IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

FOREIGN CURRENCY EXCHANGE RATE FORECASTING

[1]WilliamBabu.B, [2]VeeraKalyan.G, [3]Rajasekhar.Y, [4]LavaKumar.K

[1,2,3,4] Department of Computer Science and Engineering,
[1,2,3,4] Madanapalle Institute of Technology and Science, Madanapalle, India

Abstract: This project mainly focused on foreign currency exchange rate prediction and we have used 2 neural networks which are used in times series prediction such as Long Short Term Memory (LSTM) and Gated Recurrent Unit (GRU). Combining these two neural networks, we also used the Facebook Prophet time series algorithm. So all these algorithms make the hybrid model such that it will be more convenient to forecast the prediction of the currency rates than in previous models. In the GRU layer, there were 20 neurons which are hidden, and in the other layer, there were 256 neurons that are hidden. The main aim we used the prophet algorithm is that with the very few datasets we can able to predict the price of different countries and with different time stamps. We calculated the performance of our hybrid model using MSE, MAE, RMSE, and R2 scores and validated all of the scores. We also compared our hybrid model with different models such as the Standalone LSTM model, Standalone GRU model, and SMA (Simple Moving Average) model. Our hybrid model gives better performance than other models. In terms of the R2 Score, our hybrid model system gives outstanding scores and with this, we can say our hybrid model is the least risky model compared to other models.

Index Terms **– Introduction, Literature Survey, Modules, Figures, Algorithms, Conclusion, References**
Keywords **- Time series Forecasting, LSTM, GRU, Facebook Prophet**

I. INTRODUCTION

Foreign currency exchange rate forecasting is used in many different areas such as forex traders, travelers, stock predictions, and many more. The currency rates are frequently changing based on many different factors such as imports and exports also there are included many different areas and sectors. So it is difficult to predict the 100% accuracy. The main aim of this paper is to predict the forecasting values based on the available data set. There are many algorithms to apply for predictions and forecasting but we used algorithms like LSTM and GRU Neural Networks and using both these networks we can able to predict or forecast the values with previous datasets. Not only just predicting and forecasting the values we involved the Facebook Prophet Algorithm which makes a Hybrid algorithm with the combination of LSTM, GRU, and Facebook Prophet Algorithm. Now whatever the data set we provide to our Hybrid algorithm we can give the best results and also the dataset might not need to be the respective time such as weekly, monthly, yearly, and so on.

Whatever the data set might we provide to our Hybrid model we can predict irrespective of data sets such as we can forecast after seconds, minutes, hours, days, weeks, monthly, or yearly currency rates for different countries.

Also using performance metrics we calculated scores and compared them with MSE, RMSE, and MAE Performance analysis.

II. Literature Survey

1) P. Yaohao, P.H.M. Albuquerque, Non-linear interactions and exchange rate prediction: Empirical evidence using support vector regression, Appl. Math. Finance.
2) B.M. Henrique, V.A. Sobreiro, H. Kimura, Stock price prediction using support vector regression on daily and up to the minute prices, J. Finance Data Sci.
3) J. Zhu, J. Yang, J. Xiao, C. Huang, G. Zhao, Y. Tang, Online prediction for Forex with an optimized experts selection model, in: Proceedings of the Asia-Pacific Web.

III. MODULES

A. System Module:

1) Train Dataset:

Our system model gives the training to the dataset.

2) Pre-Processing:

Pre Processing will be done by using different libraries which are used in python.

3) Model Performance:

In this step the machine mainly concentrates on the accuracy, precision and recall. Without having the highest rate of accuracy, the development of system is useless. So, it is better to have high accuracy system. Accuracy can be calculated by the taking the number of correct predictions from the total number of predictions.

4) Predictions:

Using Machine Learning Algorithms we are able to predict the predictions and also we can able to predict the predictions using our Hybrid model also.

B. User Module:

1) Upload Dataset:

Users using our model can also upload their own dataset.

2) View Dataset:

The Uploaded Dataset the users can view their datasets.

3) Viewing Graphs:

Graphs can be generated by the system and the users can view that graphs.

