

Application of Machine Learning in Prediction of Ethereum-Based Transaction

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Abstract. A cryptocurrency payment platform, allows users to transact in cryptocurrencies on a global scale inside a decentralized environment. Ethereum's native token has been successfully migrated to the main net. The platform's digital wallet, Ethereum Wallet, allows users to store and manage their digital assets across several platforms, including computers and mobile devices. Blockchain technology has emerged as a game-changer in aftermath of the success of Bitcoin and other cryptocurrencies. Instead of establishing a new blockchain from scratch as the number of current ones rises, decentralized application developers should focus on finding a solution that best suits their needs and the needs of their decentralized apps. The ownership and transferability of digital financial assets known as "cryptocurrencies" are guaranteed by decentralized cryptographic technology. The increasing market value and popularity of cryptocurrencies pose a variety of difficulties and concerns for global business and industrial economics. The planned study's main purpose is to validate the correctness of Ethereum transactions on the blockchain. The accuracy of the suggested work was compared to that of earlier work in this study. The LSTM-based training strategy has been chosen for the planned study. The training and testing of the Ethereum transaction were done with and without considerable record filtering. Both models' accuracy was evaluated to ensure the dependability of the hybrid strategy, which combined an LSTM model with a specific filtering mechanism.

Keywords. Accuracy, Blockchain, Cryptocurrency, Ethereum, Machine learning, LSTM

1. Introduction

It has been observed that the use of machine learning and blockchain is growing frequently. This technology is the core of cryptocurrency [1, 2]. It is necessary to meet goals of traceability & transparency by creating a unique format for each data unit and employing an algorithm to encode it. Blockchain technology [3, 4] participants establish a separate, safe area for every transaction for several commercial as well as healthcare systems [5]. Networks may be maintained with the support of everyone's Cooperative efforts [6] to develop mechanisms for collaboration, communication, and motivation [7]. The term "blockchain finance" simply describes how this technology is being used. An Internet-based distributed accounting system is known as a blockchain. Peer-to-peer (P2P) internet financial mechanisms are used in these transactions. In this credit block, the timestamp is what separates it from the others. As each "node" in the network records

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every transaction, it is possible to create an accurate and up-to-date public book backup using Bitcoin blockchain technology [8].

1.1. Blockchain Transaction Processing and Blockchain Topologies

A blockchain is a network of linked, unchangeable blocks that can't be tampered with. Lists of sets may be found in each block. Blockchain In the creation of blockchain software, topologies are critical since they classify the nodes that will be included. Permission, private, and hybrid blockchain systems [9] are three of the most recent subcategories of blockchain technology. The valid block can be generated by any of the Bitcoin or Ethereum nodes, regardless of whether a consensus is required [10].

1.2. Blockchain and cryptocurrencies

Payments, betting apps built on blockchain technology, and cash transfers are all examples of blockchain and cryptocurrency being widely used in the betting industry. Digital currencies [11] like Bitcoin and ether, which allow bookmakers to evade AML and KYC requirements while also evading the restrictions of other countries, are a new threat to regulated sports betting.

1.3. Cryptocurrency

Cryptocurrency is the focus of the current issue of this publication. As "cryptocurrencies," decentralized cryptography technology ensures the ownership and transferability of digital financial assets. According to recent regulatory reports, they may define two other subcategories of crypto assets, excluding bitcoin, within the overall category of crypto assets [12]. The sole advantage of a cryptocurrency is that it can be exchanged or moved among network participants and used as a means of exchange and payment. a cryptocurrency on the verge of collapsing It is now possible to distinguish between a "stable" and an "unstable" cryptocurrency [13].

1.4. Ethereum

All cryptocurrencies cannot be purchased using US currency. Coin bases or Block are the finest places to buy Bitcoin and other popular cryptocurrency like Ethereum. Based on the price forecasts, you may create a judgment on Ethereum's future. One thing is certain: the popularity of this cryptocurrency will continue to rise. Investments in the growth of the Ethereum Foundation are made by purchasing high-demand firms. Finally, after all, the factors have been weighed; interest in both companies and cryptocurrency will skyrocket. [14]

1.5. Deep Learning

To overcome dimensionality problems, deep learning models depend on the programmer's instructions to zero down on the most accurate features. When many inputs and outputs must be processed, deep learning techniques are used. Multi-layered neural networks, known as "deep networks," are used for deep learning [14].

