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ABSTRACT:

In today's world we can see the trend of cryptocurrency is constantly increasing every day. In the financial sector, cryptocurrency has become a huge topic and the right prediction has become more important to gain profits . By using different machine learning algorithms like Linear Regression, Gradient Boosting Regressor, and XGBoost we can predict the daily price behavior of top 4 cryptocurrencies like Bitcoin, XRP, Etherum, and Binancecoin using these machine learning algorithms.

INTRODUCTION:

Predicting the price of cryptocurrencies is one of the popular case studies in the data science community. The prices of stocks and cryptocurrencies don't just depend on the number of people who buy or sell them. Today, the change in the prices of these investments also depends on the changes in the financial policies of the government regarding any cryptocurrency. The feelings of people towards a particular cryptocurrency or personality who directly or indirectly endorse a cryptocurrency also result in a huge buying and selling of a particular cryptocurrency, resulting in a change in prices.

Predictions based on machine learning models are not foolproof and should be used cautiously. Moreover, the disadvantages include the risk of overfitting, data quality issues, and the lack of interpretability in some machine learning models. Traders and investors should combine machine learning predictions with other fundamental and technical analysis methods and be aware of the limitations and uncertainties associated with cryptocurrency markets.

Cryptocurrency prediction predicts the trends of Different currencies using XGboost to increase the profit for crypto traders and help them with the crypto world. For this, we need machine learning and machine learning is divided into different types as regression and classification. For this project LSTM and different neural networks are used but they require large memory and are complex .

So, we are using XGBOOST and LIGHTGBM instead of them to reduce complexity and increase efficiency and to operate with less memory.

OBJECTIVE:

The main objective of our mini project – "CRYPTO-CURRENCY PREDICTION" is to predict the trends and amount of deviation from the actual value of predictions. Our aim is to get the

predictions of Bitcoin , Etherium and binance and other cryptocurrencies too.We used XGBOOST and LIGHTGBM instead of them to reduce complexity and increase efficiency and to operate with less memory.

FUNCTIONAL REQUIREMENTS:

ENVIRONMENTAL SETUP:

The first software we used for our project is google colab. Colab is a hosted Jupyter Notebook service that requires no setup to use and provides free access to computing resources, including GPUs and TPUs. Colab is especially well suited to machine learning, data science, and education. In cryptocurrency prediction we used google colab to test our model with a dataset an developed in the environment. The other software that we used was python. Python is the most extensively used language on the web. It is a widely used, object-oriented, open-source, high-performance programming language with many advantages – one of which is the extensive availability of libraries in Python. We used python language and its libraries in this project to run the application and use metrics to find the desired results. The libraries we used include seaborn, matplotlib, pandas, numpy, datetime, sklearn, matplotlib, colorama .

MATERIALS USED:

For this application prediction of cryptocurrency trends the dataset was taken from chinese stock market (2015-19) which can be found publicly on marketwatch.com [6]. The dataset consists of the stock history of bitcoin, Ethereum, Binance coin, XRP etc. which are used in this project. The reference material for this application was taken from Kaggle which contains the methods to find the predictions of cryptocurrencies using gradient boosting methods and is accurate model. It can be found publicly on Kaggle in the name of bitcoin, dogecoin price prediction-cryptocurrency [2]. The reference for this project was taken by considering various research papers which contains different methods to predict the cryptocurrency trends and about different cryptocurrencies. The dataset was also taken using this reference[3] .

The workflow of our mini project is as follows:

The application produces a output of plot with a performance measure when input id given and the operations performed for creating this application are data preprocessing, creating a dataframe, plotting the data,training the application and testing on test data then predicting the trends using various methods.

NON-FUNCTIONAL REQUIREMENTS:

The device used for running this application is an intel i5 processor with iris xe graphics device with windows operating system and sql database management system. Memory of the device is 256 gb with ram 8gb **.**

Our project is designed to predict the trends of cryptocurrency stocks to help the traders to invest in places where they gain profit.but our system can predict only one cryptocurrency at a time and works for only stocks from (2015-2019)Work for only single user at a time**.** This is the limitation of our mini project.

