Stock Market Prediction Using Machine Learning & Robotic Process Automation

[1]Shreya Mondhe, [2]Mayank Mukundam, [3]Dr. R. C. Jaiswal
E&TC Department, Pune Institute of Computer Technology, Pune, Maharashtra, India.

Abstract : **The definition of stock market has changed a lot in recent past as many people have been seen not just investing in it partly but also setting it up as a full time business. The obvious affect can be seen on the GDP of the country which eventually led to a business oppurtunity for the settled as well as budding entrepreneurs. The aforementioned business idea deals with the technical analysis of the stocks, though there is one more way for it i.e. sentiment analysis, still the former way is preferred as it being more accurate than the latter.Technical analysis can be done by various machine learning algorithm of which two of the prime algorithms that are LSTM & Moving average technique have been mentioned in this paper. The crux of this paper is to predict the future stock prices & letting the user know whether to sell or buy the stocks.**

I. INTRODUCTION

With advancement in Big Data Analysis majority of the sectors want to take its benefit in their business, wherein Stock Market being the major one as it opens the door for many other oppurtunities.There are many algorithm trading systems that are built & available in the market for entrepreneurs to understand where there business is haeding.Different algorithms have been proposed & used by developers for stock market prediction but not many had the potential stand in the market.The algorithms proposed in this paper mainly deals with the rectification of the problems proposed by the previous algorithms.

In the final product there will be web app where you can login & choose a company of your choice & see graphical representation of the stocks or you can directly get your result whether to sell or buy the stock.

Earlier there were no specific algorithms for stock prediction so major source of information from Paper media , Electronic Media which were that accurate enough making stocks a tough place to invest. With rising popularity in Machine Learning techniques algorithms were made, Once algorithms were made optmizations were done to make the algorithm faster & developed into a product which can be used by from a layman to a top-notch businessman.

Secondly,Machine Learning includes various Data mining , Data visualizations & data prediction techniques which makes it a useful tool specially with IOT industry.

II. WORKING

There are use of 2 major algorithms in this paper. As discussed above the paper mainly works producing 2 outputs, a) The decision of selling & buying the stocks wherein Moving Average algorithm is used.
b) The second outcome being the graphical representation of the stocks which uses Long Short Term Memory (referred as LSTM henceforth). All of this was made to appear on a Webapp which is using Tkinter library of python.
Each & Every Process is automated using Robotic Process Automation(RPA henceforth).

RPA: As the name suggests it deals with the reduction of human in any process. It basically can be defined as a software robot which not only reduces our efforts but also reduces the redundancy in tasks.[5] The prime example can be Web-scrapping & Screen-scrapping.
We have used Web-scrapping for our project wherein you just need to click on the company for which you want to analyze stock & it will search & download the CSV file from the browser.
Talking on the technical background it is usually used with a selenium library. Writing Espresso Tests can be a handy example for RPA

a) **Moving Average Technique**: It can also be called as dynamic average in Mathematics. Whenever you have data that is ever-changing with the time, the average changes & the decision is made in accordance with the new average. It is generallly used in distribution of data in certain classes.For e.g. In our case Let's say we have data of 20 days then, we can calculate average of stock values & if the data or stock value on 21st day makes our average less than the previous then we can buy it otherwise we will sell it.
The stocks values mentioned above mainly delas with the Closed prices of the stock on any specific day.

b) **LSTM**: It uses a RNN architecture along with Tensorflow framework which uses keras library. It uses input & forget gates which are responsible for input flow & memory cell respectively. [1] Forget gate helps it to remember & forget useful & useless stuff. As it uses forget gate so its efficiency is more than the RNN architecture. The forget gate enables it to store its previous result also until it is to be replaced by new information. [2]
In our case we say we have data for 100 days we then we have distributed training & testing datasets in 80:20 & For 80 days we define a window of 5 days where in it learns the data of 6th day based on it previous 5 days & for 7th day it takes into consideration data or stock closing values from 2nd-6th day & so on. On 81st day it has gain sufficient memory to predict the Stock value on its own. This algorithm generally works efficient for large amount of data.

