Indian Stock Markets Data Analysis and Prediction using Macroeconomics Indictors in Machine Learning

Jaskarn Singh, Amit Chhabra

Abstract: Machine Learning plays a unique role in the world of stock market when it comes to the trend prediction. Machine learning library MLIB helps in determining the future values of stocks. With the help of this research one can find the ups and downs of stock market by providing a signal for the same and done by analyzing the previous stock data. This study is based on analysis of stock data from 2000 to 2009 which includes top fifty companies of various sectors from all over India. Six stock data indicators known as, Bollinger Band, Relative Strength Index(RSI), Stochastic Oscillator, Williams % R, Moving Average Convergence Divergence (MACD), Rate of Change applied on the nineteen years of stock data then results of these indicators are compiled and finally with the use of machine learning libraries like Numpy, Pandas, Matplotlib, Sklearn a random forest algorithm is applied on the compiled result to predict the stock movement , these libraries which splits the results into two sets training set and testing set which also boost up the result and gives you the better prediction.

Keywords: Random Forest, Stock, Machine Learning.

I. INTRODUCTION

Machine Learning plays a unique role in the world of stock market when it comes to the trend prediction. Machine learning library MLIB helps in determining the future values of stocks. With the help of this research one can find the ups and downs of stock market by providing a signal for the same and done by analyzing the previous stock data. This study is based on analysis of stock data from 2000 to 2019 which includes top fifty companies of various sectors from all over India. Six stock data indicators applied on the nineteen years of stock data then results of these indicators are compiled and finally with the use of machine learning libraries like Numpy, Pandas, Matplotlib, Sklearn a random forest algorithm is applied on the compiled result to predict the stock movement, these libraries which splits the results into two sets training set and testing set which also boost up the result and gives you the better prediction. Six indicators are as given below.

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A. SO:

This indicator depends upon the time period which means this indicator is used for indicating the movement of stock market. Formula for SO as:

$$SO = 100 \times \frac{CP - Low}{High - Low}$$

Where,
SO= Stochastic Oscillator
CP=Close Price

B. RSI

One of the most used stock indicator for the analyze the stock data and predict the future scope of the data. The formula for the RSI is as:

$$RSI = 100 - \left(\frac{(1 + RS)}{100} \right)$$

Where,
RSI= Relative Strength Index
RS=Relative Strength

C. BB (Bollinger Band):

Formula for BB as:

$$Bandwidth = \frac{UpperBB - LowerBB}{MiddleBB}$$

D. Williams %R

E. Moving Average Convergence Divergence (MACD)

F. Rate of Change:

This indicator used for indicate change in average of the stock.

II. METHODOLGY

In this proposed system we collect the data offered through the www1.nseindia.com for analyzing and prediction and also we collect the data from the www.kagel.com. In this we used the data of nineteen years (2000-2019) for prediction. We divide this process in three phases/stages.

A. Phase/Stage 1:

We collect the data from www1.nseindia.com and www.kagel.com. Then preprocess of filter the data using the apache sparks and the cloud era by using the diff data filtration commands.

B. Phase/Stage 2:

We implement the six-ten stock indicators using the python language and used phycharm interface for the implementation of this indicators.

These indicators are (Six stock data indicators) as, Bollinger Band, Relative Strength Index(RSI), Stochastic Oscillator, Williams % R, Moving Average Convergence Divergence (MACD), Rate of Change.

C. Phase/Stage 3:

After implementation of indicators we predict the future values of data using the machine learning libraries like Numpy, Pandas, Matplotlib, and Sklearn. We divide the data into two parts testing set and test set.
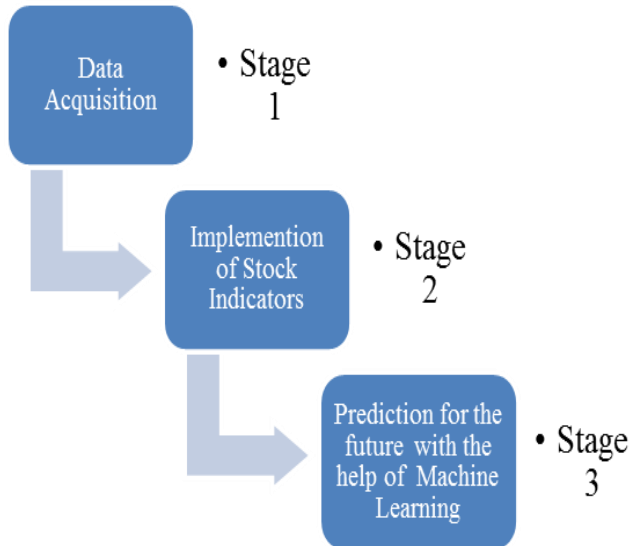
15.	Gail
16.	Grasim
17.	Hcltech
18.	Hdfcbank
19.	Heromotoco
20.	Hindalco
21.	Ioc
22.	Itc
23.	Tcs
24.	Hindunilvr

Rate of Change (RoC):fig 2 shows the RoC indicator how calculate using the proposed system.
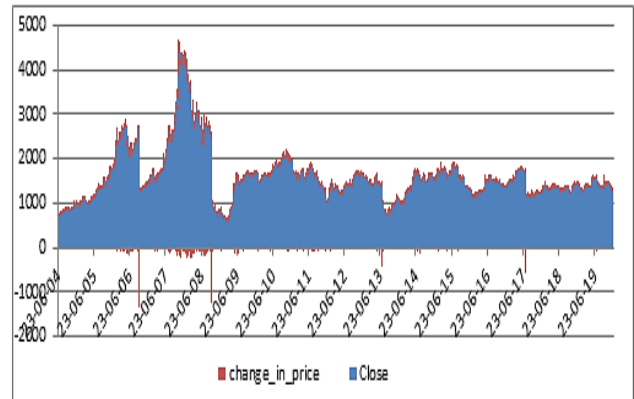

Fig 2: Shows the RoC Indicator

BB: fig 3 shows the BB indicator how graphically represented using the proposed system.

$$\text{Bandwidth} = \frac{UpperBB - LowerBB}{MiddleBB}$$

Fig 1: Stages of proposed system

III. RESULT AND DISCUSSION:

We used the data of diff Companies and we collect the data of nineteen years (2000-2019) of these companies. Some of these are listed below.

