

AN STUDY ON STOCK PRICE PREDICTION USING MACHINE LEARNING AND CLOUD COMPUTING

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ABSTRACT

As Indians are getting more and more prosperous their savings and investment trends are also changing. Many are not putting their extra money in banks but tends to invest it to get more returns. The best investment destination for many is stock markets, where due to online demat accounts one can easily invest and keep track of the investment by sitting at home or while working. But stock market has its own drawbacks as an investor needs understanding of the stocks he is investing. If he does not look in to financials of a company, he may lose money on a junk stock. So, this kind of investment ecosystem needs help for an investor and a project can be developed which will help an investor save his money and put money on right stocks. So, our stock price prediction framework will be a combination of cloud computing, mobile computing, desktop computing and machine learning together. We are choosing Android app on user side to get stock prices as its penetration in to day life is almost 100 %. First a user sends a request by entering a stock name from his mobile app designed and part of our system. The stock request is then fetched by the desktop server using cloud. We will then create a training dataset by using Yahoo Finance API and getting historical data of the stock. Then a machine learning algorithm Linear Regression is trained and it predicts the prices that the stock can achieve. This price list is then sent to the user using cloud. An alert will also be sent to the user to check price list. Then the user can login and view the stock price list on his mobile. Thus, our system will successfully help an investor in getting better insight of the stock's price behavior and decide to invest accordingly. Thus, using our system an investor can save a lot of money and time while handling an investment in stock market.

Keyword : -Stock Market, Yahoo Finance API, Cloud Computing, Mobile Computing, Machine Learning, Linear Regression..

1. INTRODUCTION

Stock market is financial backbone of any country as its helps a company to get investment by selling stocks through it. Thus, to invest in a stock market one needs a demat account which helps them buy and sell stocks online. The demat account is like a bank account of stocks of different companies. As increase in technology and use of internet many users are opening demat accounts and handle their stock portfolio using mobile phones and computers. Thus, this has provided them as a extra means of income other their main job or business. But this also gives rise to money loss as the investor may tend to invest in companies whose financials he does not understand and may be in loss. So, there is always need of a system where a user can invest by getting the next prices a stock can achieve. This kind of stock help can be given using new technologies that are available today.

1.1 Motivation

1. To improve how a stock market investor invests in stocks with better price appreciation.
2. To apply machine learning by getting insights of a stock prices and how will it behave in future.
3. A investor will be helped tremendously by predicting the stock prices of a stock he intends to invest.
4. To improve investors wealth by investing in right stocks by giving insight of future stock prices.

5. The mobile application should be used on user side as every person regardless of the age has a mobile which becomes a very good medium for a user to use a predicting system remotely.
6. So there arises a need to properly analyze and bridge the gap between the way a investor invests in stock markets.

1.2 Project Scope & Limitations

Project Scope

1. Mobile Computing:- The system can be used to send and view stock price request to server for prediction.
2. Machine Learning:- The System can be used to apply machine learning on historical data of stock and get prediction of future prices of a stock.
3. Cloud Computing:- The System can be used to share stock price prediction information between a user and admin 24x7.

Limitations-

Thus limitations of the system can be given as.

1. It cannot work without internet.
2. Proper training dataset is needed for machine learning algorithm to work properly.

2. LITERATURE SURVEY

This section describes the fundamentals of various machine learning techniques that can be used in designing a new more reliable stock price prediction system to get future prices of a stock so that a user can invest . It helps in understanding various ideas put forward by various technical papers published by various authors and how they put forth a more accurate and concrete techniques. Some of the ideas with technique and drawbacks are mentioned below:

1.Paper: - Prediction of Stock Prices using Machine Learning (Regression,Classification) Algorithms.

Year: - 2020. Author: - Srinath Ravikumar and Prasad Saraf.

Technique: - Stock price prediction using Linear Regression and Support Vector machine.

Drawback: - This paper presents a valid approach for predicting specific stock prices but it fails to explain how this system can be used and available to a user. Thus, this study fails to elaborate use of cloud computing and mobile computing which can be used to access such a system.

2. Paper: - Intraday Stock Prices Forecasting Using Auto Regressive Model.

Year: - 2020.