Several issues were faced during the application training and testing and one of the major issues was the overflow. Gaining efficiency was another major issue with application as the predicted outcome should be accurate and similar to the original trends of the currency. Finding the matching dataset with reference paper and reference project which is similar to the idea of the application.

METHODS USED:

There are many methods to check the predictions of the cryptocurrency, like XGBOOST, LIGHTGBM, CATBOOST , Stochastic Gradient Descent etc. But for this project we only used XGBOOST and LIGHTGBM.

XGBM is the latest version of gradient boosting machines which also works very similar to GBM. In XGBM, trees are added sequentially (one at a time) that learn from the errors of previous trees and improve them.

Light GBM is a more upgraded version of the Gradient boosting machine due to its efficiency and fast speed. Unlike GBM and XGBM, it can handle a huge amount of data without any complexity. Instead of level-wise growth, Light GBM prefers leaf-wise growth of the nodes of the tree. Further, in light GBM, the primary node is split into two secondary nodes and later it chooses one secondary node to be split. This split of a secondary node depends upon which between two nodes has a higher loss.

PERFORMANCE MEASURES:

We used Root mean squared error (rmse) and Mean absolute error(MAE) as metrics to measure the performance and error in the predicted trends from actual trends.Root Mean

Squared Error (RMSE)and Mean Absolute Error (MAE) are metrics used to evaluate a Regression Model. These metrics tell us how accurate our predictions are and, what is the amount of deviation from the actual values.Root mean squared error (RMSE) and mean absolute error (MAE) are two common metrics to measure the accuracy of a model. RMSE is the square root of the average of squared errors, while MAE is the average of the absolute values of the errors. RMSE is more sensitive to outliers and gives a larger error when there are large deviations MAE is easier to interpret and less skewed by outliers The choice of metric depends on the objective and the data of the model

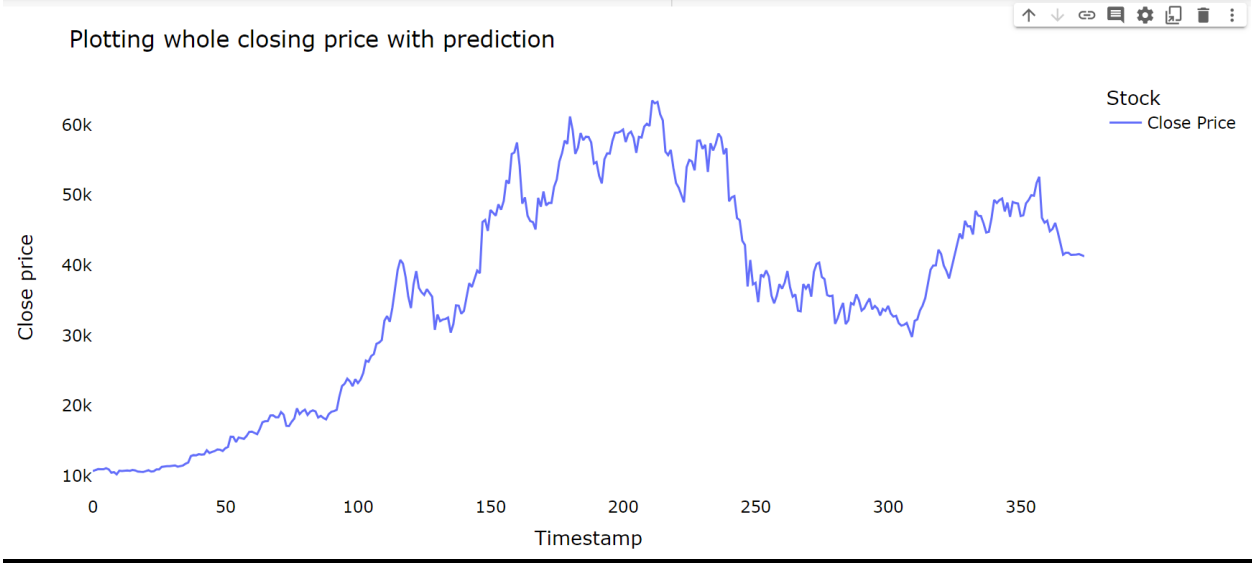
RESULTS:

In the project we predicted the trends for bitcoin cryptocurrency and Ethereum cryptocurrency.These are the results that came in for both of the currencies applying gradient methods like XGboost and light GBM.

