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## PROGNASTICATION OF STOCK MARKET

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**Abstract** \_ Stock prices changes dynamically by net buyers and sellers based on the demand and supply for the stock during the trading hours. Our Project is to determine the stock price in the near future using the Machine Learning algorithms for the given dataset of a Stock. The Dataset is Price history of the stock for the last 5 years. The Machine learning algorithm such as LSTM to determine the Target price of the Stock in the near future and the days taken to obtain the Target. Long- and Short-Term Memory algorithm is used to identity and match the pattern over the historic data to determine the forecast of the prices. LSTM and Technical Indicators are used to derive a conclusion for a given stock based on its historic performance.

**Keyword**\_ LSTM, MACD, Stocks, algorithms, prediction.

### I. INTRODUCTION

The Proposed model utilizes the Long Short Term Memory Algorithm (LSTM) and Technical Indicators such as Support and Resistance, and Moving Average Convergence and Divergence (MACD) to improvise the Decision of the user to Buy or Sell the Stock. There are Other Machine learning algorithms such as Linear Regression, Decision Tree algorithm are used to Compare two entities to derive for a result based on the Slope and y-intercept and Classifiers of the Decision Tree algorithm respectively. The LSTM uses the Memory Cell, forget gates and other utility functions which is very useful for the Time series forecasting and for pattern matching of particular Time series data and predicts the output.

### II. LITERATURE SURVEY

Stock price is predicted using Historic data of one stock is being used to train the model in one sector which is used to determine the price of the different stock in the same sector [2].

The Stock price is Strongly correlated with the Index. Stock price is correlated with the number of buyers and the number of sellers. There is a Dynamic behavior of traders based on B-B, B-S, S-B, S-S. This is the outcome of Transaction records of the Artificial Neural Network. The stock traded in exchange. The Accuracy is of the stock price is determined by MAPE [1].

The PE ratio is one of the fundamental indications of the stock. It indicates the current price is less than the intrinsic value derived or greater than the intrinsic value of the stock. It also can be compared with peers known as the Symbol PE ratio to determine the stock level in its sector. From this the fair value of the Stock can be determined as well as the Future price [3].

The Reaction of the market participants is abrupt when there is News on the particular Stock. This Shock waves causes a drastic change in Price of the Stock. This can be detected when there is sudden surge in volume, huge selling or buying pressure on the Stock, Increase in the Volatility Index [6].

Global Markets have major influence in the fluctuation of the stock in a particular exchange since many companies are worldwide. By using the Global queues, the immediate trend of the stocks is determined using the Support Vector Machine and Reinforcement learning algorithms [4].

The Support and Resistance is a technical indication of the stock where it is being overbought and oversold respectively over the history. If the support or resistance of the stock price breaks then there will be sudden surge or sag in price values [5].

### III. EXISTING SYSYTEM

In existing the piecewise linear representation which combines turning points and maximum absolute deviation points in stock time series to extract sequence features.

In the previous result, traditional classifier is used so that the stock price is unpredictable.

#### A. Disadvantages

The existing system used algorithm that is based on bootstrap sampling so the system fails when there are rare outcomes or predictors. When there is a change in the operating environment the existing system does not perform well Low accuracy.

### IV. PROPOSED SYSTEM

In the proposed system, the Long Short-Term Algorithm (LSTM) and Technical Indicators such as Support and Resistance and Moving Average Convergence and Divergence (MACD) are used to improvise the decision of the user to Buy or Sell the Stock.

