

CRYPTOCURRENCY PRICE ESTIMATION WITH DEEP LEARNING MODELS

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ABSTRACT

There are numerous studies on Bitcoin price prediction using different machine learning algorithms. For research: Extract relevant features from the dataset that have a strong relationship with the Bitcoin price, then randomly select blocks of data to train and test the model. Choosing random data for the training model will lead to negative results and reduce the accuracy of the prediction values. The best way to train a predictive model here is to practice carefully. The proposed method is used to train a simple Long Short Term Memory (LSTM) model to predict Bitcoin price over the next 5 days. Useful predictions are found when the LSTM model is trained and validated with the appropriate data set.

We use historical price and market volume data as input material and evaluate the performance of LSTM using metrics such as mean error (MAE) and root mean square error (RMSE). Our results show that LSTM outperforms statistical methods such as linear regression in terms of prediction accuracy. Our results demonstrate the potential of LSTMs in cryptocurrency price prediction and provide insight into the dynamics of the cryptocurrency market.

Keywords: Cryptocurrency Price Prediction, Long Short-Term Memory (LSTM), Recurrent Neural Network (RNN), Time Series Analysis, Mean Absolute Error (MAE), Root Mean Squared Error (RMSE).

I. INTRODUCTION

Cryptocurrencies have attracted much attention in recent years due to their decentralized nature and potential for financial gain. However, their high volatility creates serious problems for investors and traders looking to make decisions. For this reason, interest in developing models that can accurately predict cryptocurrency prices is increasing. LSTM models show great promise in betting on cryptocurrency prices and have been used in many studies with good results. These models are designed to process real time data and can capture both short and long term dependence, making them ideal for predicting cryptocurrency prices.

However, despite the interest in using the LSTM model to predict cryptocurrency prices, there are still challenges to be solved. These challenges include data collection and prioritization, feature selection, hyperparameter optimization, and model interpretation.

In this project, we aim to create a cryptocurrency price prediction system that solves these problems and provides accurate and reliable predictions. Our system will follow the LSTM model but will include many techniques and techniques to improve its performance and interpretation.

Overall, it is possible to develop a reliable and accurate cryptocurrency price prediction so that investors and traders can contribute to the growth and stability of cryptocurrency trading.

II. LITERATURE SURVEY

Table 1. Literature Review

SN.	Title	Date	Main Objectives and
1			Cryptocurrency, a digital currency, acts as a medium of exchange through the Internet. The main agenda behind cryptocurrency being so popular these days is the desire for reliable, long-term value without the involvement of any central authority like banks. The power lies in the hands of the currency holders which resolve the problems of the traditional currencies by adopting a decentralized system. Predicting the future price of different cryptocurrencies is a prominent area of interest for individuals or investors. In this work, we use a dataset collected from the

	Machine Learning Based Framework for Cryptocurrency Price Prediction (IEEE)	July 2023	coinmarketcap website for the duration of September 2014 to March 2022. The outcome of this work is compared to the existing algorithms for time series data analysis namely the Auto Regressive Moving Average Model (ARIMA), FbProphet, and several ensemble models on the basis of their accuracy in predicting the future price. We also create different ensemble frameworks for the prediction of the cryptocurrency price. To form the ensemble models, we initially select the three best-performing regression models on the dataset, namely Extra Trees, Random Forest, and Decision Trees Regressors. Our findings indicate that the ARIMA model performs better than the ensemble model with the lowest RMSE MAE and MSE.
2	Cryptocurrency Price Prediction using Long Short-Term Memory and Twitter Sentiment Analysis (IEEE)	Jan 2023	Machine learning has become the backbone of bitcoin portfolio optimization in today's technological era. This research applies a deep neural network (DNN) model, Long Short-Term Memory (LSTM), to historical bitcoin prices and Sentiment Analysis to tweet data gathered from Twitter. The LSTM algorithm is used to train the model and forecast the future cryptocurrency price. Sentiment analysis, on the other hand, examines sentiment on Twitter to determine the relationship between sentiment and cryptocurrency price fluctuations. Sentiment analysis categorizes Twitter sentiment as positive or negative, and the fraction of positive and negative tweets is used to forecast bitcoin price fluctuations. The predicted price fluctuation data is then added to the LSTM predicted price to predict the new price for the next time frame. Finally, both models forecast future cryptocurrency prices and patterns, particularly Bitcoin
3	Cryptocurrency Price Prediction Based on Long-Term and Short-Term Integrated Learning (IEEE)	March 2022	With the advancement of blockchain technology and the development of digital economy, more investors are entering the cryptocurrency market, and the use of historical information as a means to evaluate and forecast future trends in the rapidly changing cryptocurrency market has become a major topic at the moment. Based on the SVR model, this paper proposes a cryptocurrency price expectation model based on long-term and short-term integrated learning and uses a large amount of historical cryptocurrency price data to analyze and verify the integrated learning model. Experimental results indicate that the accuracy of the SVR model for cryptocurrency price prediction can be effectively improved by the integrated learning model.
			Cryptocurrency price prediction is most wanted by investors nowadays to get more money in cryptocurrency investment. All existing methods depicted in the survey for Cryptocurrencies price prediction are not suitable for real-time investment price prediction. To handle the above-mentioned issues, Recurrent Neural Network (RNN) with Long Short-Term Memory (LSTM) is anticipated for Cryptocurrency price prediction. The proposed method depends on machine learning technique, mostly in monetary fields for forecasting stock prices. Min-Max Scaler is used

4	Cryptocurrency Price Prediction using LSTM and Recurrent Neural Networks (IEEE)	June 2023	<p>for pre-processing, changing the numeric values to the common scale in the dataset. LSTM is an Artificial Recurrent Neural Network (RNN) model employed in the deep learning field, and here it is used for cryptocurrency price prediction.</p> <p>Recurrent Neural Network (RNN) using LSTM can be accomplished in the proposed model, which proceeds with a set of working out sequences by using an optimization procedure like gradient descent with back transmission through time to calculate the gradients required through the progression of optimization in order to change each weight of the LSTM network to perform error calculation at the output layer of LSTM with respect to the corresponding weight. The proposed strategy involves the result from the model, which is considered as the another contribution for a similar model.</p>
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III. PROPOSED METHODOLOGY

In our research, we conducted a thorough literature review to identify challenges inherent in cryptocurrency prediction models.