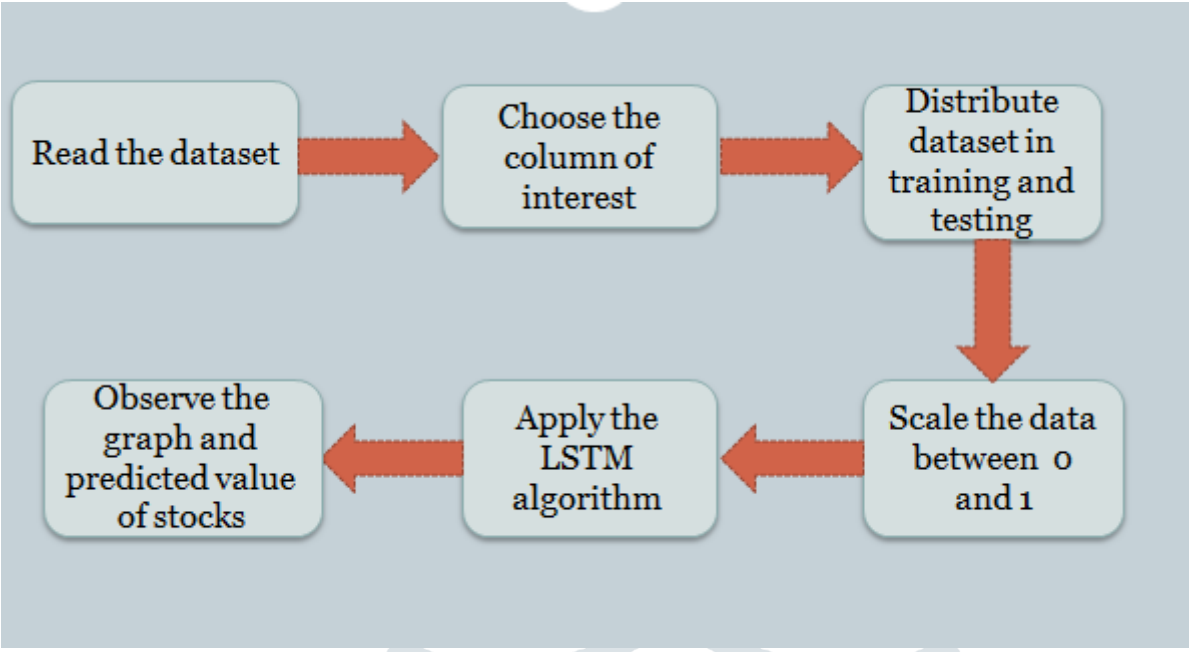


Fig 2.1: Block Diagram of the Procedure

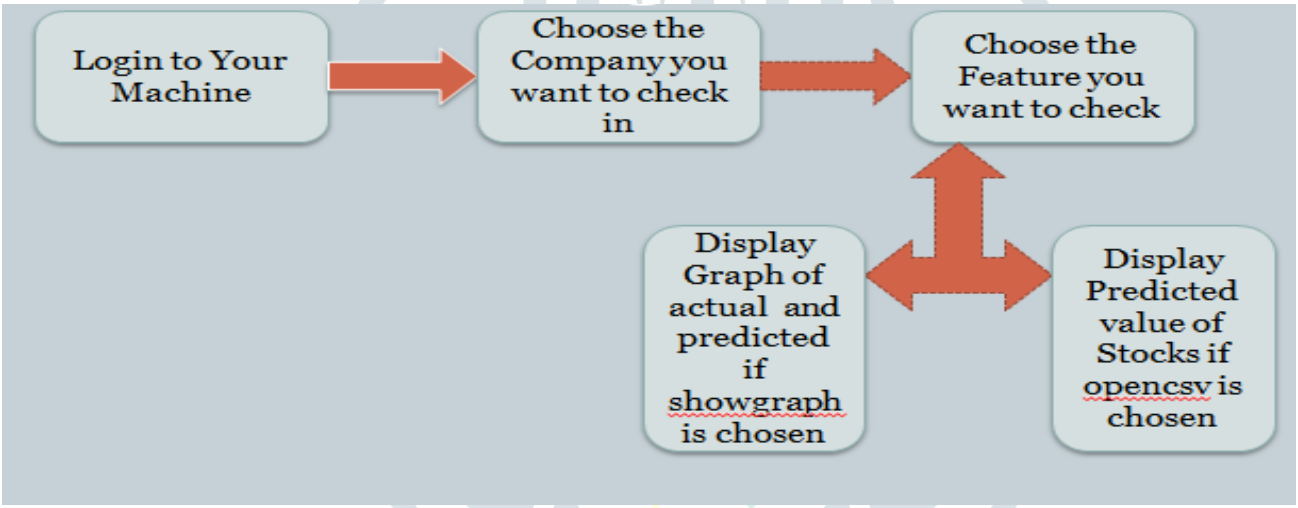


Fig 2.2: Block Diagram of the System

Fig 2.1 depicts the flowchart of the procedure that is what exactly will be done after extracting the Close Values of the Stocks. Fig 2.2 depicts the flowchart of the Web-app or we can even say it's the front-end.