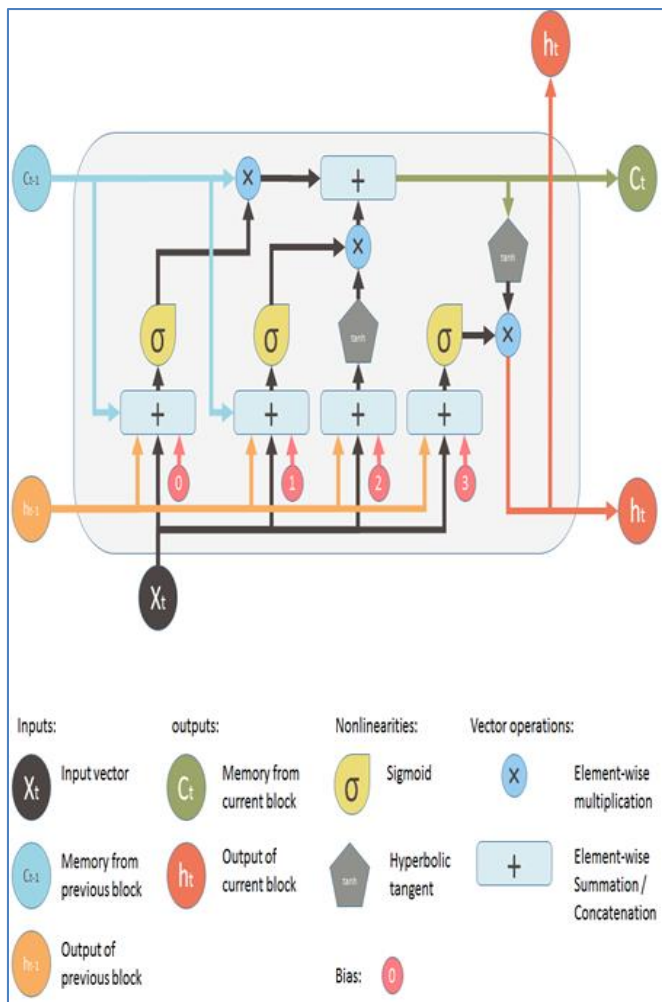
Machine Learning Algorithms such as Linear Regression and Decision Tree Algorithm are used to compare two entities to derive for a result based on the slope and y-intercept and Classifiers of the Decision Tree Algorithm respectively.

LSTM uses the Memory Cell, forget gates and other utility functions that is useful for the time series forecasting and for pattern matching and for pattern matching of particular Time series data and predicts the output.

### V. LONG SHORT-TERM MEMORY MODEL

LSTM is one of the Recurrent Neural Network (RNN) that has the ability to consider the long-term dependability and Memory. LSTM Model have a chain structure operates using gates and layers of neural networks like other RNN approaches. The structure of the LSTM is constructed in a manner of a cell state that runs through the entire LSTM, the value is changed by the gates that have function by either allowing or disallowing data to be added to the cell state. There are also components by the name of gated cells that allow the information from previous LSTM outputs or layer outputs to be stored in them.

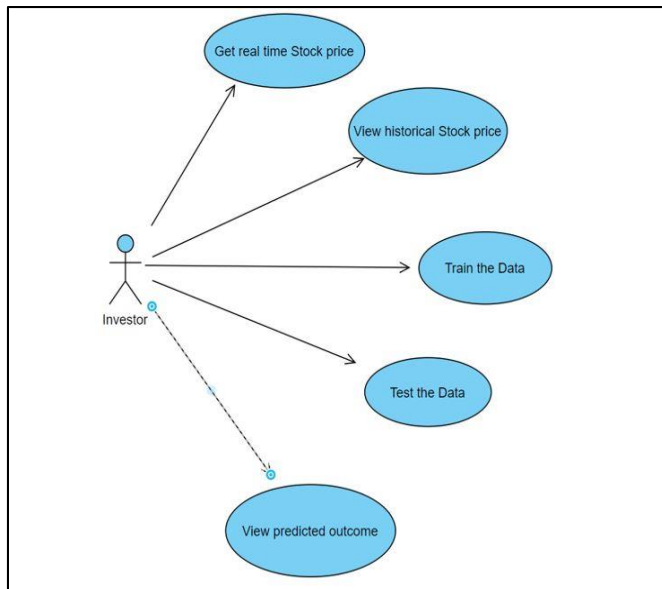
A. LSTM architecture



VI. SEQUENTIAL MODEL

A Sequential model is appropriate for a plain stack of layers where each layer has exactly one input tensor and one output tensor. You can create a Sequential model by passing a list of layers to the Sequential constructor. The sequential API allows you to create models layer-by-layer for most problems. It is limited in that it does not allow you to create models that share layers or have multiple inputs or outputs. The Sequential model API is great for developing models in most situations, but it also has some limitations.

## VII. USE CASE DIAGRAM



## VIII. TECHNICAL INDICATORS

Technical Indicators are used extensively in technical analysis to predict changes in stock trends or price patterns in any traded asset. This mainly used to track the Price action of the stock. In our System we used Support and Resistance indicator & Moving Average Convergence and Divergence (MACD) indicator.