Author: - Dushmanta Kumar Padhi, Neelamadhab padhy and Jyotirmaya Mishra.

Technique: - Intraday stock prices prediction using KNN Regression and Linear Regression.

Drawback: - This paper presents a valid approach for predicting specific stock prices but it fails to explain how this system can be used and available to a user. Thus, this study fails to elaborate use of cloud computing and mobile computing which can be used to access such a system

3. Paper: - Time Series Financial Market Forecasting Based on Support Vector Regression Algorithm.

Year: - 2019.

Author: - Doli Hasibuan, Indra Kelana Jaya, Benget Rumahorbo, Jimmy 6Naibaho, Junika Napitupulu and Edward Rajagukguk.

Technique: - Financial market forecasting using Support vector Regression.

Drawback: - This paper presents a valid approach for predicting stock market futures and it will be useful idea in predicting a price for a specific stock but it fails to explain how this system can be used and available to a user. Thus, this study fails to elaborate use of cloud computing and mobile computing which can be used to access such a system.

3. METHODOLOGY

This section will study the mathematical conditions and algorithms to be used for predicting the stock prices. These are explained as follows:

3.1 Mathematical Model :

Our projects mathematical perspective can be put and described as given below:

Set Theory Applied to the Project

1. User: -

Set(U)={U0, U1, U2, U3, U4}

U0 ∈ U = Register User.

U1 ∈ U = Enter stock name.

U2 ∈ U = Send request.

U3 ∈ U = Get Alert.

U4 ∈ U = View stock price prediction list.

2. Admin: -

Set(A)={A0, A1, A2, A3, A4, U4}
 A0 ∈ A = Get stock price request.
 A1 ∈ A = Download historical data.
 A2 ∈ A = Create training dataset.
 A3 ∈ A = Apply Linear Regression.
 A4 ∈ A = Predict and send stock price list.
 U4 ∈ A = View stock price prediction list.

Probability, NP-Hard and NP-Complete

So, by studying the sets as defined above we come to notice that a element U4 is common in both modules and used in coordination in both sets which can be placed as

$$x \in U \cap A \text{ if } x \in U \text{ and } x \in A$$

Thus, the probability of intersection of element in both modules can be given as

$$P(U \cap A) = P(U) + P(A)$$

So, intersection of common element can be shown as

$$U \cap A = \{U4\}$$

The conditional probability of both modules using the same element can be shown as

$$P(U|A) = P(U \cap A) P(A)$$

Thus, we conclude that our project “Stock Price Prediction Using Machine Learning and Cloud” success and failure will depend upon the internet as our user sends request to admin server for stock price prediction, i.e., if the internet connection is not good or not present the stock price prediction request will not be sent and will not be fetched for prediction thus the project won't work, this is a case of failure, so our project supports **NP-Hard and not NP-Complete**.

3.2 Algorithms Used:

Linear Regression

In statistics, linear regression is a linear approach to modelling the relationship between a scalar response and one or more explanatory variables (also known as dependent and independent variables). The case of one explanatory variable is called simple linear regression; for more than one, the process is called multiple linear regression. This term is distinct from multivariate linear regression, where multiple correlated dependent variables are predicted, rather than a single scalar variable. In linear regression, the relationships are modeled using linear predictor functions whose unknown model parameters are estimated from the data. Such models are called linear models. Most commonly, the conditional mean of the response given the values of the explanatory variables (or predictors) is assumed to be an affine function of those values; less commonly, the conditional median or some other quantile is used. Like all forms of regression analysis, linear regression focuses on the conditional probability distribution of the response given the values of the predictors, rather than on the joint probability distribution of all of these variables, which is the domain of multivariate analysis.

4. Proposed System

This section is mainly divided in 3 main modules with other sub parts in them. The text that follows explains the modules with a block diagram or system architecture as shown in Fig.2. to illustrate them. The working of the framework is explained as:

There modules in the project can be explained as

1. User module :-

This module is a mobile application. In this module a user will register first. Then he will login using the credentials and view menu. From menu he will select send stock price prediction request. then the user will enter a stock name and get stock quote for a exchange that is BSE or NSE. Then he will send the request. He can view the prediction in prediction view table

2. Admin module :-

This module is a desktop application. In this module an admin will view users and stock price prediction requests in a table view. The admin will then download all the request from the server. Then he will select a specific request for which prediction has to be done. Then he will fetch 2 years historical data of the stock using Yahoo finance API and create a training dataset for Linear regression algorithm. Then the admin will apply Linear regression algorithm and get predictions. Then he will send the predicted stock price to the cloud from where a user can view it on mobile.