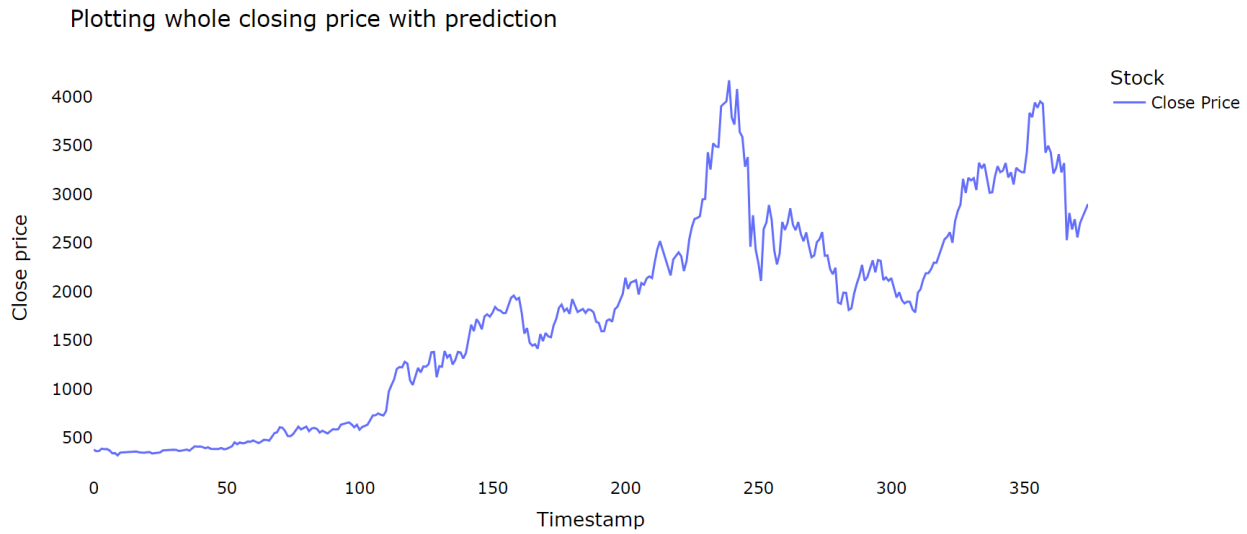
	XGBOOST		**LIGHT GBM**	
BITCOIN	**RMSE**	**MAE**	**RMSE**	**MAE**
	0.0397143775152892	**0.0307410308003782**	**0.084523**	**0.074381**
ETHEREUM	**0.047737**	**0.035726**	**0.06863799634837396**	**0.056838190877954504**

PREDICTED TRENDS OF CRYPTOCURRENCIES:

BITCOIN:



ETHEREUM:



CONCLUSION:

Therefore, our mini project's aim which was to get the result that is the trends of cryptocurrency has been achieved with minimum RMSE (Root Mean Square Error) and MAE (Mean Absolute Error) and with maximum accuracy and efficiency. The trends has been 96-97% accurate with the actual trends and the RMSE and MAE error value within 0-1 range.

FURTHER EXTENSIONS:

Development of frontend for the project and integrating it to create a user-friendly application, also increasing the efficiency of the system by using various gradient methods and lstm to deal with large usage and data. Increasing the scalability of the project by using data structures to manage large datasets and gathering the datset from the rise of stock market to get accurate

Predictions and enabling multiper users at a time to use the application to predict the trends.

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