1.6. LSTM

The classification of recurrent neural networks, such as LSTM networks, has been made. [15] As for how LSTM is trained, the "net" of trained networks is saved in the system for inspection at a later date. We think this is a fantastic addition. To build a trained network, the LSTM was implemented using two LSTM layers. To train, the proposed model employs a total of 2 LSTM layers and 1 dropout layer. There is a 70% utilization rate for training and a 30% utilization rate for testing. The feature is used to train the LSTM neural network.

2. Literature survey

PILKINGTON M [1] explains the fundamental concepts of blockchain technology, as well as some of its more innovative uses. Yli-Huomo et al. [2] gathered all relevant Blockchain studies and carried out extensive mapping. R. Ribitzky and colleagues [3] Blockchain & other technologies from a pragmatic & transdisciplinary approach Future of healthcare were being planned. E. Mengelkamp and colleagues [4] Smart grid based on the blockchain. All harmful attacks on blockchains were described by Xu J., et al. [5]. There was a lot of curiosity about blockchain technology among the general public. It was studied and empirically quantified by Rainer Stutzl et al. [6]. It took a review of current secure PoS approaches to uncover. Forage, a smart contract version of a pyramid scheme that was at its height one of Ethereum's greatest users of resources, was the subject of an empirical investigation by Tyler Kell Cornell et al. [7]. Because Forage was a smart contract, its (byte)code and all of its transactions were publicly accessible on the blockchain. E. Androulaki et al. [8] Permissioned blockchains run on this distributed operating system. Decentralized blockchains hold Smart contracts, which are activated when certain conditions are met, according to SARWAR SAYEED et al [9]. One example of a smart contract used in blockchain technology is given by Macrinici, D, et al, [10].

2.1. Research Gap

The research looked examined the ideas and uses of Blockchain technology, as well as the use of electronic health records in Blockchain. In the context of a blockchain-based smart grid, research was focussing on sustainable local energy markets [4] and whether or not blockchains could withstand any hostile assaults. Stake Shift in Major Cryptocurrencies was the subject of research [6]. Forsage's anatomy of a Smart-Contract Pyramid Scheme [7] and Hyperledger Fabric [8] were part of the research. The research was conducted on blockchain-based smart contract applications [9, 10] and research into the use of cryptography on the blockchain [11, 12]. Using ML Algorithms, researchers were able to develop a model for predicting cryptocurrency price movements [13, 14, 15].

3. Methodology

3.1. Problem statement

The fields of Ethereum, blockchain, and cryptocurrency have all seen a slew of investigations in recent years. However, there are certain limitations. Furthermore, existing studies on precision and performance were not equipped to handle practical concerns. Previous research on precision and performance had no way of dealing with practical issues. These research projects are constrained in their scope and lack adaptability. In prior inspections, a lack of attention to detail and efficiency was revealed. Real-world issues were likewise not addressed by them. Due to a lack of adaptability, research like this is unable to keep up with the times.

3.2. Proposed work

It is the primary goal of this planned endeavor to use Ethereum and blockchain technology in a real-world context. The project's choices and adaptability are numerous. To put it another way, one of the alleged advantages of doing research projects is the ability to solve an issue. Expected outcomes include increased accuracy and efficiency. Tokens, numbers, and types of tokens are all taken into account in deep learning. Predictors of transaction success and failure in Ethereum's scan environment are being improved using machine learning algorithms.

3.3. Process flow of proposed work

The proposed process flow has been shown in Figure 1. Training is done using transaction data set. Traditional approaches are used to train and test datasets to get the error values. Then apply a stochastic gradient to get the significant value to filter the transaction and filter the data set considering the significant value.

