MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Project Report

on

A New approach to stock price prediction

A project report submitted in partial fulfilment of the requirement for the degree of

BACHELOR OF TECHNOLOGY

in

IT-IOT

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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CERTIFICATE

This is certified that **Aditya Joshi(0901IO201005), Harsh Rane(0901IO201031)** have submitted the project report titled **A new approach to stock price prediction** under the mentorship of **Prof. Abhilash Sonkar**, in partial fulfilment of the requirement for the award of degree of Bachelor of Technology in **Internet of Things** from Madhav Institute of Technology and Science, Gwalior.

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DECLARATION

I hereby declare that the work being presented in this project report, for the partial fulfilment of requirement for the award of the degree of Bachelor of Technology in Internet of Things at Madhav Institute of Technology & Science, Gwalior is an authenticated and original record of my work under the mentorship of **Prof Abhilash Sonkar**, **Assistant Professor**, Department of Information Technology.

I declare that I have not submitted the matter embodied in this report for the award of any degree or diploma anywhere else.

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ABSTRACT

In this research, we try to put a machine-learning strategy for stock price prediction into practise. Stock price forecasting uses machine learning effectively. The goal is to forecast stock prices so that investors may make better informed and precise investing decisions. To improve stock forecast accuracy and generate lucrative trades, we suggest a stock price prediction system that combines mathematical operations, machine learning, and other external aspects.

There are two different stock types. The word "day trading" may be how you are familiar with intraday trading. Interday traders frequently hold securities positions for multiple days up to weeks or months, but at least from one day to the next. Because they can store historical data, LSTMs are highly effective at solving issues involving sequence prediction. This is significant in our situation since a stock's historical price plays a key role in determining its future price. Although it is difficult to anticipate a stock's exact price, we can create a model that will tell us whether it will rise or fall.

Keywords: Recurrent Neural Network; Long Short-Term Memory; Stock Market; forecasting; prediction.

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CHAPTER 1: INTRODUCTION

As machine learning is used almost everywhere, financial institutions can benefit from it too. As predicting stock prices depends on its past information, a model is needed which can retain past information and a Long short-term memory (LSTM) model solves the problem.

1.1 Objectives and scope

The purpose of our study is to gather the stock price of NIFTY 50 from the NSE of India over a relatively long period of two years and construct a solid forecasting framework for forecasting the NIFTY 50 index values. We hypothesize that it is conceivable for a machine learning or a deep learning model to learn from the features of the previous movement patterns of daily NIFTY 50 index values, and these learned features may be successfully utilized in reliably forecasting the future index values of the NIFTY 50 series. In the current proposition, we have chosen a prediction horizon of two year for the machine learning models, and two week for the deep learning models and proven that the future NIFTY index values can be forecasted using these models with a reasonably good degree of accuracy.. In the present study, we pursue four alternative techniques in creating long and short-term memory (LSTM) network-based models in order to increase the predictive potential of our forecasting models. It must be mentioned that in this study, we are not addressing the issues of short-term forecasting which are of interest to the intra-day traders. Instead, the ideas in this article are applicable for medium-term investors who would be interested in a weekly projection of the NIFTY 50 index values.

1.2 System Requirements

The project ran on a system having the following system requirements:

- 2.4GHz Intel i5-9300h 9th Gen processor
- 8GB DDR4 RAM
- 1TB 7200rpm hard drive
- NVIDIA GeForce GTX 1650 4GB Graphics

CHAPTER 2: LITERATURE REVIEW

2.1 Stock prediction using ANN and Random Forest

Mehar Vijh et al. (2019) suggested Artificial Neural Network and Random Forest approaches for forecasting the following day closing price for five businesses from diverse industries. The financial information: Stock open, high, low, and close prices are utilised to create new variables that are used as inputs to the model. Standard strategic metrics such as RMSE and MAPE are used to analyse these models. The low values of the two indicators indicate that the model is effective in forecasting stock closing prices. The comparison study based on RMSE, MAPE, and MBE values clearly show that ANN outperforms RF in terms of stock price prediction (1).

