Cryptocurrency Price Prediction Using LSTM

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Abstract: Cryptocurrencies have gained significant attention in *recent years due to their potential for high returns and decentralized nature. Predicting the price of cryptocurrencies is a challenging task, as they are highly volatile and influenced by* various factors. In this paper, we propose a LSTM-based model for *crypto currency price prediction. Long Short-Term Memory (LSTM) is a type of recurrent neural network (RNN) that is* capable of learning long-term dependencies and capturing *temporal patterns in sequential data. We train and evaluate the proposed model on historical crypto currency price data, aiming to predict future price trends. The experimental results demonstrate the effectiveness of the LSTM model in predicting crypto currency prices and its potential for assisting investors in making informed decisions.*

Keywords: Crypto currency, LSTM, price prediction, recurrent neural network, temporal patterns.

I. Introduction

Cryptocurrencies have emerged as a popular investment option, attracting both individual investors and financial institutions. However, the volatile nature of crypto currency prices poses a significant challenge for investors. Accurate price prediction models can help investors make informed decisions and maximize their returns. In recent years, machine learning techniques, especially deep learning models, have shown promising results in various prediction tasks. Long Short-Term Memory (LSTM), a variant of recurrent neural networks (RNNs), has gained attention for its ability to capture temporal dependencies and patterns in sequential data. This paper presents a LSTM-based model for predicting crypto currency prices, leveraging the strengths of LSTM to capture the underlying dynamics of the market.

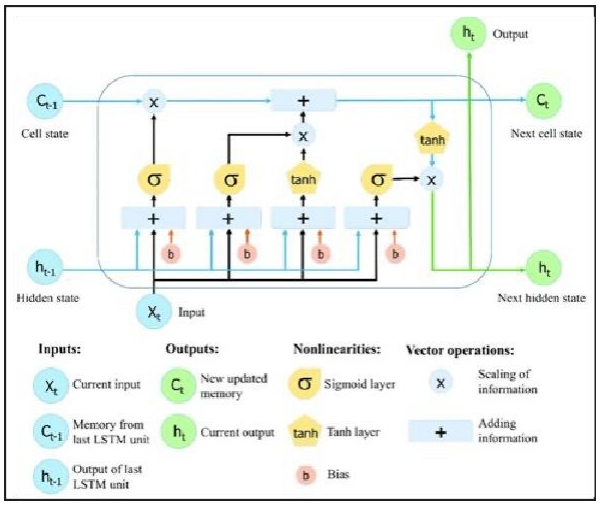

Fig. 1. LSTM cell

II. Related Work

Several studies have explored the use of machine learning models for crypto currency price prediction. Traditional methods, such as autoregressive integrated moving average (ARIMA) and support vector regression (SVR), have been widely used. However, these models often struggle to capture the non-linear and time-varying patterns present in crypto currency data. Deep learning models, particularly LSTM, have shown promising results due to their ability to handle sequential data and capture long-term dependencies. Various researchers have applied LSTM models to predict stock prices, and we build upon their work by applying LSTM to crypto currency price prediction.

III. Methodology

In this study, we propose a LSTM-based model for crypto currency price prediction. To build our model we are going to use the LSTM RNN, our model uses 80% of data for training and the other 20% of data for testing. For training we use mean squared error to optimize our model.The model architecture is as follows:

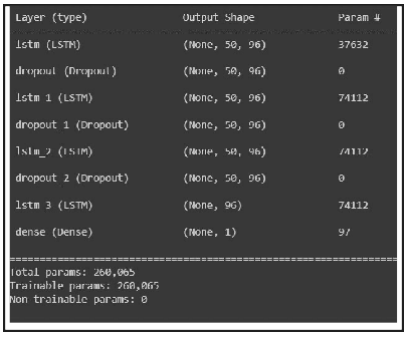

Fig. 2. LSTM model architecture

The model consists of multiple LSTM layers followed by dropout layers to prevent overfitting. The input to the model is a sequence of historical crypto currency prices, and the output is the predicted price for the next time step. The LSTM layers allow the model to learn the temporal dependencies and patterns in the data. The final dense layer produces the predicted price value.

