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## Performance scrutiny of price prediction on blockchain technology using machine learning

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ARTICLE INFO	ABSTRACT
<p><b>Article history:</b> Received: 19-05-2025 Received in revised form: 31-05-2025 Accepted: 02-08-2025</p> <hr/> <p><b>Keywords:</b></p> <p><i>blockchain, price prediction, machine learning, LSTM, Dataset</i></p>	<p>The volatile nature of crypto currency prices on blockchain platforms presents challenges and opportunities for investors and traders. We focus on employing machine learning algorithms to predict crypto currency prices based on historical data from the blockchain. We evaluate the performance of these models based on metrics such as mean squared error, root mean squared error, and accuracy. Additionally, we compare the performance of these models with traditional statistical methods commonly used for price prediction. The results of our study provide valuable insights into the feasibility and effectiveness of using machine learning techniques for price prediction on blockchain platforms. The findings can aid investors, traders, and financial institutions in making informed decisions and managing risks associated with crypto currency investments. Overall, this research contributes to the growing body of knowledge on the application of machine learning in the blockchain domain and provides guidance for future developments in this area.</p> <p>© 2025 The Authors. Published by IASE. This is an open access article under the CC BY-NC-ND license (<a href="http://creativecommons.org/licenses/by-nc-nd/4.0/">http://creativecommons.org/licenses/by-nc-nd/4.0/</a>).</p>

### INTRODUCTION

Blockchain is an emerging technology with significant potential for application across various industries. While it is commonly associated with supporting crypto currencies like Bitcoin, it offers solutions to longstanding trust-related issues among individuals [1]. Accurate price forecasting plays a crucial role in enabling informed investment decisions within the expansive domain of crypto currency. To estimate

prices, the LSTM and Facebook Prophet algorithms were employed, and their performance was compared using metrics like RMSE and other error measures. The execution of this application relies on smart contracts, which serve as the foundation for any blockchain-based software [2].

In our current society, we heavily rely on centralized institutions that operate based on trust. However, these centralized systems present numerous challenges. The primary

objective of Blockchain technology is to overcome these challenges by transitioning from centralized trust-based systems to decentralized trust-free solutions [2]. It establishes a trustless environment among all parties involved, eliminating the need for intermediaries.

The decentralization of information in Blockchain reduces the potential for data manipulation, thereby distinguishing it from other systems. Before a new block can be added to the chain, certain conditions must be met [1]. The computer that solves the puzzle verifies the solution, which is subsequently distributed to other computers in the network.

### **CONCEPT OF BLOCKCHAIN TECHNOLOGY**

Blockchain technology initially gained attention as the underlying technology for Bitcoin, a digital currency. However, experts and practitioners believe that Blockchain has broader applications beyond just Bitcoin and can be utilized in various domains. Its potential impact is predicted to be significant in areas such as energy, logistics, music industry, healthcare, and more [3]. Since Blockchain is a relatively new field, there is still a lack of consistent language and well-defined terms associated with it.

Different experts have provided various definitions for Blockchain. According to Zhao et al. (2016), Blockchain is described as "a distributed peer-to-peer system of ledgers that employs an algorithm to negotiate the content of ordered and connected blocks of data, ensuring integrity using cryptographic and security technologies."

### **LITERATURE REVIEW**

This section provides an overview of different deep learning models used for price prediction. In the study conducted by McNally et al. (2018), the non-stationary price dynamics of three crypto currencies were examined. The dataset comprised 1030 entries recording the open, high, low, and closing prices of the three currencies. The comparison between LSTM and ANN models revealed that LSTM models outperformed ANN models. Another research by Yiyang W. and Yeze Z. (2019) evaluated several advanced deep learning models for crypto currency price prediction, with a preference for LSTM and CNN-based models for time series prediction. Silva et al. (2020) proposed a novel deep learning-based prediction framework utilizing the concept of metric learning and random sampling. The framework compared

samples and input patterns using data collected from the okcoin.com website over a four-year period [4].

Raikwar et al. (2018) proposed a blockchain framework for implementing smart contracts in an insurance company. This decentralized platform ensures transparency and trust by recording transactions, reducing processing time, ensuring security, and expediting payment settlements.

Managing and accessing large-scale medical data is a crucial challenge addressed by Khatoon (2020). Ethereum's open-source network is utilized to create smart contracts for managing medical records stored across different nodes [6].

## **DESIGN AND IMPLEMENTATION**

### **Hardware/ Software Used**

The following hardware and software have been used for implementing the work.

#### **Hardware**

Processor: 11th Gen Intel(R) Core(TM) i7-1165G7 @ 2.80GHz, 2803 Mhz, 4 Core(s), 8 Logical Processor(s)

#### **Software**

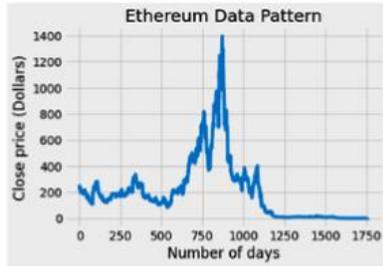
Two software packages have been used for different parts of implementations:

- For predicting crypto currencies prices- Google Colab notebook Python has been used to implement Collaborator, often known as "Google Colab." It does not necessitate any setup. Free access to GPUs is offered through [5].
- Google Colab. File sharing is also simple. We write and execute code in an interactive environment called a "Colab notebook." We can integrate executable code and rich text into one document in colab. We can also include photos, HTML, and other elements. When you create a Colab notebook, these notebooks and data files are saved in your Google Drive account, which saves system space [4].

