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Survey towards Stock Prediction System used in Recent Times

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ABSTRACT: In the financial sector, the stock market and its trends are highly volatile in nature. Recent studies have shown that news articles and social media analysis can have an immense impact on investors' opinion toward financial markets. Thus, the purpose of this study is to explore the relationship between news sentiment and stock market movement using information from different news agencies, business magazines, and financial portals. This study offers an application of the Bayesian structural time (BST) series model that is more transparent and facilitates better handling of uncertainty than the autoregressive integrated moving average (ARIMA) model and the vector autoregression (VAR) method by using prior information about the structure of the model. One of the main pitfalls of this model is the presumption of linearity. The long short-term memory (LSTM) model is a nonlinear model that can capture various nonlinear structures present in the data set. Proposed methodology is a hybrid model, which combines the LSTM model with the BST model along with the regression component that captures information from different news sources to identify market predictors. The proposed model detects unusual behavior or anomalous pattern of the stock price movement, which makes our model superior compared to the traditional methods.

KEYWORDS: stock market, prediction, SVM, LSTM, Hybrid Approach;

I. INTRODUCTION

Stock Market prediction and analysis is the act of trying to determine the future value of a company stock or other financial instrument traded on annex change. Stock market is the important part of economy of the country and plays a vital role in the growth of the industry and commerce of the country that eventually affects the economy of the country. This system named "Stock Market Prediction" is a web application that aims to predict stock market value using SVM, LSTM, Linear Regression. This project is intended to solve the economic dilemma created in individuals that wants to invest in Stock Market. With the growth of the Internet, social networks, and online social interactions, getting daily user predictions is feasible job. Thus, our problem statement is to design a public service incorporating historical data and users predictions to make a stronger model that will benefit everyone. In earlier 2009, Stock market forecasting was done by ARIMA Model. ARIMA, short for 'Auto Regressive Integrated Moving Average'. It is Time series Model where forecast is done by time series using the series past values. The Model is designed for statistical problems. Though model is adept at modelling seasonality and trends, outliers are difficult to forecast for ARIMA for the very reason that they lie outside of the general trend as captured by the model. The sentiment analysis cannot be done with ARIMA model. The system will be implemented to design and develop a system to detect sentiment analysis for stock investment through news article and social media.

II. RELATED WORK

1. Ray, Paramita, Bhaswati Ganguli, and Amlan Chakrabarti. "A Hybrid Approach of Bayesian Structural Time Series With LSTM to Identify the Influence of News Sentiment on Short-Term Forecasting of Stock Price."

Authors propose a hybrid model, which combines the LSTM model with the BST model along with the regression component that captures information from different news sources to identify market predictors. The proposed model detects unusual behavior or anomalous pattern of the stock price movement, which makes our model superior compared to the traditional methods. Our new hybrid model accumulates error with lower rates and shows a remarkable performance over some of the other existing hybrid models, such as AR-MLP, ARIMA-LSTM, and VAR-LSTM model.[1]

2. Ching-Te Wang, "The Prediction System for Data Analysis of Stock Market by Using Genetic Algorithm"



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In this paper, a web robot scheme to crawl the data and collect the information, which is provided for the analysis procedure. The system can predict the stock value for the users. After set the suitable rule, the web robot can collect data as soon as possible. To speed the computation between data crawling and data analysis, the system designs the structure of centralized distributive web robot system, which distinguishes web robots, data server and analysis server. Therefore, the system makes the process automatically and enhances the reaction rate efficiently. The main characteristic of this system is to collect data automatically by using web robots and 2 establish regular expressions, X path to analyzing web pages. From the experimental results, the system has shown a better performance. Consequently, the method can crawl the valuable data, analyze huge information efficiently and provide the function to predict the prices in the stock market[2].

3. Sahaj Singh Maini, "Stock Market Prediction using Data Mining Techniques":

In this paper, the performed predictive analysis on Dow Jones Industrial Average Index, which consists of thirty companies and is majorly owned by S P Global. This is crucial to the traders as such analysis can influence the decision making with regard to buying or selling an instrument in a positive manner. We have discussed two statistical machine learning models, namely Random Forest Model and Support Vector Machine which are used to provide a reliable prediction of stock market trends based on historical data. On the basis of the results obtained; we can say that both the models exhibited notable performance in predicting the direction of the stock index. The Random Forest model using a 1-gram model for text analysis produced an accuracy of 84.33 [3].