Table I: Shows some Companies Data which used for analyzing and prediction.

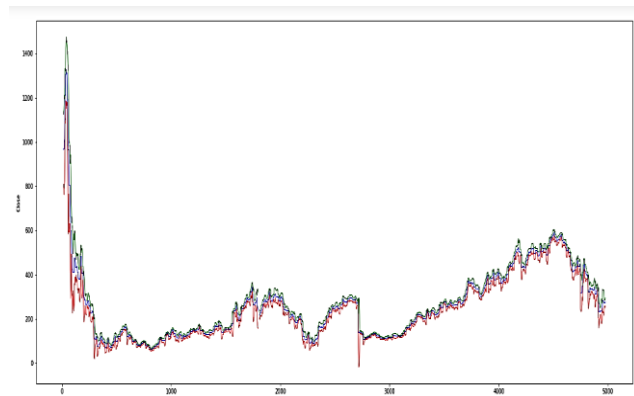| S. No.	Name of the Organization
1.	Wipro
2.	Hdfc
3.	Adaniports
4.	Asianpaint
5.	Axisbank
6.	Bajajfinsv
7.	Bajfinance
8.	Bhartiartl
9.	Bpcl
10.	Britannia
11.	Cipla
12.	Coalindia
13.	Drreddy
14.	Eichermot

Fig 3: BB(Bollinger band) indicator

RSI: fig 4 shows the RSI indicator how graphically represented using the proposed system.

$$RSI = 100 - \left(\frac{(1+RS)}{100}\right)$$

Where,
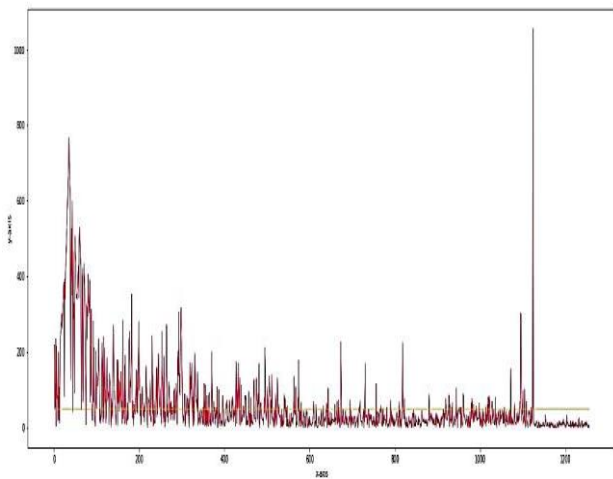RSI= Relative Strength Index
RS=Relative Strength

Fig 4: RSI indicator

Accuracy: we consider the accuracy based upon testing set. We used ASF (accuracy score function) and machine learning libraries formula for accuracy as:

$$Accuracy = (T_{+ve} + T_{-ve}) / ((T_{+ve} + T_{-ve}) + (F_{+ve} - F_{-ve}))$$

Where,

T_{+ve} = True Positive $\qquad$ F_{+ve} = False Positive

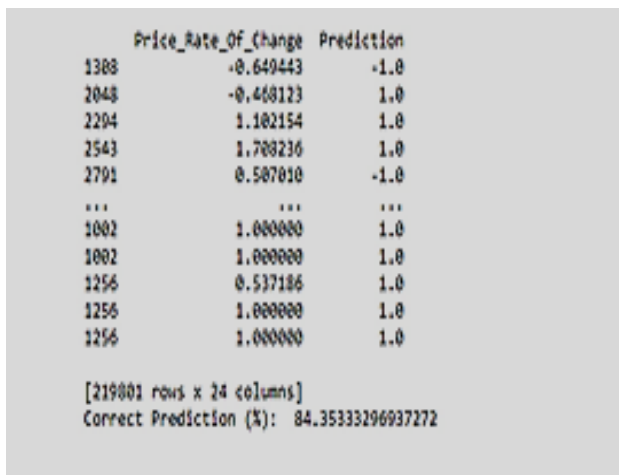T_{-ve} = True Negative $\qquad$ F_{-ve} = False Negative

Fig 5: Shows the accuracy of proposed system

IV. CONCLUSION:

This paper will provide the future stock prediction whether the stock will close up or down. It will give you the idea about the prediction depending on the data of previous days. The study can be applied on any stock market whether Indian or other in the world. To demonstrate the methodology in this work past nineteen years of stock data from Nifty-50 has taken as sample. With the help of machine learning libraries six indicators (RSI, Stochastic Oscillators, Williams's %R, ROC, Bollinger Band) has applied on this data. On the final compiled result Random Forest algorithms technique has been applied and an accuracy of 84.3% has been obtained. Working of these six indicators can be tested by Applying this method on stock market of any nation and the results can be improved with the use of some other stock indicators available in the world of stock market

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AUTHORS PROFILE

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