III. RESULTS AND ANALYSIS

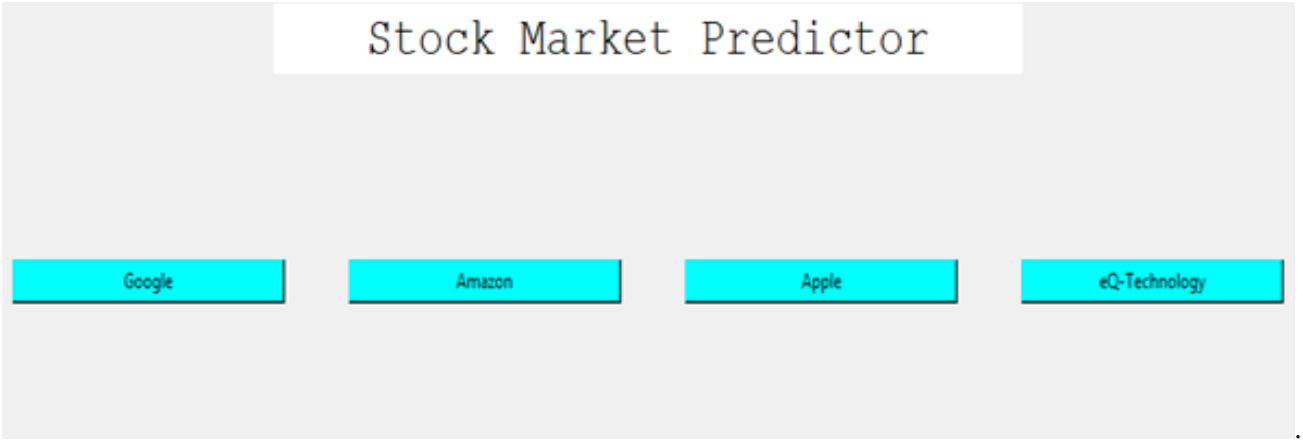


Fig 3.1: Depicts the graph of the front-end of the web-app

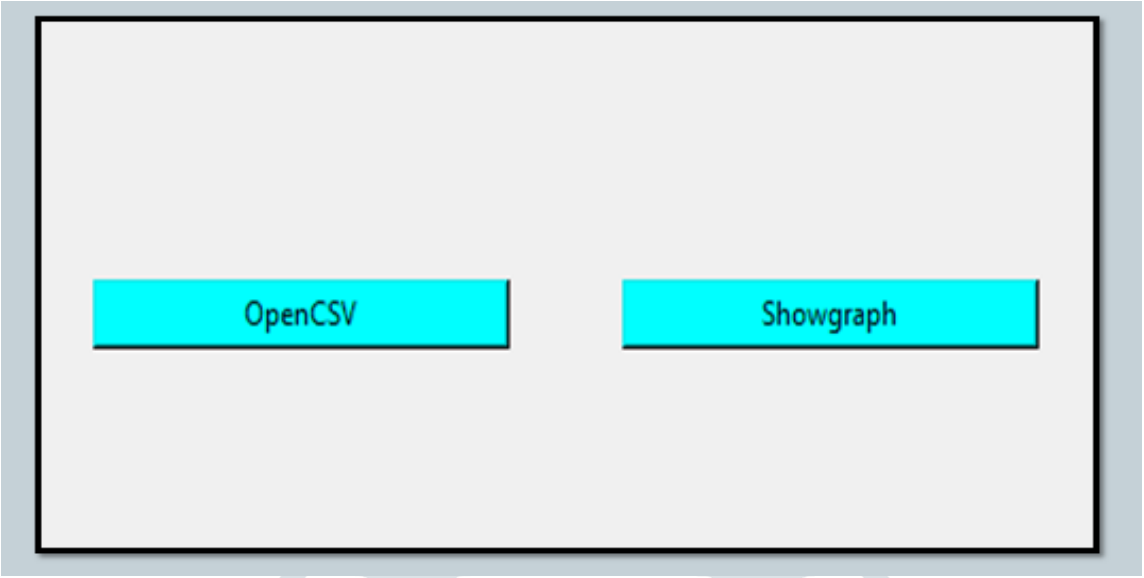


