LITERATURE SURVEY ON STOCK PRICE PREDICTION USING MACHINE LEARNING

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Abstract— **In today's financial world stock exchange has become one of the most significant events. The world's economy today is widely dependent on the stock market prices. The Stock Market has been very successful in attracting people from various backgrounds be it educational or business .The nonlinear nature of the Stock Market has made its research one of the most trending and crucial topics all around the world.. People decide to invest in the stock market on the basis of some prior research knowledge or some prediction. In terms of prediction people often look for tools or methods that would minimize their risks and maximize their profits and hence the stock price prediction takes on an influential role in the ever challenging stock market business. Adopting traditional methodologies such as fundamental and technical analysis doesn't seem to ensure the consistency and accuracy in the prediction. As a result the machine learning technologies have become the recent trend in the stock market prediction whose prediction is based on the existing stock market values eventually as an outcome of training on their previous values. This paper focuses on RNN (Recurrent Neural Networks) and LSTM (Long Short term memory) technologies in predicting the ongoing trend of the stock market.**

Keywords— **Stock, Stock Market, Shares, Shareholder, Recurrent Neural Network(RNN), Long Short Term Memory(LSTM)**

I. INTRODUCTION

A stock or a share which is also known as a company's equity is referred to as a financial instrument that is used to represent an ownership in a company that represents a proportional assertion on its assets and earnings .
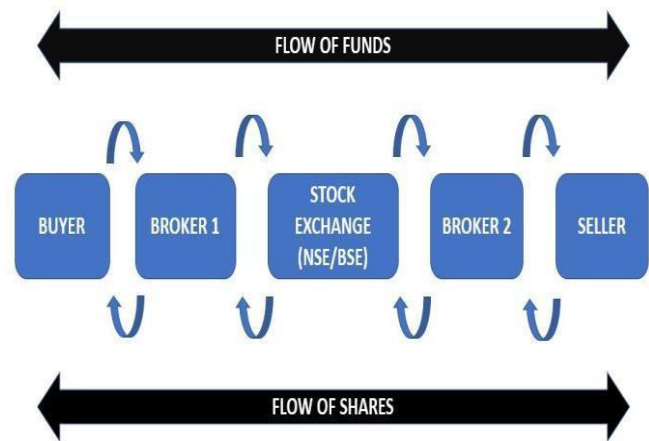

Fig 1: Flow of shares and funds

Stock ownership means that the shareholder is the owner of a part of the company which is equal to the number of shares that is held as a fraction of the company's total outstanding shares. For example, an individual who is the owner of a hundred thousand shares of a company with a million outstanding shares would be having a ten percent stake ownership in it. The outstanding shares of most companies run into huge values as huge as millions or even

billions. Stock exchanges are nothing but the secondary markets wherein the present owners of the shares could transact with the potential buyers. It is a matter of utmost importance to understand that the corporations that have been listed on stock markets do not sell and buy their own shares often. So when a share of stock is bought in the share market, it is not being bought from the company itself but from the company's shareholder. In the same way when a share is being sold it is not being sold to a company directly but is being sold to an investor. In developing countries like India the rapid growth of its economy depends largely on the growth of its Stock Market. If there is a rise in the stock market, the growth in the company's economy would be rather high. If there is a downfall in the stock market the growth in the company's economy would be down. So it can easily be said that the stock market and country's economic growth is largely confined to the performance of the stock market. Only 10% of any country's population is showing interest or involving themselves with the stock market investment and the reason for this could majorly lie in the fact that the nature of the stock market is very dynamic. There is a misunderstanding or a false conception about the stock market and is often thought of as an act of gambling. So this misconception could be replaced by creating an awareness among people. Recently, many traders have been employing the machine learning models for the stock price prediction because of its rising popularity as a result of its proficiency and effectiveness in the prediction. Various methodologies such as sentimental analysis, usage of past prices of the stocks, growth in the sales and dividends have been developed to predict the stock effectively. As we are aware in order to predict the stocks accurately not only do we require data but also one of the above factors where the market hypothesis can be built. We have selected the Machine learning techniques here because they provide us with better results as compared to any other prediction model. It can be thought of as a proficient way to be able to represent such developments. It foretells a market value that is as close as possible to the perceptible value, hence improving its accuracy. The most important part of machine learning is the dataset that is used. The dataset being used must be as tangible as possible because even a slight variation in the data can cause considerable changes in the outcome. This paper majorly deals with predicting the stock prices using LSTM and RNN algorithms.
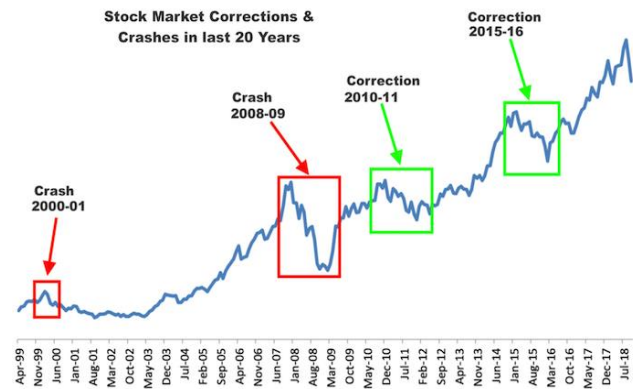