4. Chang SimVui, Gan Kim Soon, Chin Kim On, "A Review of Stock Market Prediction with Artificial Neural Network (ANN)":

This paper provides a review on the application of ANN in stock market prediction. Although NN has shown acceptable results, many researchers are still trying to improve the accuracy of the stock market prediction by using a hybrid method, and by taking into account more external factors in order to generate more accurate prediction. It is a known fact that the dynamic stock market world is non-linear, volatile and subject to influences by so many external factors. This paper can be used as an introductory material to those who are interested to work on stock market prediction using NN [4].

5. Radulacomin, "Stock Market Prediction":

This study generated a new algorithm on predicting the stock markets. As it was shown in this paper, there are several methods on predicting signals through machine learning algorithms and numerical methods. PCASVM was implemented to both eliminate the false predictions and to determine what features are important. Comparing to the simple methods from SVM and evolving to GASVM and PCASVM, the solution to the main problem and sub-issues is more efficient and shows promising results for a real prediction using recent data sets[5].

III. PROPOSED ALGORITHM

The system is designed to predict the stock values .The outline for system can be jotted down as :

A. Prediction system for Machine Learning

Machine Learning (ML) is that field of computer science with the help of which computer systems can provide sense to data in much the same way as human beings do. In simple words, ML is a type of artificial intelligence that extract patterns out of raw data by using an algorithm or method. The main focus of ML is to allow computer systems learn from experience without being explicitly programmed or human intervention Predicting how the stock market will perform is one of the most difficult things to do. There are so many factors involved in the prediction - physical factors vs. physiological, rational and irrational behavior, etc. All these aspects combine to make share prices volatile and very difficult to predict with a high degree of accuracy.



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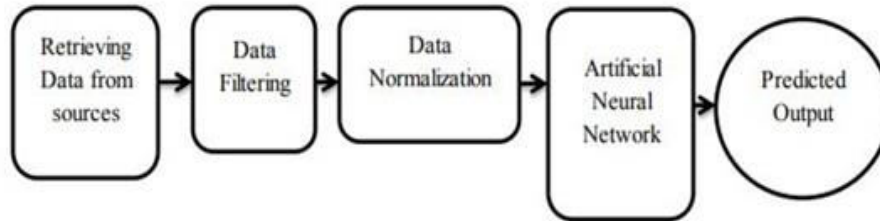


Fig 1: Prediction System

B. System Architecture for system

- Data Sources
- This project attempts to predict the stock value with respect to the stock’s previous value and trends. It requires historic data of stock market as the project also emphasizes on data mining techniques. So, it is necessary to have a trusted source having relevant and necessary data required for the prediction
- Dataset Creation
- First of all, a dataset is created for training the Artificial neural network. In this study, daily stock market data Open (10 am), High (1 pm), and Closing value (3 pm) have been collected for the duration of four years (January 1, 2015 to March 29, 2019) from the NSE of India[3].The collected data are arranged according to the format for the library we use for training. The dataset should be of exact format that FANN specifies. It includes number of training pair, number of input and number of outputs in the first line of the data set file and data from the second line.

