showed evidence on persistence. The variance ratios were significant under heteroscedasticity in most of the cases where it was significant under homoscedasticity assumption. This implies that heteroscedasticity does not play a major role in the Indian market

EXISTING SYSTEM:

Predicting stock prices using machine learning, there are many methods and researches have been conducted. They have used Support Vector Machine(SVM) method to implement the idea. A Support Vector Machine (SVM) is a discriminative classifier that formally defined by the separating hyperplane. In other words, the given labelled training data (supervised learning), the algorithm outputs the optimal hyperplane which categorizes new examples. In the two-dimensional space this hyperplane is a line dividing a plane into two parts where in each class lay in either side.

PROPOSED SYSTEM:

In this paper, we propose a Machine Learning approach that will be trained from the available stocks data and gain intelligence and then uses the acquired knowledge for an accurate prediction. In this context this study uses a machine learning technique called Long Short Term Memory(LSTM) to predict stock prices for the large and small capitalizations.

CONCLUSION

In the project, we proposed the use of the data collected from different global financial markets with machine learning algorithms in order to predict the stock index movements. LSTM algorithm works on the large dataset value which is collected from different global financial markets. Also, LSTM does not give a problem of over fitting. Various machine learning based models are proposed for predicting the daily trend of Market stocks. Numerical results suggest the high efficiency. The practical trading models built upon our well-trained predictor. The model generates higher profit compared to the selected benchmarks.

FUTURE ENHANCEMENT

Even though good scores are achieved using ML algorithms, there can be an improvement. Adding more data helps the algorithm to learn better. Hyperparameter optimization is another method of tuning the hyperparameters to get the best performance on the data set provided. It can be implemented using the Scikit-learn machine learning library. The two famous algorithms which can be used are:

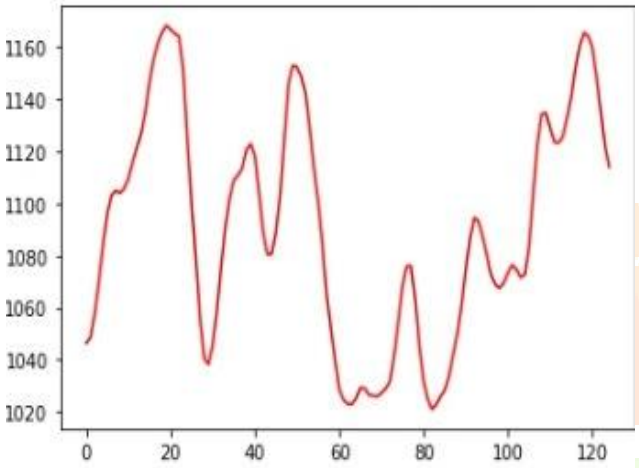
Grid Search: In this method, a search space as a bounded domain of hyperparameter values is defined then random points are sampled within the bounded domain.

Random Search: In this method, a search space as a bounded domain of hyperparameter values is

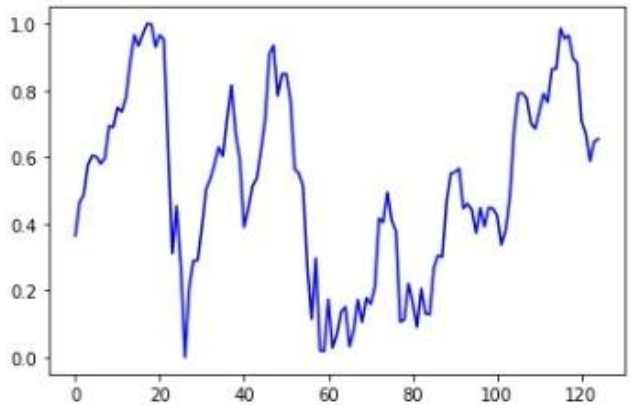
defined, and then random points are sampled in the bounded domain.

SCREENSHOTS:

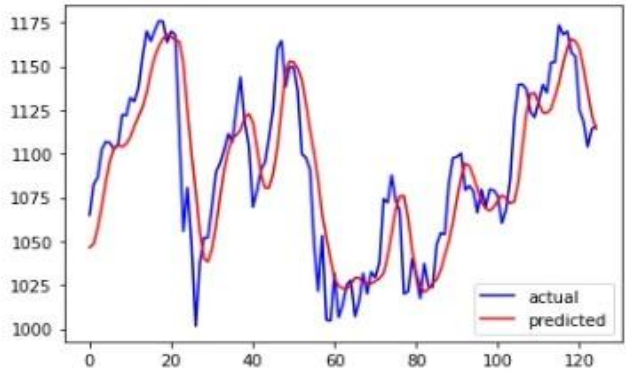
Progression of stock over period



Our model prediction



Original output for next 125 days



Comparison of the prediction

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