Fig 2: Indian Stock Market Trend

II.   PROPOSED ALGORITHMS

LITERATURE SURVEY
[1] Research on Stock Price Prediction Method Based on Convolutional Neural Network, IEEE 2019- Sayavong Lounnapha et al. This paper intends for a prediction model for stock price which is centered at the convolutional neural networks, that has exceptional capability of learning on its own. The data set is taught and tested relating the behaviours of both Convolutional Neural Networks and Thai stock market The result shows that the model on grounds of Convolutional Neural Networks can effectually recognize the altering trend in stock market price and envisage it which provides significant allusion for stock price forecast. The accuracy of the prediction is found to be elevated, and it could also be promoted in the field of finance.

[2] Enhancing Profit by Predicting Stock Prices using Deep Neural Networks, IEEE 2019-Soheila Abrishami, et al.,
The prediction of economic time series is quite a herculean task, which has fascinated the attentiveness of many scholars and is extremely vital for investors. This paper focuses on presenting a deep learning system, which makes use of a range of facts for a part of the stocks on the NASDAQ exchange to predict the value of the stock. This model has been trained on the smallest of data for a particular stock and accurately estimates the concluding value of that stock for multi-step-ahead. It consists of an auto encoder in order to remove noise and makes use of time series data engineering to syndicate the advanced features with the original features. These new features are given to a Stacked LSTM Autoencoder for multi-step-ahead estimation of the stock concluding value. Further, this estimation is used by a profit maximization approach to offer assistance on the right time for buying and selling a particular stock. The results indicate that the suggested framework outclasses the state of the art time series forecasting methodologies with respect to analytical accuracy and effectiveness.

[3]An LSTM-Method for Bit-coin Price Prediction: A Case Study Yahoo Finance Stock Market, IEEE 2019- Ferdiansyah et al., Bit-coin is a type of Cryptocurrency and currently is one of a kind of investment on the stock market. Stock markets are inclined by several risks. And bit-coin is one kind of crypto currency that keeps rising in recent years, and sometimes suddenly falls without knowing influence on the stock market. There's a need for automation tools to predict bit-coin on the stock market because of its fluctuations. This research study studies how to create mode prediction bit-coin stock market prediction using LSTM. Before confirming the results the paper tries to measure the results using RMSE (the Root Mean Square Error).The RMSE will at all times be larger or equal to the MAE. The RMSE metric assesses how well a model can calculate a continuous value. The method that is applied on this research to predict Bit-coin on the stock market Yahoo finance can forecast the result above $12600 USD for the next couple of days after prediction.

[4] Share Price Prediction using Machine Learning Technique, IEEE 2019-Jeevan B et al., Lately stock market has been the talk of the town with more and more people from academics and business showing interest in it. This paper mostly deals with the approach towards predicting stock prices using RNN (Recurrent Neural Network) and LSTM (Long Short Term Memory) on National Stock Exchange using numerous elements such as the present-day market price as well as anonymous events. A recommendation system along with models constructed on RNN and LSTM methods are used in selecting the company is also mentioned in this paper.

[5] Stock Market Prediction Using Machine Learning Techniques, IEEE 2020- Naadun Sirimevan et al., The Stock Market Prices play a crucial role in today' economy. Researchers have discovered that social media platforms such as twitter and web news tend to influence the decision-making process of any individual. In this research behavioural reflex towards web news is taken into count to reduce the gap and make the prediction much more accurate. Precise predictions

were made for a day, a week and two weeks here after.