Fig 3.2: Depicts the Screen on the web-app when any of the company presented in Fig 3.1 is clicked

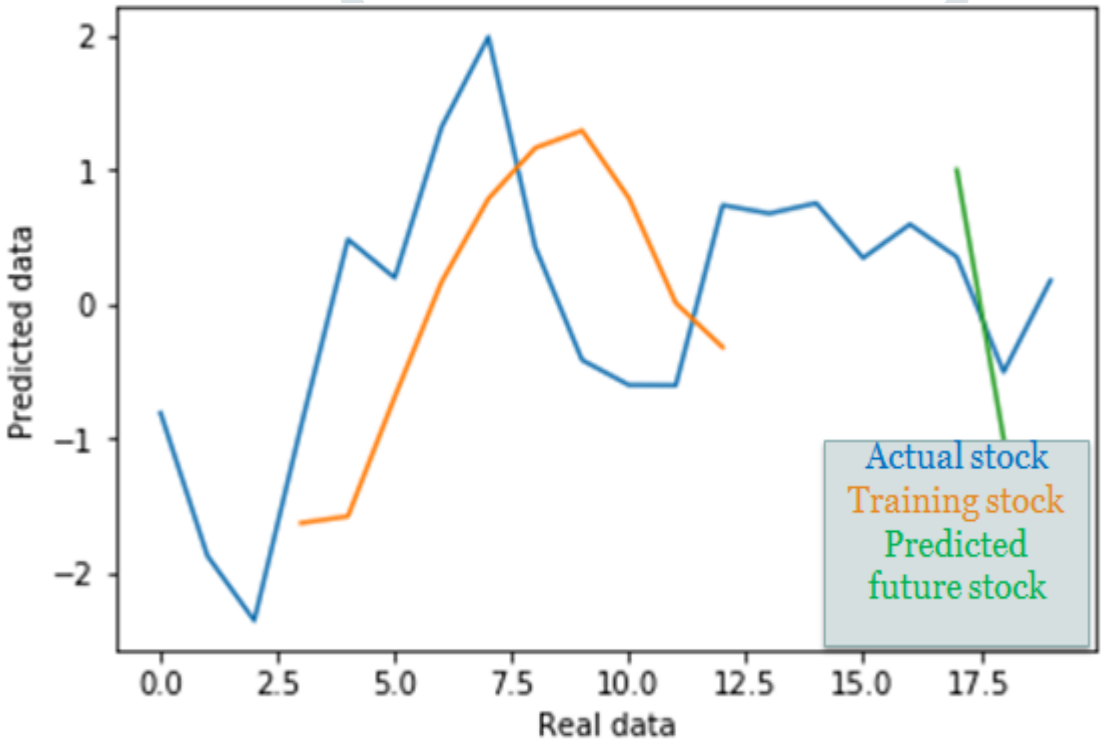


Fig 3.3: Depicts the final graphical representation of the Real & Predicted stock