3. Google cloud module :-

This module is used as a communication medium between customer and admin. We are using Google sheets as backend which is a non-SQL database. It is free without charges and available 24X7.

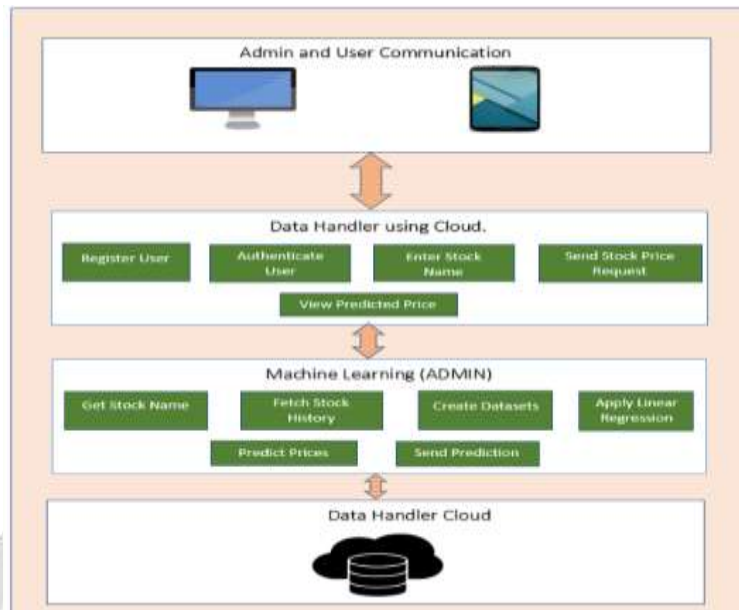


Fig-1: System Architecture Diagram.

5. RESULTS AND DISCUSSION

The final outcome of the project is given below:

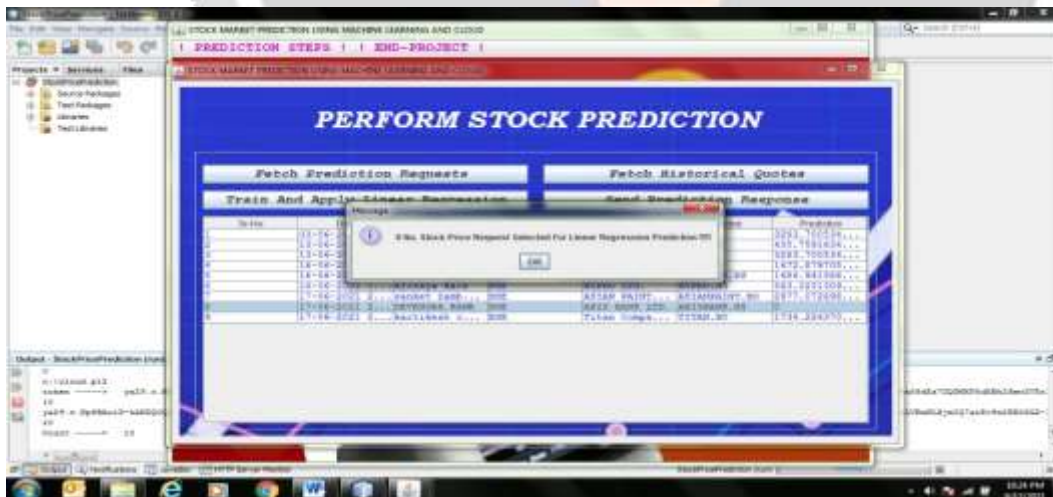


Fig -2: Applying linear regression on the dataset



Fig -3:Menu Screen

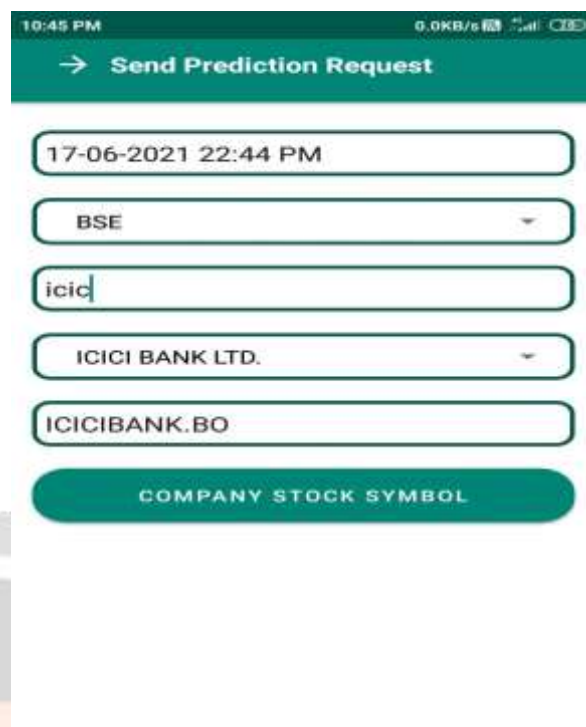


Fig -4:Send Prediction Screen

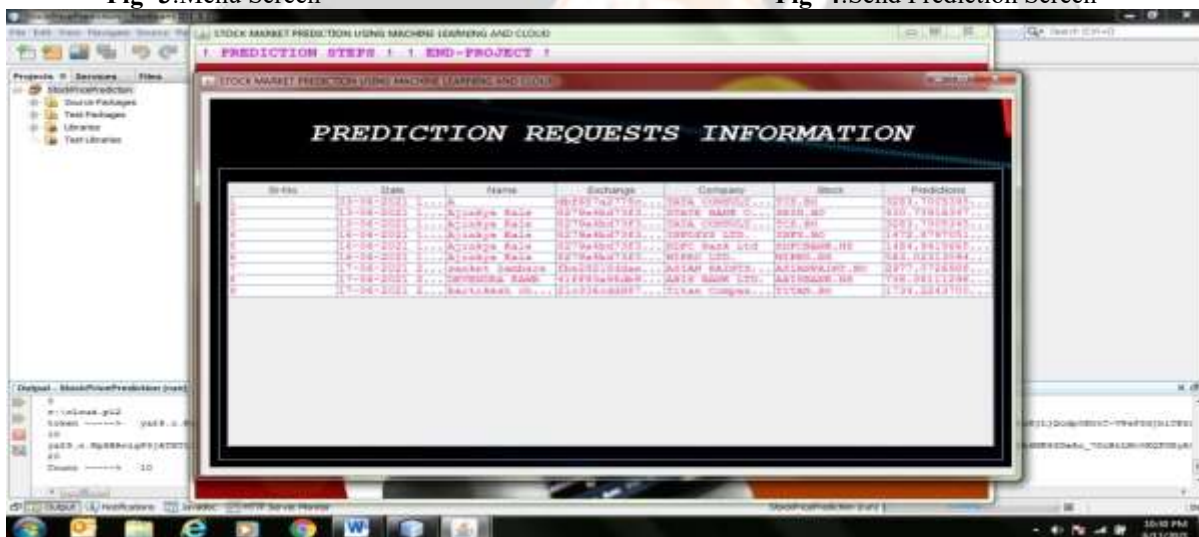


Fig -5: Prediction Request Information Interface

6. CONCLUSIONS

In this project, we are developed novel collaboration of machine learning, cloud computing, mobile computing and desktop computing together to create a more reliable stock investment application which will successfully give insights on high and low of stock. The basic idea of the project was to design a reliable stock price prediction system which will save money and time to study financials of a stock. While designing the project we incorporated ideas from [1][2][3] to fit different ideas in one framework. We made use of Yahoo Finance API to get historical data of a stock. We also have used Linear Regression algorithm to predict prices of stock. We have also made effective use of mobile computing to design a mobile app on user side as mobiles are used by everybody today. We made use of Google Cloud Platform as our cloud provider. Thus, we conclude that we will save time and money of stock market investor by giving correct idea of volatility of a stock.

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