Problem definition: The first step is to define the problem of accurately predicting cryptocurrency prices. This will include a review of the methods currently used for cost estimation and the limitations of these methods.

Gather: The next step is to collect the requirements of the software system. This will include determining the work required to accurately predict cryptocurrency prices, as well as the required historical data, the type of algorithm to be used, the user interface, and other requirements.

Design and Architecture: The next step will be the design and architecture of the software system. This may include designing the software system architecture, selecting the technology framework, and developing the development plan.

Development: The development phase should follow the design and development of the software system. This includes collecting and processing historical data, using LSTM algorithms for prediction, improving user interfaces, and integrating real-time price updates.

Testing: When the installation is completed, testing is performed to ensure that the system is working properly. This includes assessing the accuracy of predictive models, performance evaluation, and user acceptance testing.

Deployment: The final step is to deploy the software system to the production site. This may include distributing the software in a hosting environment so that users can access it and providing ongoing support.

Continuous improvement: Once a software system is implemented, it must be continually improved to ensure that the forecast model is accurate and up-to-date. This will include monitoring the performance of the system, reviewing user feedback, and making updates as necessary.

These solutions will ensure that the "Using LSTM for Cryptocurrency Forecasting" software system is well designed and meets investors' requirements to accurately predict cryptocurrency prices is well designed and meet investors requirement to accurately predict cryptocurrency prices.

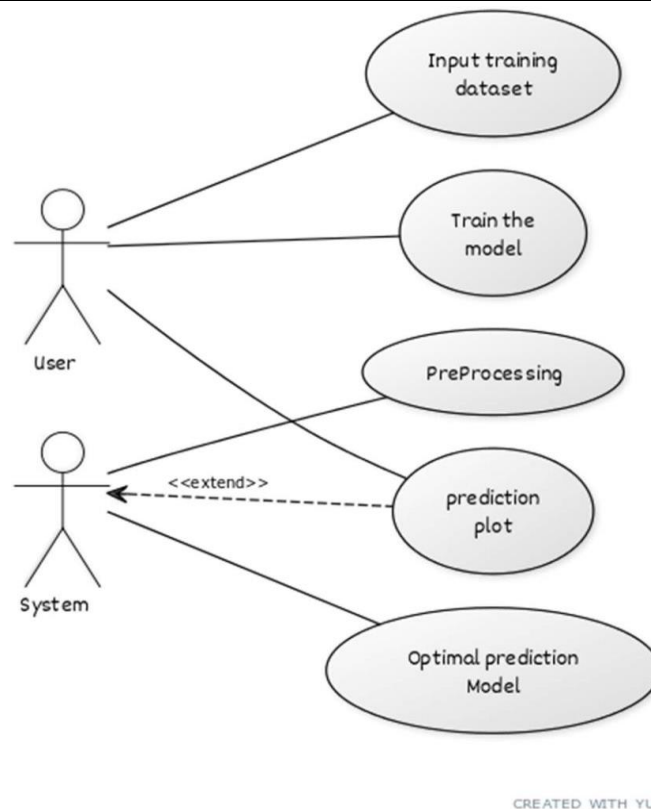


Figure 1: Use case diagram of crowdfunding application

IV. MOTIVATION

Machine learning is the science of getting computers to act without being explicitly programmed. Machine learning is a method of data analysis that automates analytical model building. Machine learning is important because it gives enterprises a view of trends in customer behavior and business operational patterns, as well as supports the development of new products. Cryptocurrencies and Blockchain based technologies are relatively new domains and need exploration and research. The use of LSTM-based neural networks for time-series prediction has shown promising results in a variety of domains, including stock market prediction and natural language processing. By applying this technique to the cryptocurrency market, we aim to develop a model that can effectively capture the complex patterns and dependencies in the historical price data and generate accurate forecasts of future prices. The success of this project could have significant implications for investors, traders, and other stakeholders in the cryptocurrency market. By providing more accurate and reliable price predictions, our model could help reduce the risk and uncertainty associated with cryptocurrency investments and improve overall market efficiency. Furthermore, the development of this project could also contribute to the broader research community's understanding of deep learning techniques for time-series prediction and their applications in financial markets.

V. CONCLUSION

Cryptocurrency price prediction is difficult for researchers due to external and objective factors affecting price prediction, such as ARIMA, SARIMA and others frequently used in analysis finance.

There are usually six time series, but there are many restrictions on thinking. Recent research topics include the implications of using neural networks and there are many changes in value estimation. In this paper, we describe a support learning prediction method integrated with the blockchain framework for price prediction of Litecoin and Monero. The proposed method showed superior performance compared to other current methods in this field. In this system, we achieved a higher accuracy rate of Litecoin and Monero than the other systems we mentioned before. The aim of this research is to improve cryptocurrency prediction performance with a lower error rate.

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