2.2 Stock prediction using Support Vector Machine (SVM)

V Kranthi Sai Reddy (2018) proposes a Machine Learning (ML) technique that would be taught using accessible stock data to obtain intelligence and then utilise that information to make an accurate forecast. This study used a machine learning approach known as Support Vector Machine (SVM) to forecast stock prices for big and small capitalizations, as well as in three separate markets, using prices with daily and up-to-the-minute frequencies. The SVM algorithm operates on a vast dataset of values gathered from several worldwide financial markets. Furthermore, SVM does not have the issue of overfitting (2).

2.3 Stock prediction using Relational Stock Ranking (RSR)

Fuli Feng et al. (2019) present a novel deep learning technique for stock prediction called Relational Stock Ranking (RSR). Our RSR technique improves on previous methods in two important ways: 1) customising deep learning models for stock ranking; and 2) recording stock relationships in a timely manner. Our work is notable for proposing a new component in neural network modelling called Temporal Graph Convolution, which represents both the temporal evolution and the relation network of stocks. To validate our strategy, we do back-tests using historical data from the NYSE and NASDAQ stock exchanges. Extensive experiments show that our RSR approach is superior. It beats cutting-edge stock prediction methods, earning an average annual return ratio of 98% on the NYSE and 71% on the NASDAQ (3).

2.4 Stock prediction using Artificial Neural Networks

Artificial neural networks (ANNs) are studied by Amin Hedayati Moghaddama and his colleagues to see if they can estimate the daily NASDAQ stock exchange rate. We have evaluated a number of feed forward ANNs that were trained using the back propagation approach. The short-term historical stock values and the day of the week were both taken into account by the approach utilised in this study (4).

CHAPTER 3: TECHNOLOGIES USED

3.1 Numpy

As python does not have any inbuilt library for arrays, we use numpy for multidimensional arrays. We have used inbuilt methods of numpy like np.array and np.reshape for converting lists into and array and for changing dimensions of the array.

3.2 Pandas

Pandas uses numpy as it's base and is used for data manipulation and analysis. We have used pd.read_csv for loading the datasets used for our model.

3.3 Matplotlib

It's a python library used for data visualization. We have used plt.plot for plotting the predicted stock price vs actual stock price on a graph.

3.4 LSTM

The control flow of an LSTM is comparable to that of a recurrent neural network. It processes data and forwards information as it propagates. The processes within the cells of the LSTM vary.

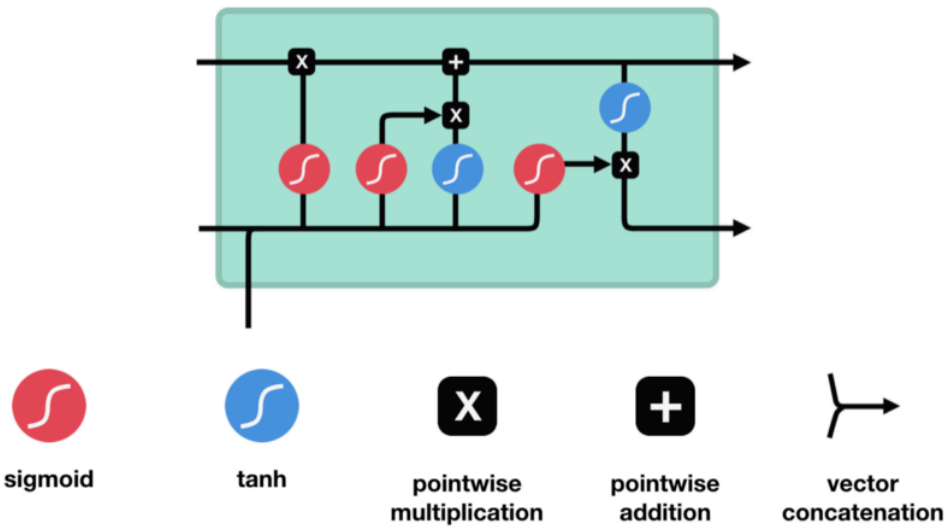

Fig 2.1

These operations of LSTM decide whether to keep the information or discard it. The cell state and its many gates are at the heart of LSTMs. The cell state serves as a transportation channel for relative information all the way down the sequence chain. You might think of it as the network's "memory." In principle, the cell state can carry meaningful information throughout the sequence's processing. As a result, information from earlier time steps might travel to later time steps, diminishing the impact of short-term memory. As the cell state travels, information is added or deleted from the cell state via gates. The gates are several neural networks that determine whether information about the cell state is permitted.

