

Machine Learning-Based Stock Market Prediction

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Abstract: In this paper, a thorough analysis is done for existing methods and new advanced methodologies for stock market prediction are proposed. Three different approaches namely Fundamental analysis, Technical Analysis, and the application of Machine Learning are theorized. Evidence in support of the weak form of the Efficient Market Hypothesis has been found that historic price does not contain useful information but it is wrongfully believed that sampled data may be predictive. Relevant News for any share market listed Company is effective on the further movement of stock. This paper suggests that Fundamental Analysis and Machine Learning could be used to guide an investor's decisions.

Keywords: Machine learning, Stock market prediction, efficient market hypothesis.

I. INTRODUCTION

One of the most prominent ways for making money for middle-class investors is an investment in Stock. After that, it is the actual trading business of high-class investors and traders. A company's share price is the most important point for investors which always fluctuates up and downwards.

Eyes always need on live price of share market and instant decision making is necessary to prevent loss of money and eventually to gain money. For this, you have to make a study of the company's financial history and future agenda.

Dependent on the overall study related to the market and company you can decide to invest. But you have limits to study because one cannot be sure that study and analysis are correct. Company's market history, the tendency of maintaining business in any period or slack, policies, and announcements are the key points of Stock Rate. It is a difficult field of work and needs a lot of experience to be a successful investor.

Prediction of stock has a predominant application which is pulchritudinous for the entire stock market investing circumference. The proposed theoretical predicament lays a groundbreaking establishment when it comes to efficiently predict the stock market peripheral.

II. TECHNICAL UNDERSTANDING OF PROPOSED SYSTEM

Here we have proposed a system that will work with an improved level of recommendation. The system will be developed with Natural Language Processing (NLP) of Artificial Intelligence and Convolutional Neural Network (CNN) of Machine Learning. The architecture of the proposed system is profoundly established in Fig.1. NLP will help us to find Companies with Good News in terms of live performance in the market. That will help to choose the best performer in the market. NLP will classify news in positive and negative sets and will give a performance graph of the selected organization. Based on that we will get a sense of the best performing company. NLP gives us NLTK (Natural Language Tool Kit) that will work on our news for detecting goods and bad of its impact.

For time series forecasting CNN is used. The algorithm will work on CSV (Comma Separated Values). This algorithm was developed on Deep Learning Concepts. Time Series Forecasting is the base of our system. As we are using data of Stock Values on the number of days with Date format, we will need to use the time series forecasting technique.

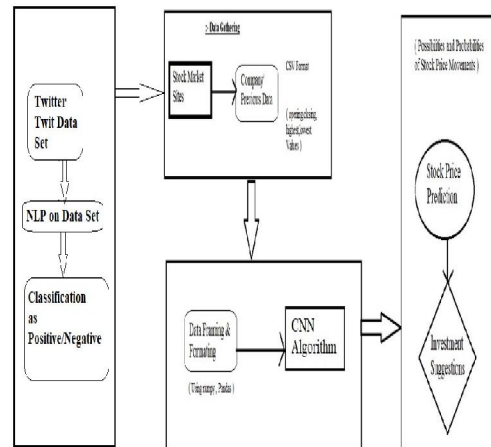


Figure 1: System Architecture

We will get the predicted value of the stock of the company we choose and on basis of that, we will give a recommendation.

III. SYSTEM ANALYSIS

3.1 Module

- Pre-processing
- Feature Extraction
- Classification

3.2 Data Flow Diagram

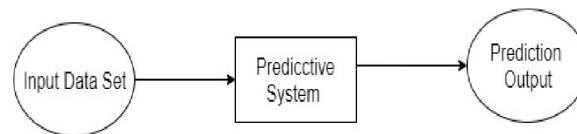


Figure 2: Data Flow Diagram

In Data Flow Diagram, we Show that flow of data in our system in Fig.2 we show that base DFD in which rectangle present input, as well as output and circle, show our system, In Fig.3 we show actual input and the actual output of system input of our system is text or image and output is rumor detected likewise in Fig.4 we present operation of the user as well as admin.