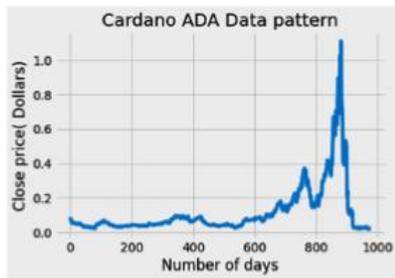
Predicting Prices of Different Crypto currencies:

- Using pandas, data files are uploaded. Only two columns are used: the date and the close price; the rest are omitted.
- The "matplotlib" library is used to visualize the dataset, and the five described dataset patterns may be seen from figure. The Ethereum input data pattern is shown in below

Figure. The x-axis for the Ethereum crypto currency shows the number of days, while the y-axis shows the close prices in dollars [7].



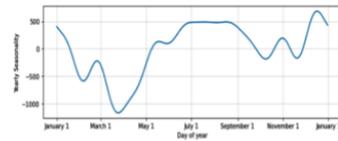
**Figure 1: Ethereum Input Data Pattern**



**Figure 2: Cardano ADA Input Data Pattern**

The input data trend for the Bitcoin closing price. Change points: trend can automatically detect the frequent change points in the input dataset. In below Figure shows the change points in the predicted prices for Bitcoin. In below Figure shows the forecast component-trend snapshot for Bitcoin price. The forecast component-yearly season a snap shot for Bitcoin price [3]. The forecast component-monthly seasonality snapshot for Bitcoin price.

The MAPE error (IBF website) has been calculated and its graph has been presented in the result chapter.



**Figure 3: Forecast Component – Monthly Seasonality**

Where, A=actual values, F=forecast values, N=number of samples. Events considered in Facebook prophet are Bitcoin Halving, Hardfork, and ETF.

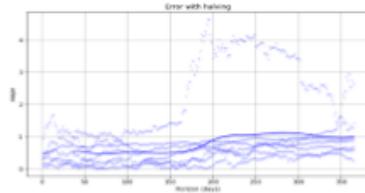
### EXPERIMENTAL RESULTS

This section compares five of the most popular block chain platforms, including Ethereum, NEO, Cardano-Ada, EOS, and TRON. The comparison was made using the following criteria: founder, year, purpose, data stored, languages used, native crypto currency, block release time, transaction rate, consensus process etc [4].

### Prediction through LSTM

The RMSE for training and testing for the above-mentioned currencies has been calculated. TRX has a minimal train and test RMSE score of 0.00 and 0.01 respectively. As a result, the LSTM algorithm outperformed the TRX crypto currency [5]. A comparison of original and expected close

prices of Ether, Cardano, EOS, TRX NEO has been depicted in respectively.



**Figure 4: Predicted error through MAPE for Bitcoin**

## CONCLUSION

Blockchain is an emerging technology. Depending on the application area, the technology offers a lot of room for development and application. However, more research is needed on this subject to fully harness the promise of sophisticated technologies like Blockchain and smart contracts. Because the technology is still in its infancy, there is plenty of room for more research. The historical basis of the Blockchain was covered in this study, and multiple blockchain platforms were compared on many attributes. Based on a comparison of several platforms, Ethereum was found to be the most extensively utilized platform for developing distributed apps. As a result, Ethereum was selected as the platform for creating a distributed smart energy micro grid application. Each

blockchain platform has its own native currency or token known as a crypto currency.

## REFERENCES

1. Boles W.W, Boashash B., "A human identification technique using inzages of the iris and wavelet transform", *IEEE Transactions on Signal Processing*, Vol.85, NO. 9, pp.1348-1363. 46, NO. 4, pp. 1185-1188., 2016.
2. Abiyev, Rahib H., and KorayAltunkaya. "Personal iris recognition using neural network." *Intl. J. Security & its Appl* 2, no. 2, 41-50, 2016.
3. Agudo, I, Nuñez, D, Giammatteo, G, Rizomiliotis, P & Lambrinouidakis, C 2011, „Cryptography Goes to the Cloud“, International Workshop on Security and Trust for Applications in Virtualised Environments, vol. 187, pp. 190-197.
4. Ahmed A Abd El-Latif, Bassem Abd-El-Atty & Muhammad Talha 2018, „Robust encryption of quantum medical images“, *IEEE Access*, pp. 2169-3536.
5. Akerkar, R & Sajja, PS 2009, „Bio-inspired computing: constituents and

- challenges“, International Journal of Bio-Inspired Computation, vol. 1, no. 3, pp. 135-150.
6. Alejandro Aguado, Victor Lopez, Jesus Martinez-Mateo, Thomas Szyrkowicz, Achim Autenrieth, Momtchil Peev, Diego Lopez & Vicente Martin 2017, „Hybrid Conventional and Quantum Security for Software Defined and Virtualized Networks“, Journal of Optical Communication Network, vol. 9, no. 10, pp. 819-825.
  7. Al-Haidari, F, Sqalli, M & Salah, K 2018, „Evaluation of the impact of EDoS attacks against cloud computing services“, Arabian Journal for Science and Engineering, vol. 40, no. 3, pp. 773-785.