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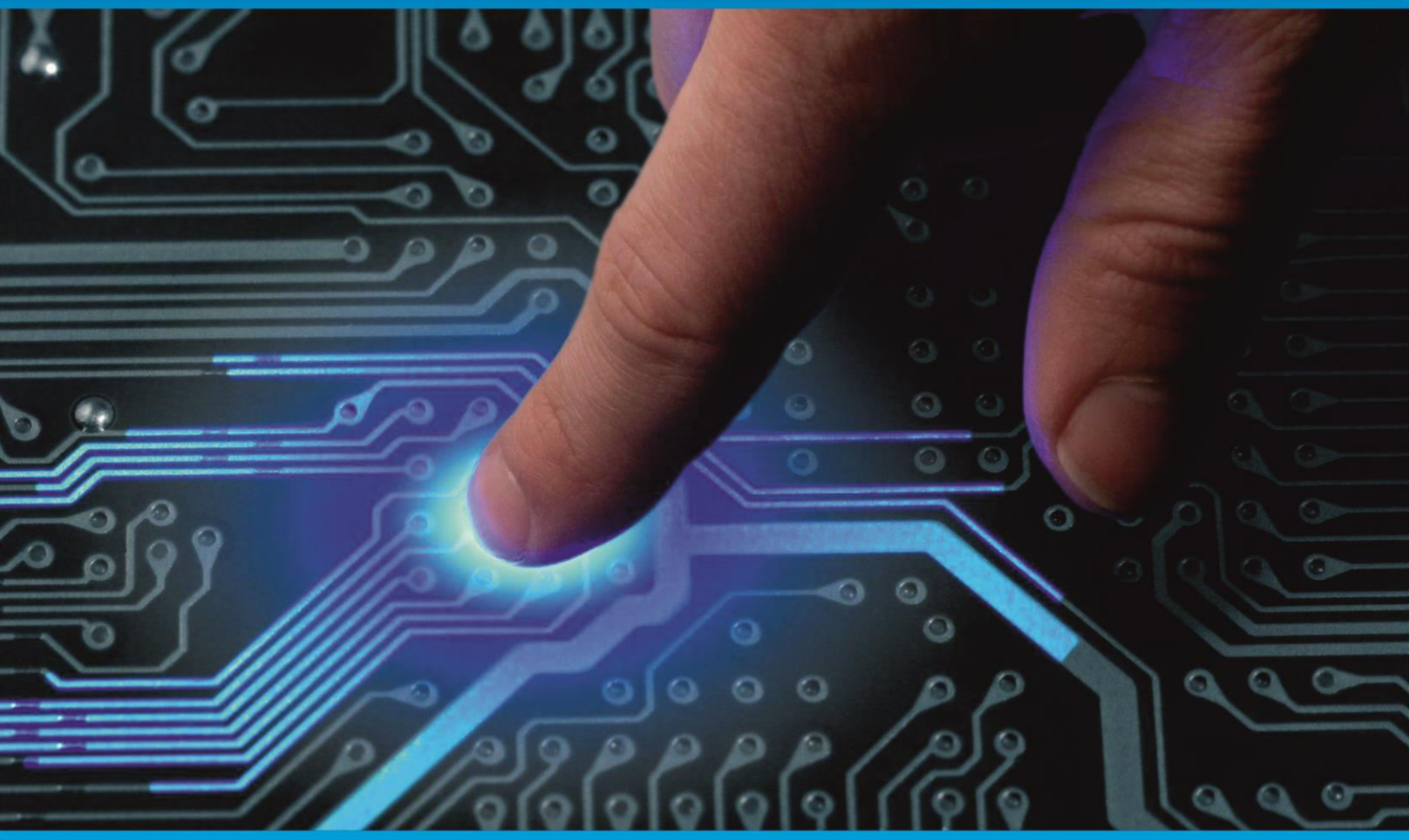

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Clustering and Prediction in Share Market Using LSTM

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ABSTRACT: Market style analysis is critical when designing a stock price prediction framework. Under different market styles, stocks may show quite different behaviours; thus, predictions will vary. Consequently, incorporating market styles into stock price predictions should help improve the prediction performance. In this paper, we investigate how to characterize market styles to improve stock prediction performance under varying market styles. Machine learning is becoming increasingly popular these days and a growing number of the world's population see it is as a magic crystal ball predicting when and what will happen in the future. The experiment uses artificial neural networks to reveal stock market trends and demonstrates the ability of times series forecasting to predict future process based on past historical data. First, stock data set are taken from API. Second, compute simple moving average for a given time window. Third, train LSTM neural network. Fourth, prediction and compare predicted values to the actual values. The dataset is taken from the specific time period and future stock is predicted.

