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STOCK PREDICTIONS USING HYBRID MACHINE LEARNING AND DEEP LEARNING MODEL

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ABSTARCT

Stock price prediction is an important topic in finance and economics which has spurred the interest of researchers over the years to develop better predictive models. The Autoregressive Integrated Moving Average (ARIMA) models have been explored in literature for time series prediction. Time series analysis comprises methods for analyzing time series data in order to extract meaningful statistics and other characteristics of the data..Time series forecasting is the use of a model to predict future values based on previously observed values. ARIMA models are, in theory, the most general class of models for forecasting a time series which can be made to be "stationary" by differencing (if necessary), perhaps in conjunction with nonlinear transformations such as logging or deflating (if necessary). A random variable that is a time series is stationary if its statistical properties are all constant over time. Prediction of stocks requires a lot of knowledge on market share values and trends. This knowledge can be obtained by experience in this particular field. For a normal human it requires a lot of time and energy to gain experience to predict trends in stock prices. With advancement in technology, machine learning algorithms keep the capability of predicting trends in stocks because of the huge computational capacity which is available nowadays.

1.INTRODUCTION

1.1 MOTIVATION

Prediction of stocks requires a lot of knowledge on market share values and trends. This knowledge can be obtained by experience in this particular experience to predict trends in stock prices. With advancement in technology, machine learning algorithms keep the capability of predicting trends in stocks because of the huge computational capacity which is available nowadays.

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We come across many instances in real life where we try to forecast what will happen in Future tomorrow, next week, next month, next year or may be in coming years etc). Few common examples are:

1. What will be the stock price after a month?

2. What revenue business will make next year?

3. What will be the air temperature tomorrow?

1.2 PROBLEM DEFINITION

A Knowledge Based Stock Predictor which identifies patterns in data and then processes it. This web application takes the previous required data like opening prices, closing prices and number of stocks sold as input, then process the received data and gives the output of predicted stock prices.

1.3 OBJECTIVE OF PROJECT

To predict accurate Stock prices with a very low cost or RMSE(Root Mean Square Error) score. Here we are using a combination of Machine learning model and Deep learning model to get accurate prediction of stock prices.

2.EXISTING SYSTEM

Hybrid ARIMA-BPNN Model for Time Series Prediction of the Chinese Stock Market, Li Xiong, Yue Lu. Autoregressive Integrated Moving Average (ARIMA) Model and Back Propagation Neural Network (BPNN) model are popular linear and nonlinear models for time series forecasting respectively. The integration of two models can effectively capture the linear and nonlinear patterns hidden in a time series and improve forecast accuracy. In the existing system, a hybrid ARIMA-BPNN model containing technical indicators is proposed to forecast four individual stocks consisting of both main board market and growth enterprise market in software and information services sector.

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2.1 DISADVANTAGES OF EXISTING SYSTEM

The accuracy of time series prediction by using the hybrid ARIMA-BPNN model is less. Therefore the predicted results may not be accurate.

3.PROPOSED SYSTEM

In the proposed system, hybrid ARIMA-GRU models are used for time series prediction. The Autoregressive Integrated Moving Average(ARIMA) and Gated Recurrent Unit(GRU) are most popular linear and nonlinear models for time series forecasting respectively. The integration of two models can effectively capture the linear and nonlinear patterns hidden in a time series and improve forecast accuracy. Hybrid ARIMA (Auto Regressive-Integrated Moving Average)-GRU(Gated-Recurrent-Unit) model has been proposed which learns continuously from the history of stocks invested, sold and brought by the clients. ARIMA-GRU model identifies patterns, analyzes which kind of data is suitable for prediction and then predicts suitable value.

3.1.ADVANTAGES OF PROPOSED SYSTEM

The major advantage of ARIMA-GRU model is accuracy of time series prediction is better than the existing system.

4.IMPLEMENTATION & RESULTS

4.1. INTRODUCTION

Implementation is the stage of the project when the theoretical design is turned out into a working system. Thus, it can be considered to be the most critical stage in achieving a successful new system and in giving the user, confidence that the new system will work and be effective. The implementation stage involves careful planning, investigation of the existing system and its constraints on implementation, designing of methods to achieve changeover and evaluation of change over methods.