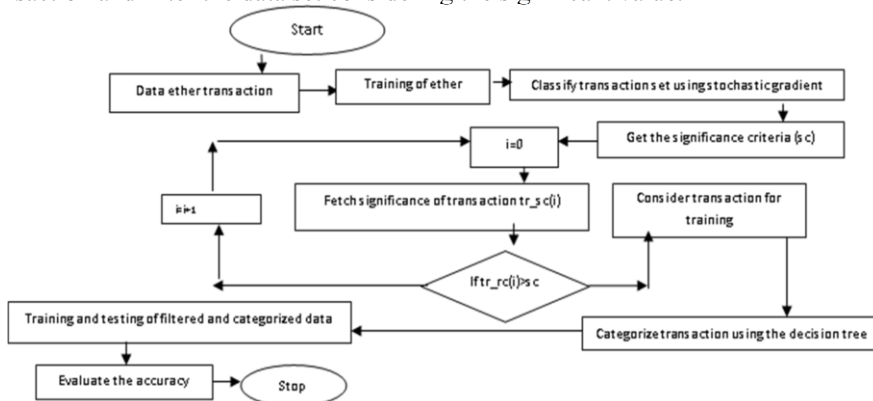


Figure 1. Process flow of proposed work

To increase the accuracy of the filtered data set, the LSTM model is used to train the epoch, batch size, and hidden layer. Testing is done on a dataset of records to predict the outcomes of different classes. Classes are analyzed using the Decision Tree classifier. The confusion matrix is then presented. A confusion matrix is used to determine the score, accuracy, recall value, and precision. Compare these variables.

4. Result and Discussion

In this simulation, out of the 15000 records in the dataset, only 10500 records were used for training purposes. And a total of 4500 records have been tested. For example, while some records are in the success category, others are represented in the accompanying table to be failures.

4.1. Confusion matrix

A confusion matrix is generated by testing following machine learning-based training. Table 1 is presenting the Calculation of Accuracy parameter of Previous Work with Overall Accuracy is 88.02%.

Table 1. Calculation of Accuracy parameter of Previous Work [23]

Class	n (truth)	n (classified)	Accuracy	Precision	Recall	F1 Score
1	3731	4000	88.02%	0.90	0.96	0.93
2	769	500	88.02%	0.73	0.47	0.58

4.2. Simulation result for the proposed model

It has been observed that out of 2302, 2185 transaction has been considered Success, and the remaining is considered failure transaction. Table 2 is presenting the calculation of the Accuracy parameter of the proposed work with overall Accuracy of 91.42%.

Table 2. Calculation of Accuracy parameter of Proposed Work [23]

Class	n (truth)	n (classified)	Accuracy	Precision	Recall	F1 Score
1	377	4000	91.42%	0.92	0.98	0.95
2	726	500	91.42%	0.84	0.58	0.69

The comparative analysis of traditional and proposed work has been shown in Figure 2.

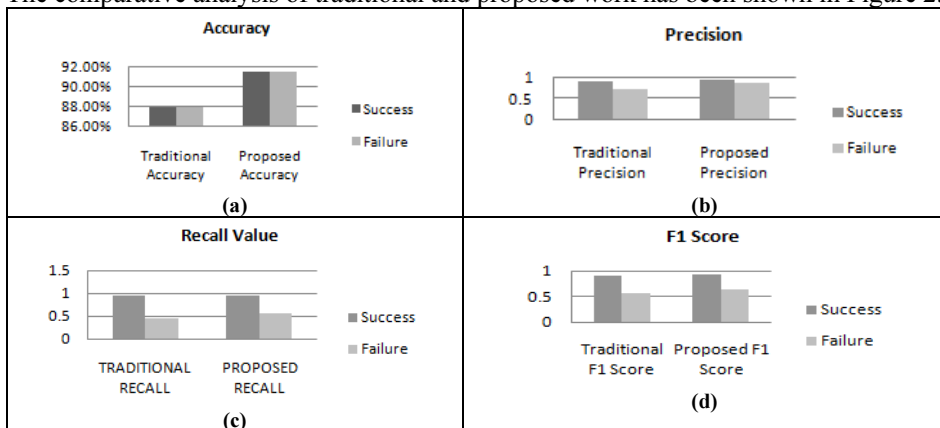


Figure 2. Comparative Analysis of previous and proposed work

5. Conclusion

This study was able to overcome the problems of previous studies. This research has yielded more precise and useful findings. The possible real-world relevance of the findings is of this research. The researchers have a wide range of applications and can adapt to changing circumstances. It is believed that Ethereum has a long-term future that is even brighter than expected.

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