## A. Support and Resistance Indicator

Technical analysts use support and resistance levels to identify price points on a chart where the probability favor a pause or reversal of a prevailing trend. Support occurs where a downtrend is expected to pause due to a concentration of demand. It Indicates the Where a stock is Overbought. Resistance occurs where an uptrend is expected to pause temporarily, due to a concentration of supply. It Indicate where a stock is oversold. Support and resistance areas can be calculated using the Pivots Points (PP).

$$\text{Pivot Points} = (\text{High} + \text{Low} + \text{Close}) / 3$$

$$\text{Support} = \text{PP} - \text{High}$$

$$\text{Resistance} = \text{PP} - \text{Low}.$$

## B. Moving Average Convergence Divergence Indicator (MACD)

Moving Average Convergence Divergence (MACD) is a trend following momentum indicator that shows the relationship between two Moving Averages of a security's price. There are two lines in a MACD indicator depending upon the Convergence and Divergence of these lines Buy or Sell Signal of Stock. The 9 Period (days) exponential Moving average is usually called the Signal Line. Whenever a MACD line crosses above the Signal Line it indicates Buy Signal and as the contrary when MACD line crosses below the Signal Line, sell signal is generated.

## IX. ALGORITHM USED

S. No	Algorithm used	Uses of Algorithm
1	The Long Short Term Memory Algorithm (LSTM) and Technical Indicators such as Support and Resistance, and Moving Average Convergence and Divergence (MACD)	Improvise the Decision of the user to Buy or Sell the Stock
2	Machine learning algorithms such as Linear Regression, Decision Tree algorithm	Compare two entities to derive for a result based on the Slope and y-intercept and Classifiers of the Decision Tree algorithm respectively
3	LSTM uses the Memory Cell, Forget gates and other utility functions	Useful for the Time series forecasting and for pattern matching of particular Time series data and predicts the output.

## X. REQUIREMENTS

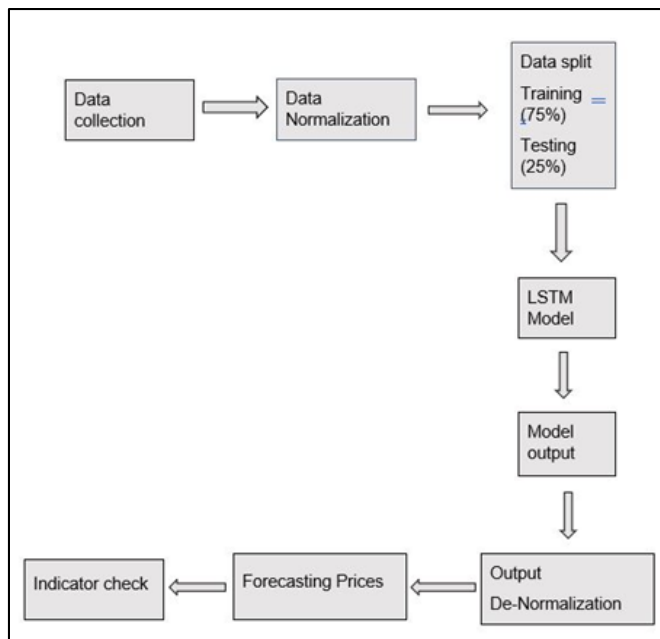
## HARDWARE SPECIFICATION:

- Processor: Intel i3 5th Gen
- RAM: 4 GB
- Hard Disk Drive: 1 TB

## SOFTWARE SPECIFICATION:

- Coding Language: Python 3.6
- Tool: Jupyter Notebook

## XI. SYSTEM ARCHITECHTURE



## XII. MODULES

## A. Dataset

The Dataset is obtained from NsePy a Python Package which gives the Historic data of the gives stock. It requires a Ticker name which is given by the exchange at the time of Initial Public Offering (IPO). The Ticker name indicates the Company's name at the exchange. And also takes the Start date and end date for which the data is to Collected. After assigning the correct start and end date for last 5 years the function get history returns the Data of Open, High, Low, Close and other 14 parameters in a data frame.