ISSN: 2278-4632
Vol-10 Issue-5 No. 14 May 2020

4.2.OUTPUT SCREENS

1. HOME PAGE

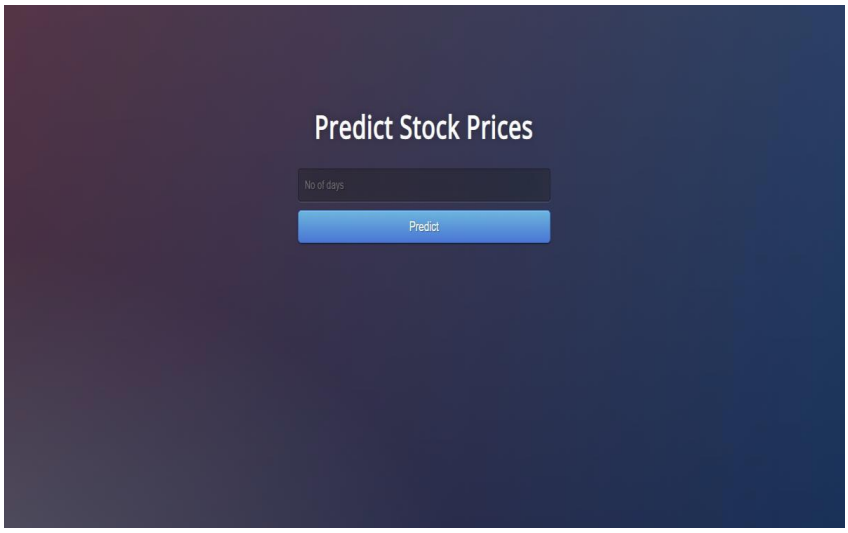

Fig 5.1 Home page

2. THE OUPUT SCREEN AFTER ENTERING NO. OF DAYS

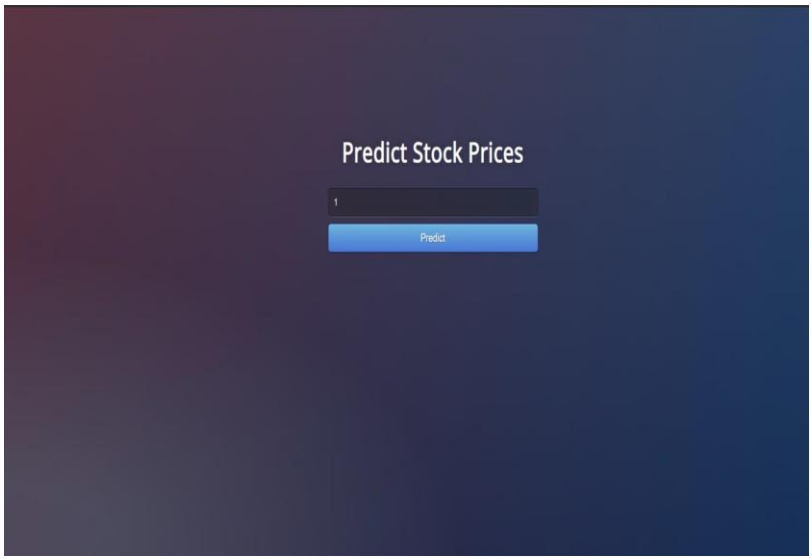

Fig 5.2 Entered input filed

After entering the number of days in the given input block, we have to click on the predict button to get the require output.