CHAPTER 4: RESULTS

4.1 Result

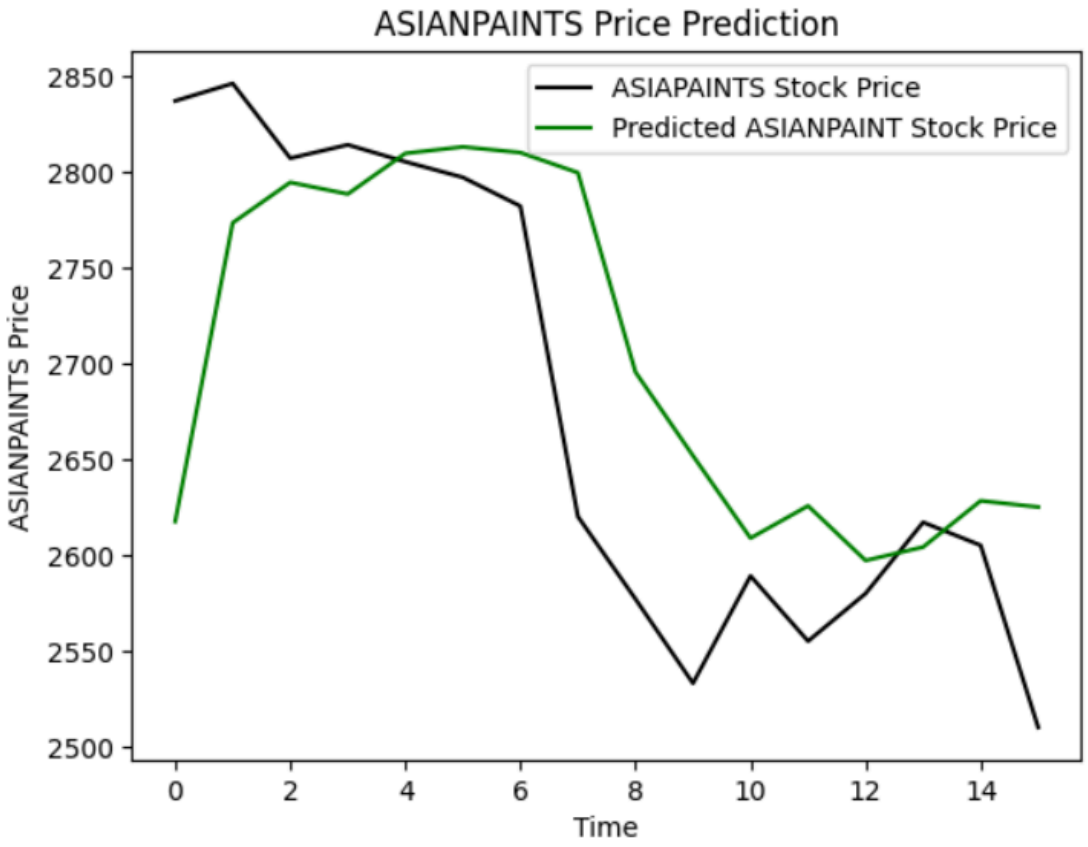

Figure 4.1

4.2 Result Analysis:

On analysing the graph, we found that the model initially lags behind but after a period of time it catches on with the upwards and downward trends with an average difference of 22.94 between predicted and actual stock prices.

```
(predicted_stock_price-real_stock_price).mean()
```

```
22.949288940429682
```

Figure 4.2

4.3 Applications:

We can expand this programme in the future to anticipate bitcoin trade and also incorporate sentiment analysis for improved predictions.

4.4 Limitations:

While on the whole it seems that the LSTM is good at forecasting the values for the following day, in practise the forecast for the following day is quite near to the actual value of the preceding day, also It cannot pay attention to the entire dataset.

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