KEYWORDS: Stock market prediction, Deep learning, Sentimental Analysis, LSTM and RNN model, Alphavantage API

I. INTRODUCTION

Due to the stock market dynamics, it is believed that stocks within the market manifest with different market styles in different periods. Market styles can be defined in many ways and characterized by different factors.
From a market frequency point of view, market styles can change yearly, monthly, daily, or even in response to various market events. Because market style behaviours, such as rotation and trend, can affect the performances of stock price prediction models, people have become increasingly interested in market style analysis and in applying it to their investment strategies to obtain higher profits and fewer losses.
In this project we are going to determine the future movement of the stock of a financial exchange using LSTM model and Recurrent Neural Network. The accurate prediction of share price movement will lead to more profit investors can make.

II. ISSUES WITH EXISTING SYSTEM

The existing system, an autoregressive integrated moving average, or ARIMA, is a statistical analysis model that uses time series data to either better understand the data set or to predict future trends. ARIMA is an acronym for "autoregressive integrated moving average." It's a model used in statistics and econometrics to measure events that happen over a period of time. The model is used to understand past data or predict future data in a series. ARIMA uses a number of lagged observations of time series to forecast observations.

III. PROBLEM STATEMENT

Many people are ready to invest their money in share market but due to market risk they show hesitation to invest money because share market is unpredictable. If a person who is ready to invest money without knowing share market trend then they might be in risk of loss so a prediction application can help the user to know the current and future trend of the desired stock.

IV. PROPOSED SYSTEM

In this system LSTM and Recurrent Neural Network is being used for better results of stock price where the data is taken from alphavantage API, SMA is computed for required dataset and model is trained. User can provide input in

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run time environment so model is validated and predicted and sentimental analysis is calculated through gross profit, profit loss, positive and negative reviews.

V. LITERATURE SURVEY

1) Thakkar, Ankit, and Kinjal Chaudhari. "CREST: Cross-reference to exchange-based stock trend prediction using long short-term memory." Procedia Computer Science 167 (2020): 616-625.To analyze patterns of the daily open price of each company's stocks, LSTM models have been incorporated; these models predict individual stocks as well as the difference between each company's open price
in both the exchanges. The derived values are applied to predict the stock trend for the next-day open price.

2) Bini, B. S., and Tessy Mathew. "Clustering and regression techniques for stock prediction." Procedia Technology 24 (2016): 1248-1255. comparison between partitioning based, hierarchical, model based and density based techniques are
performed with the help of validation index such as c-index, Jaccard index, rand index and silhouette index. K-means algorithm in partitioning based technique and EM algorithm in model based technique shows better performance than hierarchical and
density based technique.

3) Nabipour, Mojtaba, et al. "Deep learning for stock market prediction." Entropy 22.8 (2020): 840.This study employed tree-based models and neural networks (ANN,RNN, LSTM) and as a regression problem. The predictions were made for 1, 2, 5, 10, 15, 20, and 30 days ahead.LSTM was our superior model for predicting all stock market groups with the lowest error and the best ability to fit (by average values of MAPE: 0.60,1.18).

4) Maknickienė, Nijolė, Aleksandras Vytautas Rutkauskas, and Algirdas Maknickas. "Investigation of financial market prediction by recurrent neural network." Innovative Technologies for Science, Business and Education 2.11 (2011): 3-8.Combinations of parameters of RNN such as the number of epochs, data and neurons amount, determine different behavior of learning and prediction. weak
learning without prediction; strong learning with prediction; excellent learning without prediction

5) Kim, Taewook, and Ha Young Kim. "Forecasting stock prices with a feature fusion LSTM-CNN model using different representations of the same data." PloS one 14.2 (2019): e0212320.A feature fusion of LSTM-CNN model for forecasting stock prices by combining features of different representations of financial time series data. In order to create the proposed model and to construct an SC-CNN model that is optimized for stock chart images. We construct four stock chart images to see which chart images perform better.

VI ADVANTAGES OF PROPOSED SYSTEM

- LSTM works better if we are dealing with huge amount of data and enough training data is available.
- The principal advantage of RNN is that it can model a collection of records (i.e. time collection) so that each pattern can be assumed to be dependent on previous ones.
- Recurrent neural networks are even used with convolutional layers to extend the powerful pixel neighbourhood.

VII. FUTURE ENHANCEMENTS

In future projects we are proposed to use Facebook Prophet that provides features both from generalized linear models (GLM) and additive models (AM), mainly extending GLM by using non-linear smoothing functions. ThemaindifferencebetweenProphetandotherstatisticalmethodsistheanalyst-in-the-loop approach. This approach allows the analyst to apply their domain knowledge about the data to the forecasting algorithm, without having any knowledge of the statistical methods working from within andmight consider combining linear and non-linear models to build a new model in stock predicting such as using an exponential smoothing method to fit the linear part in financial time series and using the neural network to fit the non-linear part.