ISSN: 2278-4632
Vol-10 Issue-5 No. 14 May 2020

3. THE OUPUT IS OBTAINED IN THE GRAPH FORMAT

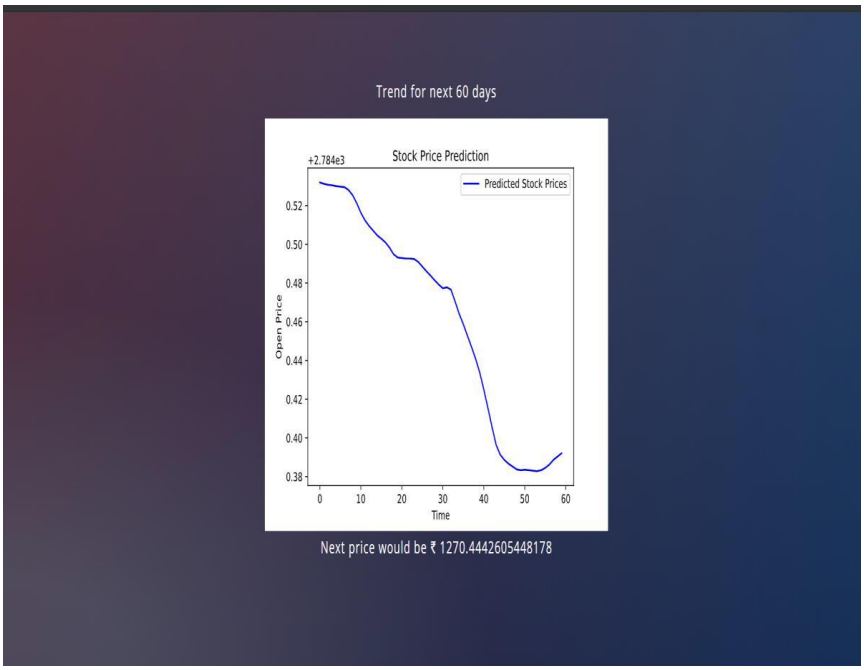

Fig 5.3 Predicted result

4.3 RESULT ANALYSIS

1. ARIMA RESULT

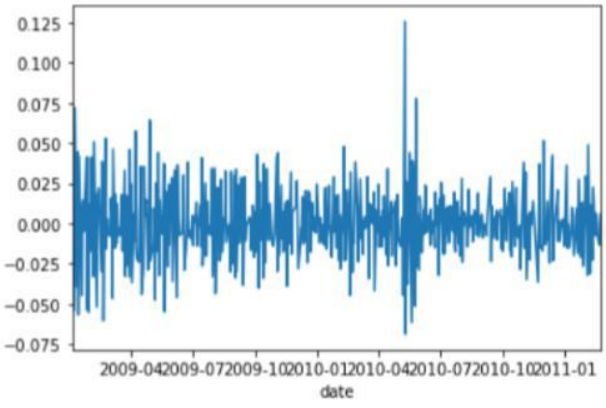

Fig 5.4 ARIMA output

ISSN: 2278-4632
Vol-10 Issue-5 No. 14 May 2020

2. GRU RESULT

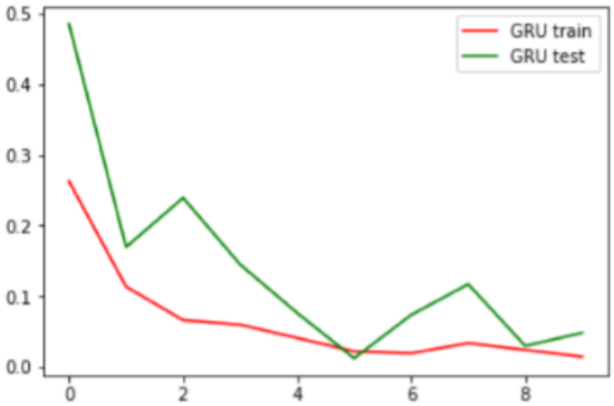

Fig 5.5 GRU output

3. PROPOSED ARIMA-GRU RESULT

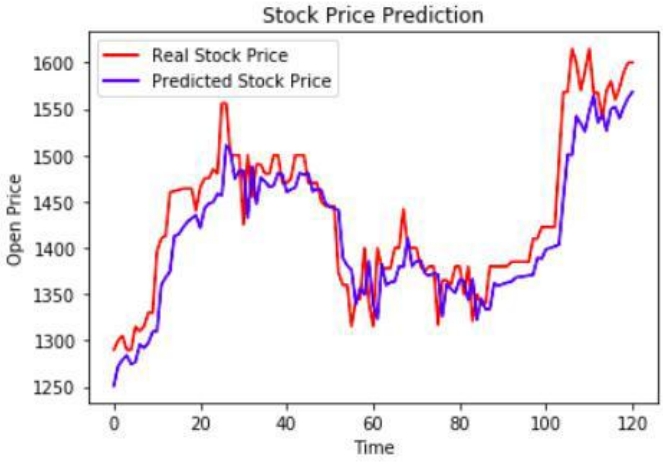

Fig 5.6 ARIMA-GRU output

4.4 CONCLUSION

We have implemented the project using combination of Machine Learning model and Deep Learning to get results accurately. Here we used ARIMA and GRU models which are popular linear and non-linear models for time series prediction.

ISSN: 2278-4632
Vol-10 Issue-5 No. 14 May 2020

4.5. TEST CASE SCENARIOS

S.NO	DATA GIVEN TO ARIMA-GRU MODEL	OUTPUT	TEST RESULT (PASS,FAIL)
1	DATE OPENING PRICE CLOSING PROCE VOLUME	PREDICTED STOCK RESULT	PASS
2	OPENING PRICE CLOSING PRICE VOLUME	NO OUTPUT	FAIL
3	DATE CLOSING PRICE VOLUME	NO OUTPUT	FAIL
4	DATE OPENING PRICE CLOSING PRICE	NO OUTPUT	FAIL

4.6.VALIDATION

Validation check is performed on the text field where we enter the number of days to predict the stock prices. Here only numeric values are accepted in the text field and no alphabetic or special symbols are not accepted.

5.CONCLUSION

Many effective algorithms have been introduced to make efficient predictions but most of them failed after very short period due to growing uncertainties in the share market. Uncertainties arise due to the development of many industries and likeliness of common people investing into their interested fields. Hence it becomes very difficult for any algorithm to decide constant parameters to judge those stock prices. These parameters always change according to outer conditions and total dealings done for the stock. Hence when we are using an hybrid model of both machine and deep learning then these models must trained according to the changing parameters in the market. Space complexity is not at all a problem these days but time complexity will always remain as a negative factor for any hybrid algorithms. These algorithms needed to be adaptive in nature and get trained to the newest data available in the market. So henceforth, when a new trend is observed is tend to be observed in the market. Then these changes must already have been predicted by the model. So the level of training done for the model must be advance in nature. These developments are nearly possible because of the computational capacity available

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Vol-10 Issue-5 No. 14 May 2020

these days. Therefore, from the literature survey, this much amount of information is gathered to get a deep insight of the hybrid model which is needed to be implemented in the near future. Algorithms such as LSTM-GRU, LSTMARIMA and LSTM-GRU are very efficient but those algorithms lag to give accurate prediction when they are trained for only for once. Hence if these algorithms undergo continuous training, that might end up giving very efficient results.

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