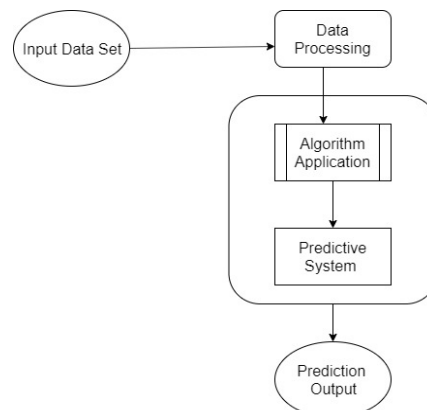


Figure 3: Data Flow Diagram1

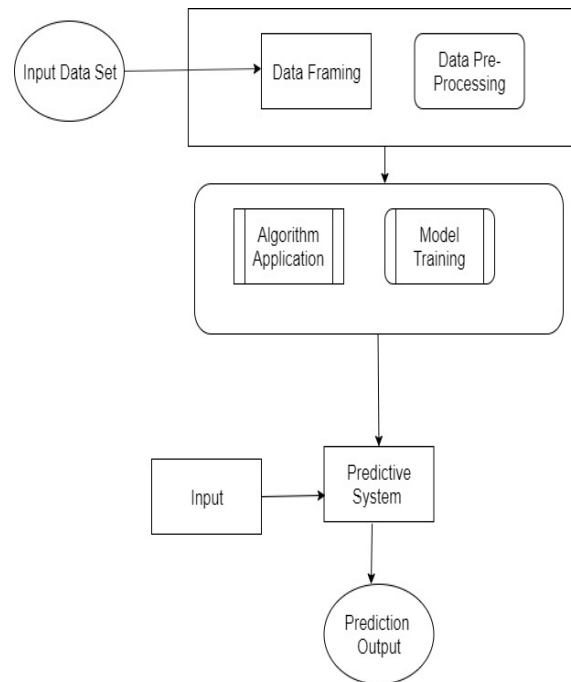


Figure 4: Data Flow Diagram2

IV. ALGORITHM

4.1 Mathematical Working and Flow of CNN

Mathematical Working and Flow of CNN:

1. Input Layer - has input size [7, 1] because we have 7 features
2. conv1d - First convolutional layer
3. averagePooling1d - First average pooling layer
4. conv1d - Second convolutional layer
5. averagePooling1d - Second pooling layer
6. flatten - Reduce the dimension, reshape input to [number of samples, number of features]
7. dense - Fully connected layer using linear activation function with 1 unit which returns 1 output value

Figure 5: Syntax

Multilayer perceptron (MLP) has variations among them neural network (NN) is present and a convolutional neural network (CNN) comes under it. Convolutional Neural Network (CNN) consists of an input layer, several hidden layers, and an output layer like any other NNs. Function $f(x)=x$ is an identity function and it is represented by the Input layer. Output layer which makes decisions passes previously calculated weights through a linear function. Hidden layers can be of different variants either convolutional, pooling, dropout, or fully connected. The advantage is that the activation function is present at the end of all layers which gives additional functionality e.g., normalization, sigmoid, tanh, and RELU are examples of these activation functions. Weights of convolution layers can be seen as 2D filters and they apply convolution operation with these filters.