IV. Figures and Diagrams

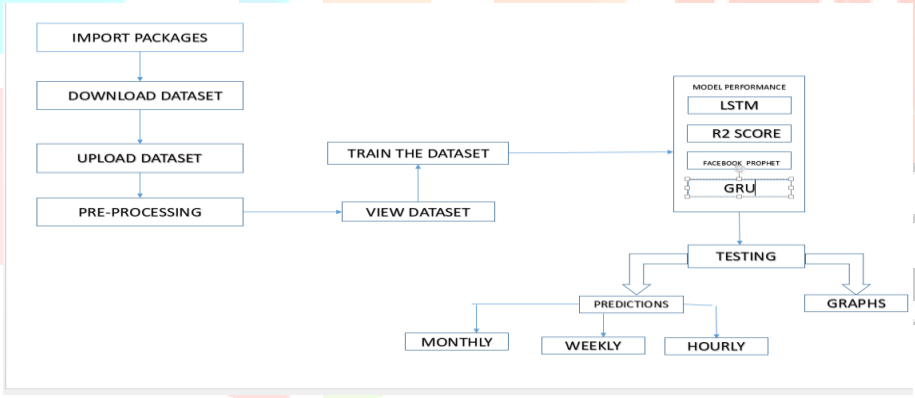

Figure .1: System Architecture

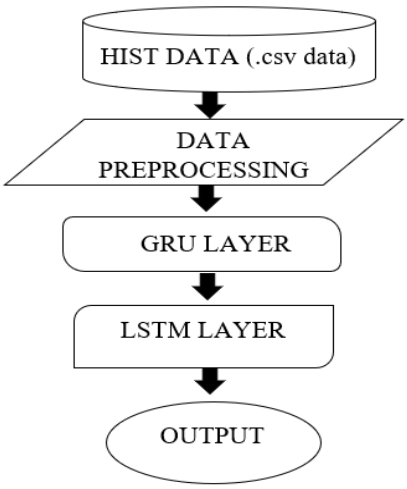

Figure .2: Data Flow Diagram

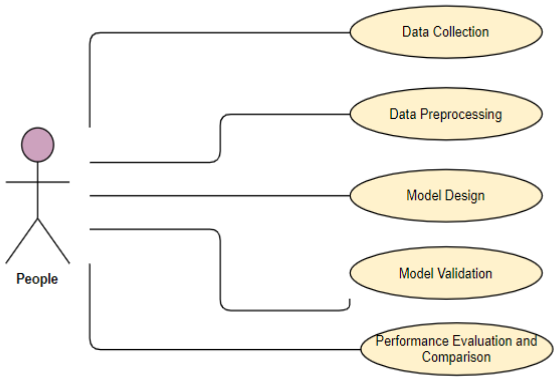

Figure .3: Use case Diagram

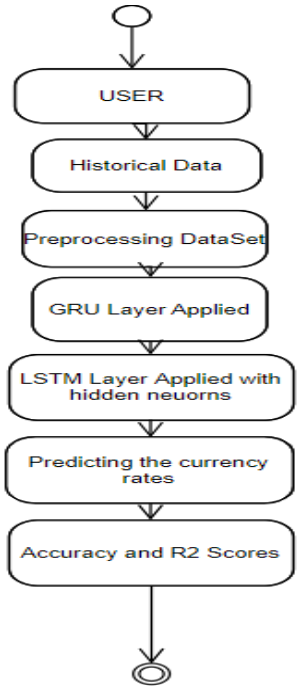

Figure .4: Activity Diagram

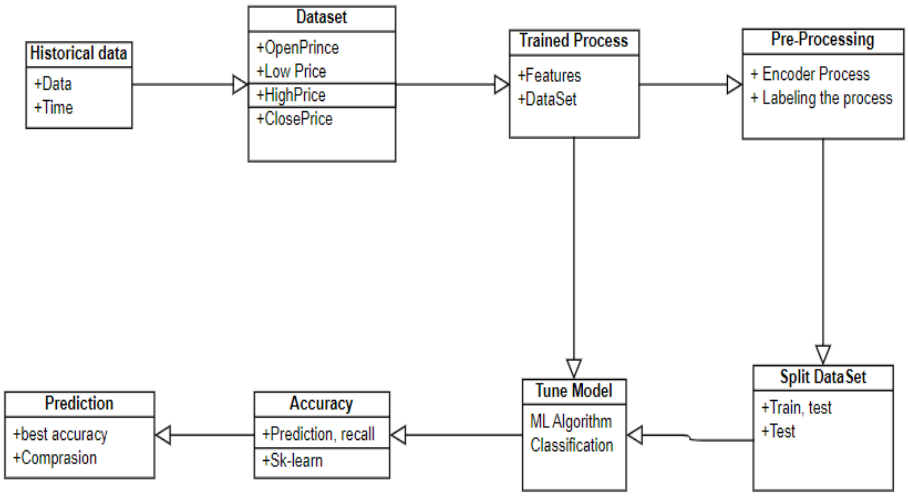

Figure .5: Class Diagram

V. Algorithms:

LSTM:

Long Short Term memory is mainly used in the field of Deep Learning and the name suggests that it stores the long-term memories and also short-term memories, unlike traditional neural networks this LSTM is a recurrent neural network which means it keeps on reoccurring like a loop until it gets terminated. LSTM is also mainly used in the sequence predictions problems by having the feedback connections that are obtained with the input cells. LSTM has a lot of applications and can solve the short-term problems that mainly occur in Recurrent Neural Networks. LSTM can simply solve the numerous problems that are not solved in the RNN by capturing the temporary long-term dependencies without having the optimization struggles.

GRU:

The Gated Recurrent unit is very similar to LSTM. Just like LSTM, GRU also uses Gates to control and argue to flow of the information. GRU is relatively new as compared to LSTM so they have some improvements over LSTM. GRU is simpler and alternative to LSTM and has fewer gates. It has Simple architecture than that of LSTM there will be no cell state in the GRU only a hidden state will be there and it is also faster in the training process it uses a reset gate for short-term memory and uses an update gate for long-term memory. Instead of using the separate gates used as used in LSTM in GRU, we use only a single gate to count historical data.

Facebook Prophet:

Prophet was open-sourced by Facebook and it is the core of the data science team in early 2017. Facebook Prophet is an open-source forecasting tool available for Python and R Programming Languages. It is made to help developers, researchers and analysts work efficiently, set goals, and allocate resources over weeks or years. Prophet is fully automated so that non-experts in data forecasting can quickly make high-quality forecasts but also allows for hand-tuning so that experts can improve their results by adding specialized knowledge. Prophet additive regression model works best with time series that have strong seasonal effects and several seasons of historical data.

Prophet can automatically detect changes in trends by selecting change points from the data and model yearly seasonal components using the Fourier series.
However prophet is also robust to missing data shifts in the trend and typically handles outliers as well.

VI. Conclusion:

We have made a research on different currency pairs especially we calculated our model for the USD to INR and EUR to INR. When we gave data set to test the prediction for 10 minutes and 30 minutes for the proof of concept. we have taken the data set from the xe.com website and collected the 1-minute data set interval to convert the data set to 30 minutes interval and 10 minutes interval datasets. Before passing the LSTM network we give our data set to the GRU model then which generates the values of weights then only we can pass to the LSTM network then the LSTM network passes to the dense layer by calculating the weight values. To have the output layer we pass the dense layer overall model to it. To minimize the loss of function the system-generated output should have to be compared against the actual values. Then there comes the Prophet algorithm which is used as the prophet additive regression model works for them in the time series data set. As if there were strong seasonal effects of the historical data that we had chosen there will be no obstacle to forecasting the currency rates of different counties. But we are now forecasting the currency rates of USD to INR this hybrid model will predict the rates by comparing all scores used in the testing purpose. Our Hybrid model which is the proposed model will give excellent outcomes as compared to other models. Our proposed model will give better outcomes but not 100% accuracy when the prices increase rapidly and downfall the prices suddenly.

REFERENCES

[1] S. Achchab, O. Bencharef, A. Ouaarab, A combination of regression techniques and cuckoo search algorithm for forex speculation, in: Proceedings of the World Conference on Information Systems and Technologies.
[2] P. Yaohao, P.H.M. Albuquerque, Non-linear interactions and exchange rate prediction: Empirical evidence using support vector regression, Appl. Math. Finance.
[3] B.M. Henrique, V.A. Sobreiro, H. Kimura, Stock price prediction using support vector regression on daily and up to the minute prices, J. Finance Data Sci.
[4] P. Taveeapiradeecharoen, K. Chamnongthai, N. Aunsri, Bayesian compressed vector autoregression for financial time-series analysis and forecasting, IEEE Access
[5] C. Serjam, A. Sakurai, Analyzing predictive performance of linear models on highfrequency currency exchange rates.
[6] M.S. Raimundo, J. Okamoto, SVR-wavelet adaptive model for forecasting financial time series, in: Proceedings of the 2018 International Conference on Information and Computer Technologies (ICICT).