## B. Dataset Attributes

- 1) **Date:** The date of the particular trading day.
- 2) **Symbol:** The Symbol Denotes the Ticker Name of the Company's Stock at the exchange.
- 3) **Series:** The Series denotes whether is a Equity or Derivative or the Type of Contract of the particular Stock. Here we have Taken Equity Sector (EQ).
- 4) **Open:** The Open Price indicates the Price at which traders can trade at the time of opening bell of the exchange. It depends on the total order placed during
- 5) **High:** The High price is the Highest Price of the Stock which is traded during the trading hours of 9.15 am to 3.30 pm.
- 6) **Low:** The Low price is the Lowest Price of the Stock which is traded during the trading hours of 9.15 am to 3.30 pm.
- 7) **Close:** The Close Price is the Last Traded price at which the exchange closes the execution of orders for a particular stock at 3.30 pm. This is determined by the Exchange at the Closing Bell and Further can't be changed. Although Adjusted Close price can be Derived but the Close price is a base for the calculated Adjusted Close price. For implementing our LSTM for predicting the Close Prices, a model was implemented using the Keras framework and trained using a dataset that contained data about the Close price of the Stock.
- 8) **Volume:** The Volume of a stock indicates the Total number of Shares that is being exchanged between the Buyers and Sellers respectively.
- 9) **Turnover:** The Turnover is a term denoting the Total value of the Stock which has been traded throughout the Trading hours.
- 10) **VWAP:** The volume weighted average price (VWAP) is a trading benchmark used by traders that gives the average price a security has traded at throughout the day, based on both volume and price. It is important because it provides traders with insight into both the trend and value of a security.
- 11) **Trades:** The Trades show the total number of Orders Executed by the Exchange in a trading day.

- 12) **Deliverable Volume:** The Total number of shares that has been bought by the Shareholder to carry forward his security for tomorrow or for a long-term investment. This is called the Deliverable Volume of shares.
- 13) **Percentage Deliverable:** The ratio between Volume and Deliverable Volume in percentage is known as the Percentage Deliverable of a particular Security.

#### *C. Data normalization*

The Historic Close Price of stock is taken as our prediction and Forecasting. The Close Price is Normalized between 0 to 1 for the better understanding of the Machine. Normalizing the input for our Network to improve the convergence properties of our LSTM.

#### *D. Data split*

The Close price for the last 5 years contains 1444 values. The Dataset is then split in a ratio of 75% for Training and the remaining 25% for Testing purpose. The Training data contains 1083 Close prices and the Testing data contains 361 close prices.

#### *E. Time Series Data*

The Training and Testing data is further processed as Timeseries data in which the Dataset is Tuned such that for every timesteps of 100 data an output is presented for the purpose of Training the Model. The Train and Test dataset are created based on the time-series data using create dataset Function.

#### *F. Data Reshaping*

The Training and Testing data are reshaped to size 100 for the input to the First layer of the LSTM model. Further its reshaped to three-dimension such that every index contains 100 Close price data. The data is reshaped such that 1 sample, 100 timesteps, and 1 feature.

#### *G. LSTM Model*

The LSTM model was constructed and trained with the Keras neural network API. The API is a open source deep learning library written in Python and uses TensorFlow as backend. TensorFlow is also an open-source machine learning framework for numerical computations. Keras fast learning curve and together with its easy implementation of deep learning models made a great tool for us to use for this project.

#### *H. Forecasting*

The Future Close prices is forecasted using our trained LSTM model. Using the Last 100 data as our input to the model, the model predicts a close price as a output. This is output is then appended to the last hundred days and then again given as input to the model to predict the output for the consecutive days and runs in a loop until the next 30 days Close prices of the Security is predicted by the Model. For Every day's Next Output is predicted based on the previous 100 data. Then gets appended to the output list for the other next day's output previous model output and other 99 data are taken. This Cycle continues for 30 days of Forecasting.

### XIII. CONCLUSION

The Model as well as the integrated indicators such as Support and Resistance, MACD indicator shows a clear downfall in the Close prices in the Reliance Security. So as of now it is not the better idea to hold the security in a long-run. After a healthy correction and based on the investment related news the stock can rise for a short term and profit booking of the shareholders can happen such that it also falls in. As the Stock is being traded near 52w-High Investors should be cautious for their investment and Read the Company related information.



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