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# A Novel Robust Digital Cheque Clearance Using Blockchain

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ABSTRACT

Blockchain technologies, particularly cryptocurrency, have piqued the interest of academics, governments, and business in recent times. Despite the availability of a wide range of blockchain-based solutions, the lack of tools to analyses these dynamic and distributed networks may stymie the field's advancement. Many of the benefits of block chain technology can only be seen at large scales. Earlier cheque deposit (cheque truncation system) system require manual operations such as manually visiting bank to submit cheque which require 3 days' time and it is difficult for bank employee to identify as fraud cheque as this require lots of expertise. The proposed e-cheque system is free from the various security attacks such as alteration of the e-cheque, double spending of e-cheque, counterfeits e-cheques. The e-cheque generated in the proposed system can be deposited electronically or physically via teller machines. Blockchain has inbuilt support for data reliability, integrity and security which makes Blockchain data immutable. Blockchain store each data as block/transaction and then associate each block with unique Hash code and maintain this blocks at multiple nodes or servers. Before storing new record Blockchain verify Hashcode of each block and if any block data modify then it result into different Hashcode which will raised attack alarm.

Keyword: cheque truncation system, Blockchain technology, quick cheque clearance.

## INTRODUCTION

The purpose of this study is to evaluate the current Applications that are based on the Blockchain Technology in various fields and to build a better model for an application that is used in the financial sector. It is necessary to adapt the banking system in the financial sector to the current situation in order to meet the requirements. Checks are processed using the present technique, which, although having certain restrictions, is more focused. Following the analysis, the study proceeded with the goal of resolving the limits of the system for the processing and clearing of cheques by shortening the amount of time required for processing and increasing the level of security. The disruptive nature of Blockchain technology was helpful in applying the technology to the creation of a secure system for the processing of cheques. In order to offer a sufficiently upgraded framework, already existing techniques for the processing of cheques were discovered, and their limitations were determined. To achieve the same goals, smart contracts were utilized to automatically finish the operation of check processing by issuing a valid tokenized cheque to update the information in IPFS blockchain. This allowed for the same goals to be achieved. The cheque processing system is composed of many stages, such as the administrator phase and the phase in which checks are generated by utilizing ERC20 tokens. This is to validate the tokenized check that was produced by a bank that has been granted permission. The subsequent step is known as the check details phase. After this, the user phase will come into play, at which point the beneficiary data will be entered. At this point, validation is carried out by signing the cheque and then cancelling the transaction after it has been initiated. After the completed transaction is published in the IPFS blockchain, the bank will validate the compliance features. In order to check for issues connected to the issue, several security technologies are utilized. The performance is evaluated, and then recommendations for enhancing the performance on mathematical models are provided
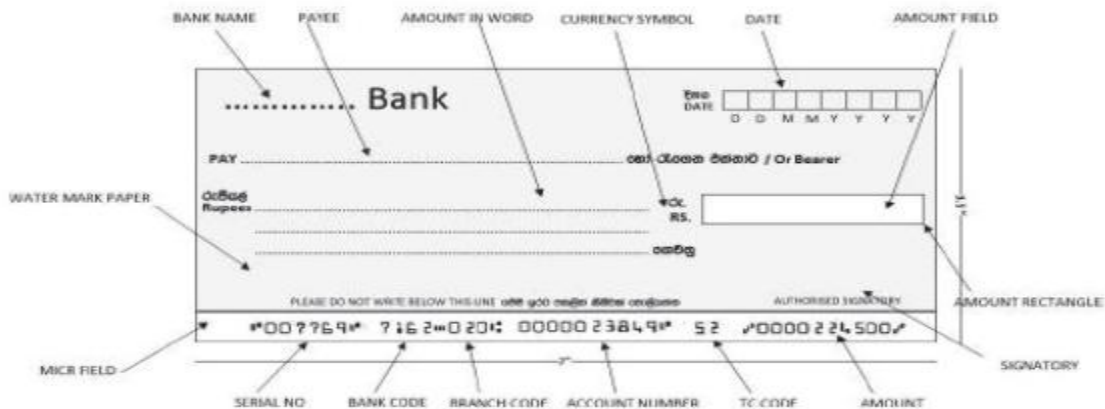


Fig. 1. Elements of a paper cheque in India

Presently, frauds executed on cheques had become a regular incident as technical advancements empower these frauds to difficult to distinguish. In Sri

Lanka, fraudulent cheques are ordinarily distinguished by bank employees by utilizing its attributes. Further, several commercial banks use software development kits (SDK) and scanner based hardware tools. These procedures are tedious and ineffcient; for sure, it is infeasible for arrangement in every commercial bank.