METHODOLOGY
Stock market prediction seems like a complicated problem because there are various factors that are still left unaddressed and do not seem to be statistical at first. But to our rescue there are various machine learning algorithms by using which we could efficiently predict current trends in the stock market by using the references from the previous data. Here the dataset that we are going to use has been collected from Yahoo finance. This dataset consists of nearly 9,00,000 records related to the stock prices required and many other values that are relevant to each other. This data predicted the stock prices at some intervals of time for each day in a year. Many sections such as volume, date etc were included in it. In order to simulate and analyze only one company's data was taken into account. The data considered or taken into account

was readily available in the csv format which was first read and converted into a data frame by making use of one of the most popular libraries, Pandas in Python. In the due course, one specific company's data was pulled out by separating data depending on the symbol field. After this, the data was segregated into testing and training data sets by performing normalization by using yet another popular Python library known as Sklearn library. The test set was placed as 20 percent of the dataset that was available. Although Machine learning has various algorithms that could be used for predicting the stock prices here in this paper we make use of two main algorithms known as RNN and LSTM.
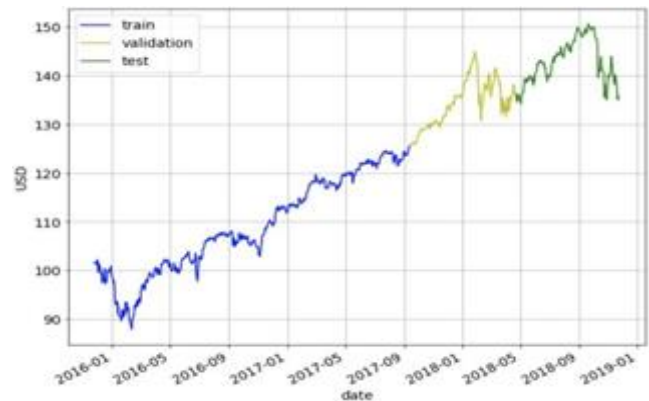

Fig 3: A Representation of test,train and validation accuracy of RNN-LSTM Model.

RNN AND LSTM
Recurrent Neural Network is a type of Neural Network in which the input to the next layer is taken from the output of the previous layer. It has many types to it and LSTM is one among them. LSTM stands for Long Short Term Memory. It basically has three parts to it which are input layer, forget layer, output layer. Input layer is responsible for deciding what amount of information should be carried forward to the next layer from the previous layer and the output layer is responsible for deciding what amount of data should be sent forward into the next layer as input. The reason for the immense popularity of the LSTM is its special power to memorize the data . In a basic neural network that consists of only one layer that is hidden the number of layers to be contained in the input layer mostly depends on the dimensionality of the data, and these input layer neurons get connected to the hidden layers via 'synapses'. The relationship between each of the two nodes from the input layer to the hidden layer consists of a coefficient called weight which acts as a decision maker for the signals. The learning process of the model is basically nothing but a continuous fine-tuning of weights and gradually after the completion of the entire process, the artificial neural networks will have optimum weights for each synapse. An activation function such as a sigmoid or a tangent function

is applied to the input layers in order to minimize the error rates and a softmax activation function is used in the output layer. The main functionality of this activation function is to produce non linearity in the model. After this a Back propagation algorithm will be applied in which the same process repeats itself again and again that is, the information keeps getting transferred back and forth until the weights are normalized and the error rate is minimalized. Finally the model will be trained on the training dataset and tested on the test data set.

III.   EXPERIMENT AND RESULT

This proposed system makes use of data taken from Yahoo finance, trained and tested. The LSTM RNN model used for the prediction is found out to be very effective and resembles the actual trend very well. The results obtained on the training dataset had a Mean Square Error of 0.00106 and a Root Mean Square Error of 0.03.

The results on the testing data had a Mean Square Error of around 0.00875 and a Root Mean Square Error of around 0.09. The larger the dataset and more the frequency of training higher will be the accuracy that will be obtained.

IV.   CONCLUSION

From the research done so far it could be concluded that the RNN and LSTM libraries are very effective in determining the stock price trends effectively relative to the actual market trend. At the same time what we could find out is that the python libraries that were used as a part of the training process were not very optimal. As far as the training speed is considered the functions that we use from the mathematics principle have a lot faster speed comparatively and they consist of more detailed designs and significant improvements when tested under various situations. However, the python library functions are considered to be more adaptable. From our work done so far we can easily tell that certain stock trends can be predicted easily on the basis of certain general rules and regulations of the stock. This the main reason behind the existence of the private placement institutes. Few things such as optimization of the neural network parameters as well as the training process however always has much room for improvement. All these points would be considered as further steps in the research.

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