IV. CONCLUSION & FUTURE PLANS

- The accuracy produced by this system is 85% which is way higher than current machine learning driven systems.
- Shifting from web-app to android app & developing a game to spread the awareness among youth.
- Introduction of Natural language processing in this.

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REFERENCES

[1] Mr. Anirudh Prakash "Stock Price Prediction" www.github.com, Oct 18.
[2] Mr. Raghav Nandakumar, Mr. Uttamraj K R, Mr. Vishal, Mr. Y V Lokeswari "Stock Price Prediction Using Long Short Term Memory", Mar-2018, International Research Journal of Engineering and Technology.
[3] Mateusz Wilinski, Wei Cui, Anthony Brabazon, "An Analysis of Price Impact Functions of Individual Trades on the London Stock Exchange".

[4] Micheal Paluch Lidia Jackowska-Strumillo "Intelligent information system for stock exchange data processing and presentation", 978-1-4673-6936-7/15/$31.00 ©2015 IEEE.

[5] Mr.A.Pavithra, Mr.C.Anandhakumar and Mr.V.Nithin Meenashisundharam,"Internet of Things with Big Data Analysis- A Survey", International Journal of Scientific Research in Computer Science Applications and Management Studies, 2019

[6] Mckinsey & Company "The value of Robotic Process Automation" March 2017.

[7]Mr.Suyash Mahajan, Mr.Salma Shaikh, Mr.Jash Vora, Mr.Gunjan Kandhari, Mr. Rutuja Pawar,"Cricket Analytics and Predictor", 2019.
[8] Ms. K. Hiba Sadia, Mr.Aditya Sharma,Mr. Adarrsh Paul,Mr. SarmisthaPadhi, Saurav Sanyal, "Stock Market Prediction Using Machine Learning Algorithms", International Journal of Engineering and Advanced Technology (IJEAT), April 2019.
[9] Manna Majumder , MD Anwar Hussian "FORECASTING OF INDIAN STOCK MARKET INDEX USING ARTIFICIAL NEURAL NETWORK", Department of Electronics and Communication Engineering, North East Regional Institute of Science and Technology.
[10] Ms. Aparna Nayak, M.M.Manohara Pai, Radhika M.Pai "Prediction Models for Indian Stock Market",Procedia Computer Science, 2016.
[11] Professor Mary Lacity Curators' Professor, College of Business University of Missouri-St. Louis,
Professor Leslie Willcocks The Outsourcing Unit Department of Management The London School of Economics and Political Science," Robotic Process Automation: The Next Transformation Lever for Shared Services", January 2016.
[12] Guðrún Lilja Sigurðardóttir," Robotic Process Automation: Dynamic Roadmap for Successful Implementation", June 2018.
[13] ABEYRATNA GUNASEKARAGE," THE PROFITABILITY OF MOVING AVERAGE TRADING RULES IN SOUTH ASIAN STOCK MARKETS" ,MARCH 2011.

[14] S K MITRA, "USEFULNESS OF MOVING AVERAGE BASED TRADING RULES IN INDIA", INSTITUTE OF MANAGEMENT TECHNOLOGY FEBRUARY 2011.

[15] DR. S.D. VASHISHTHA, DR. UMED SINGH, RAJESH KUMAR, "PREDICTION OF BUY AND SELL SIGNALS USING A MOVING AVERAGE-TOOL OF TECHNICAL ANALYSIS" , MARCH 2013.