IV. Experimental Setup

To evaluate the proposed model, we collected historical crypto currency price data from reliable sources. The dataset includes features such as opening price, closing price, volume, and other relevant indicators. We preprocess the data by normalizing it to ensure consistent scaling. We split the dataset into training and testing sets, using a majority of the data for training and a smaller portion for testing. The model is trained using backpropagation with the Adam optimizer and mean squared error (MSE) as the loss function. We tune the hyperparameters through experimentation to achieve the best performance.

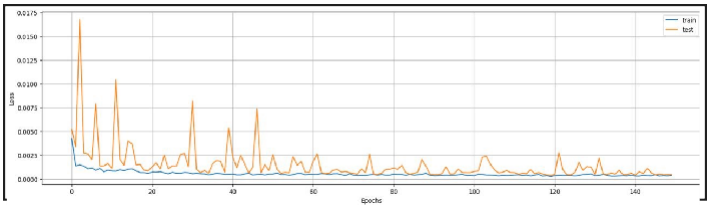

Fig. 3. Training and testing loss

V. Results and Discussion

We evaluate the performance of the LSTM model by comparing the predicted prices with the actual prices from the testing dataset. We use evaluation metrics such as mean absolute error (MAE), the predicted prices with the actual prices from the testing dataset. to assess the model's accuracy. Additionally, we visualize the predicted prices and compare them with the actual prices to gain further insights into the model's performance.

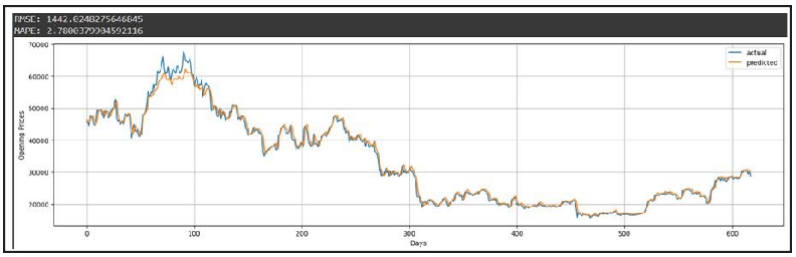

Fig. 4. BTC price predictions

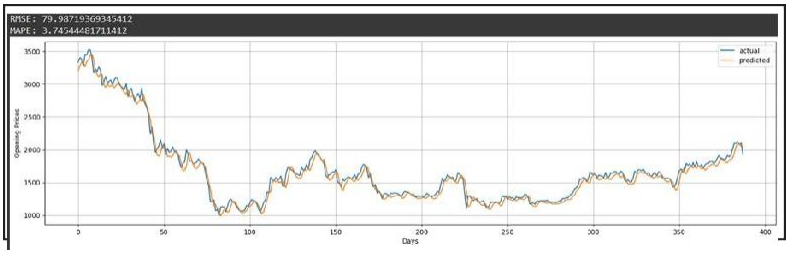

Fig.5. ETH price predictions

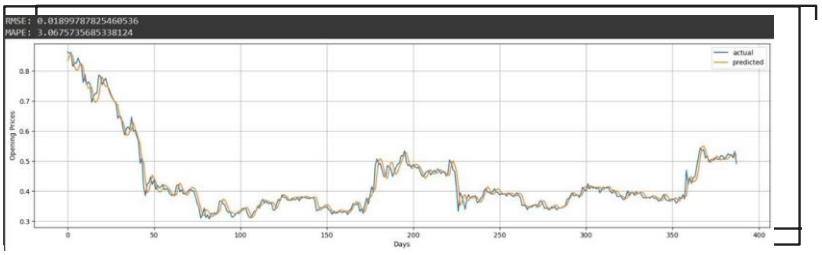

Fig.6. XRP price predictions

VI. Conclusion

In this paper, we presented a LSTM-based model for crypto currency price prediction. The experimental results demonstrate the effectiveness of the proposed model in predicting crypto currency prices. The LSTM model, with its ability to capture temporal dependencies and patterns, shows promise in assisting investors in making informed decisions. However, further research can be conducted to improve the model's performance and explore additional features and techniques for enhanced prediction accuracy.

VII. Acknowledgment

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