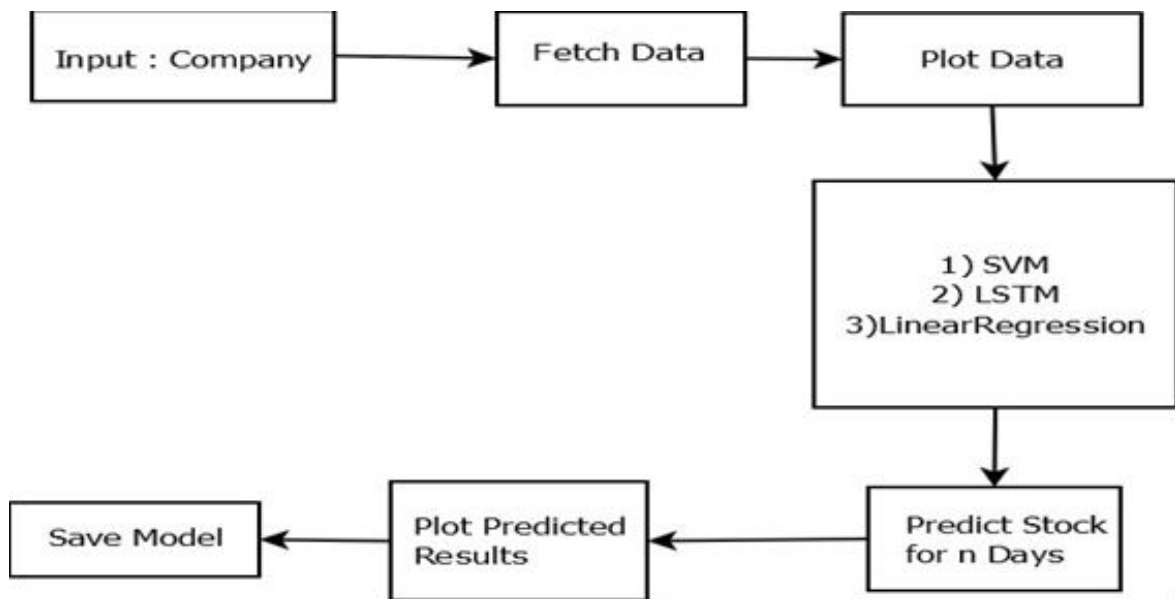


Fig 2: System Architecture

- Data Normalization
- The data is normalized before being input. The input vectors of the training data are normalized such that all the features are zero-mean and unit variance. The target values are normalized using minmax function such



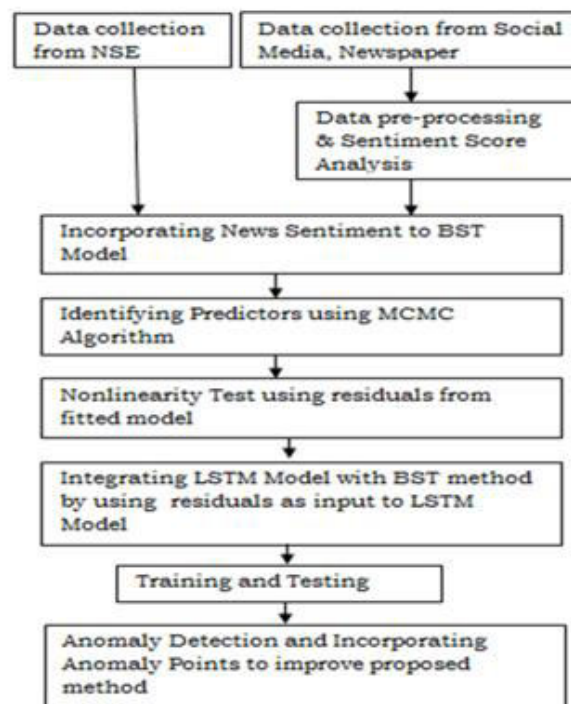
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that all the values are converted into the values within the range of 0 to 1. The minimum value is represented by 0 and the maximum value is represented by 1.

IV. SIMULATION RESULTS

Hybrid approach to use LSTM and Bayesian for Prediction The system applies the BST timeseries model with feature selection for forecasting. Bayesian structural time series (BSTS) model is a statistical technique used for feature selection, time series forecasting, nowcasting, inferring causal impact and other applications. The model is designed to work with time series data. The model has also promising application in the field of analytical marketing. The system also uses LSTM for more accuracy from data from social media .LSTM networks are well-suited to classifying, processing and making predictions based on time series data, since there can be lags of unknown duration between important events in a time series. LSTMs were developed to deal with the vanishing gradient problem that can be encountered when training traditional RNNs.



V. CONCLUSION AND FUTURE WORK

The successful prediction of a stock's future price could yield significant profit. The efficient market hypothesis suggests that stock prices reflect all currently available information and any price changes that are not based on newly revealed information thus are inherently unpredictable. The plunging stock market has intensified the debate over the future of the bull market, and these three gurus have widely differing views. In this project, demonstrating a machine learning approach to predict stock market trend using different neural networks. Result will show how it can use history data to predict stock movement with reasonable accuracy. Also, with T test result analysis we will conclude that LSTM performs better compare to Back propagation and SVM. For this implementation, we would like to conclude that if we incorporate all the factors that affect stock performance and feed them to neural network with proper data preprocessing and filtering, after training the network we will be able to have a model which can predict stock momentum very accurately and this can result into better stock forecasting and profit for financial firms. self-contained.



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