V. EXPERIMENTAL RESULTS

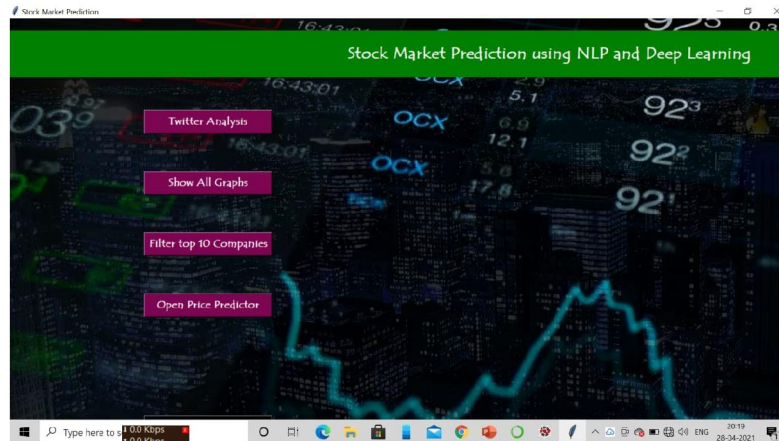


Figure 6: Result1

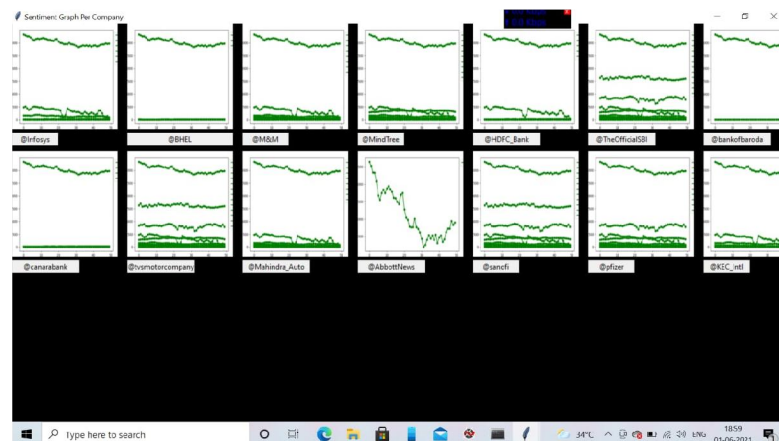


Figure 7: Result2

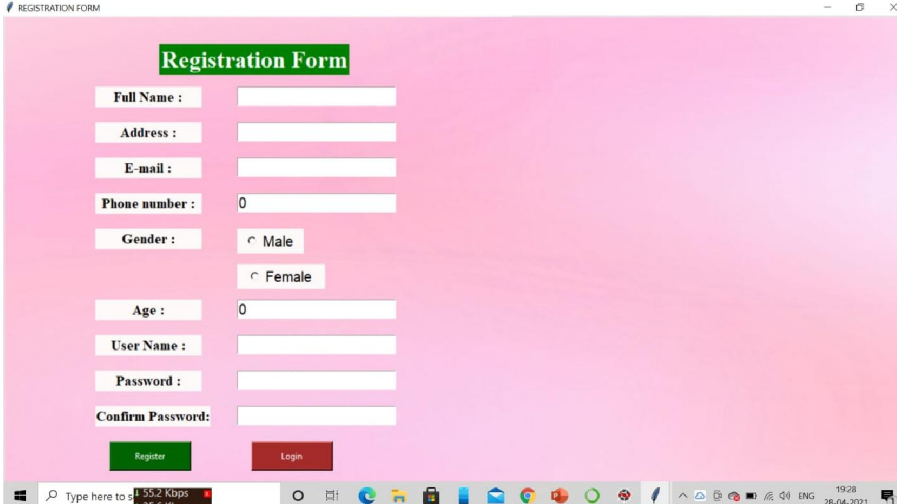


Figure 8: Result3



Figure 9: Result4

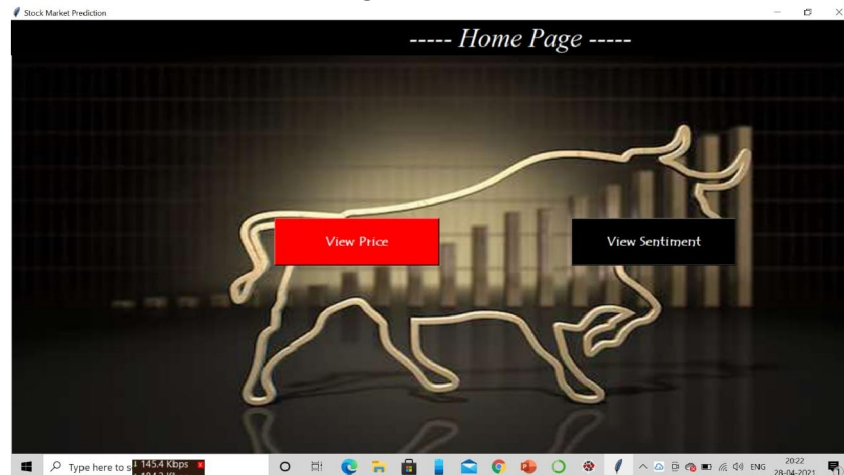


Figure 10: Result5



Figure 11: Result6

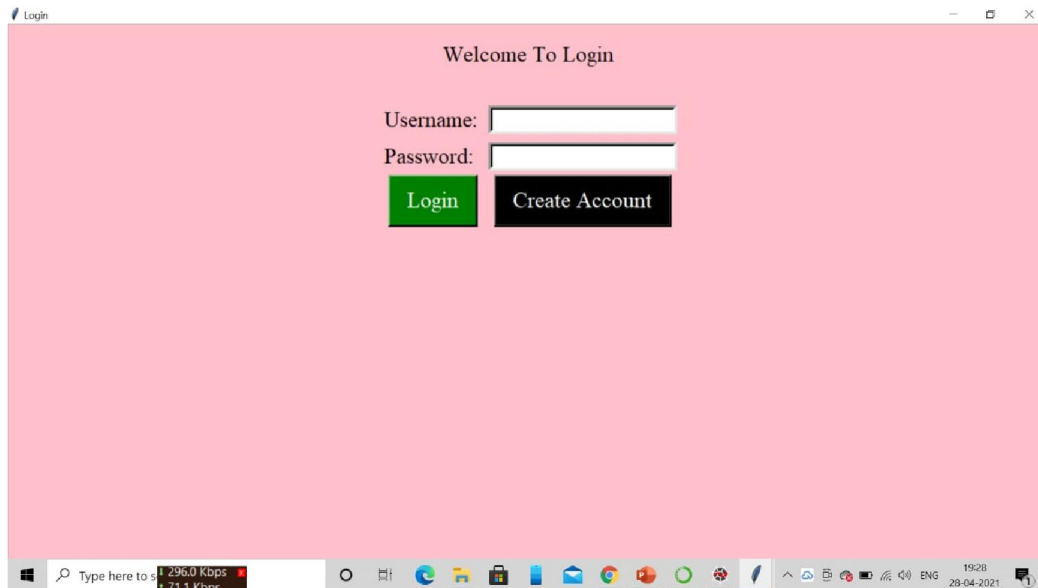


Figure 12: Result7

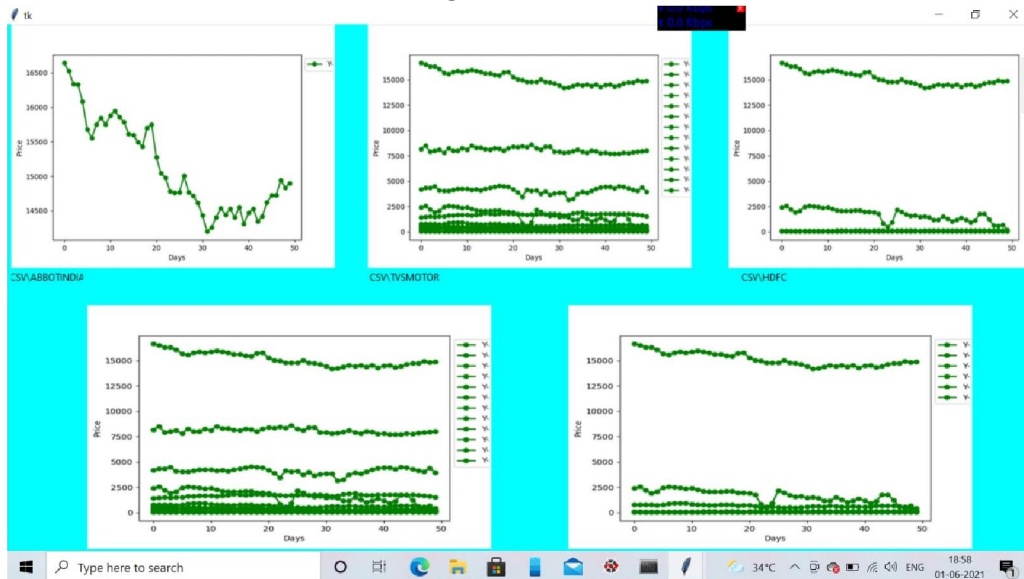


Figure 13: Result8

VI. CONCLUSION

Here, we found for stock market prediction we can use machine learning technology. A person cannot read and learn deeply about the graph of any company's stock price. In practical life, we need to analyze data on a vast level with multiple companies. Hence, we can take the help of Machine Learning algorithms and can have a much better prediction. We can use the CNN algorithm. So, we can have much more accuracy in prediction.

VII. ACKNOWLEDGMENT

The completion of our project brings with it a sense of satisfaction, but it is never complete without them those people who made it possible and whose constant support has crowned our efforts with success. One cannot even

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