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VIII. RESULTS

By comparing the two forecasting plots, we can see that the ARIMA model has predicted the closing prices very lower to the actual prices. This large variation in prediction can be seen at the majority of the places across the plot. But in the case of the LSTM model, the same prediction of closing prices can be seen higher than the actual value. But this variation can be observed at few places in the plot and majority of the time, the predicted value seems to be nearby the actual value. So we can conclude that, in the task of stock prediction, the LSTM model has outperformed the ARIMA model.

After the prediction of future data, the application also performs sentimental analysis based on positive, negative news and gross profit, loss with respective to searched stock symbol.

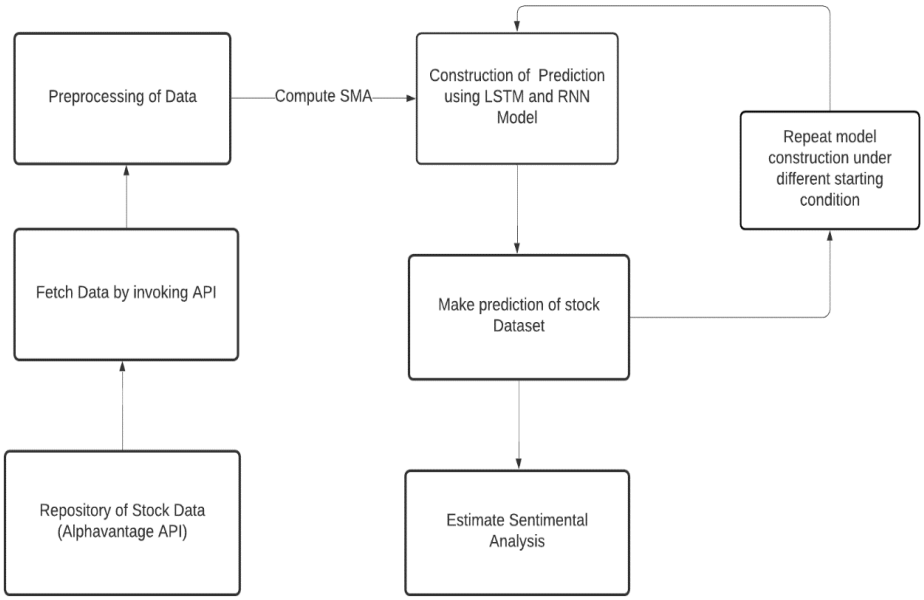

Fig Dataflow Diagram

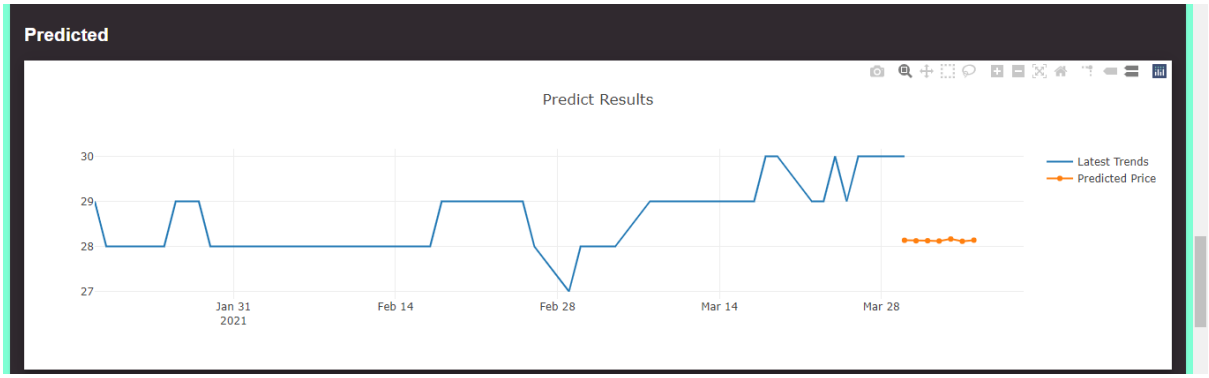

Fig Predicted Result

IX. CONCLUSION

In this paper, several deep learning models are used including LSTM model, Recurrent Neural Network model and to predict the five-day-ahead closing price of stock indices traded in different financial markets. Stock markets are hard to monitor and require plenty of context when trying to interpret the movement and predict prices. As such, LSTMs perform better as they are able to keep track of the context-specific temporal dependencies between stock prices for a longer period of time while performing predictions.Use of recently introduced deep learning techniques in the prediction of stocks have yielded promising results and thereby marked the use of them in profitable exchange

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schemes. It has led to the conclusion that it is possible to predict stock market with more accuracy and efficiency using deep learning techniques.

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