Through the proposed system, the untouched drawbacks of the current CIT based cheque clearing systems such as the time consuming process will be addressed by producing a secure and effective system which only takes only 5 minutes to clear a cheque, along with a mechanism for paper cheque fraud detection. For this, block chain has appeared as a novel technology and the traditional paper cheques will be replaced using digital cheques. This paper proposes the utilization of CheckMate system to the cheque clearing process of commercial banks of Sri Lanka. Mainly the system contains the following features:

- A mobile and web-based application to handle the cheque clearing and fraud detection process.
- A prediction algorithm with an accuracy of 80% to predict the cheque rejection possibilities and reasons.
- A novel mechanism to verify Magnetic ink character recognition (MICR) field data and handwritten signature on a paper cheque.
- One-time password (OTP) to verify the cheque issuer.

## Related work:

2.1 Online Digital Cheque Clearance and Verification System using Block Chain

Authors: Bogahawatte w,Isuri Samanmali A.

This research portrays an automated solution, which isfeasible for any commercial bank in Sri Lanka, to address above-mentioned issues. The proposed system is based on the blockchain where all banks willing to take an interest in this framework must connect the proposed blockchain based system to supply the quicker cheque clearance to its clients. Answers were proposed with a complete framework consisting of four main phases: (i) paper cheque clearing process, (ii) digital cheque issuing and clearing process, (iii) cheque fraud detection process and (iv) cheque transaction securing process. Python along with Flutter framework and Ethereum were the major technologies used for implementing the system. The proposed system is highly scalable as Ethereum provides added integrity to the system. The approach advocates the customer as well as the bank with much simpler and speedier cheque clearing process with increased security. It also contributes with a paper cheque fraud detection system with faster and reliable results. The proposed system provides benefits to the user as well as the bank by addressing the requirement of producing a secure, effective and environment friendly system. Finally, CheckMate permits a consistent stream of cheque clearance operation for the payer and the payee without any mediators.

2.2 Blockchain-based framework for automated cheque clearance in financial institutions

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The cheque clearing houses in financial institutions is increasing day-by-day, which necessitates the upgrading of the existing cheque truncation system (CTS). It is a manual process which uses Magnetic Ink Character Recognition (MICR), where cheques have been scanned and sent to the clearing house for further processing. The limitations of existing CTS are — illegal duplication of cheque images, invisible ink usage, visibility issues in beneficiary name, and amount on the cheque. To handle the aforementioned issues of the existing CTS, blockchain has emerged as a new technology which is a distributed ledger that is timestamped and immutable. Being immutable, forgeries related to images of cheques during clearance cycles are not allowed. This provides trust and consensus among all participating entities in the network. Motivated by the above discussion, in this paper, we propose a framework named MudraChain for automated cheque clearance, where clearance operations are handled by the blockchain network, instead of existing CTS. It includes: (i) A multi-level authentication scheme to make the blockchain-based framework secure and tamper-proof among participating financial stakeholders, (ii) A quick-response (QR) code generation algorithm which performs digital signing of a cheque, and (iii) A novel two-factor authentication protocol to generate a time based one-time password (TOTP) for secure funds transfer. The obtained results are examined against state-of-the-art approaches to indicate the supremacy of the proposed framework. Thus, MudraChain allows a seamless flow of clearance operation via blockchain for the payer and the payee without any intermediaries. Finally, it addresses the requirements of building a secure application for cheque clearance in view of decentralized blockchain 4.0 applications.

## 3.3 PROPOSED SYSTEM

The proposed system is based on the blockchain, and all banks that are interested in participating must link to the proposed blockchain-based system in order to provide their clients with faster check clearance.

The proposed system is based on the blockchain where all banks willing to take an interest in this framework must connect the proposed blockchain based system to supply the quicker cheque clearance to its clients.Answers were proposed with a complete framework consisting of four main phases: (i) paper cheque clearing process, (ii) digital cheque issuing and clearing process, (iii) cheque fraud detection process and (iv) cheque transaction securing process.

The proposed framework depends on blockchain, and all banks keen on partaking should associate with the proposed blockchain-based framework to convey speedier really look at clearing to their clients. A complete architecture with four main stages was presented as a solution: systems for clearing paper checks, giving and clearing computerized checks, recognizing actually look at extortion, and protecting really look at exchanges. Ethereum, Python, and the Ripple structure were the essential advancements used to carry out the framework. The proposed arrangement is very versatile because of Ethereum's expanded respectability. The thought empowers a check going through process that is faster, less complex, and more secure for both the

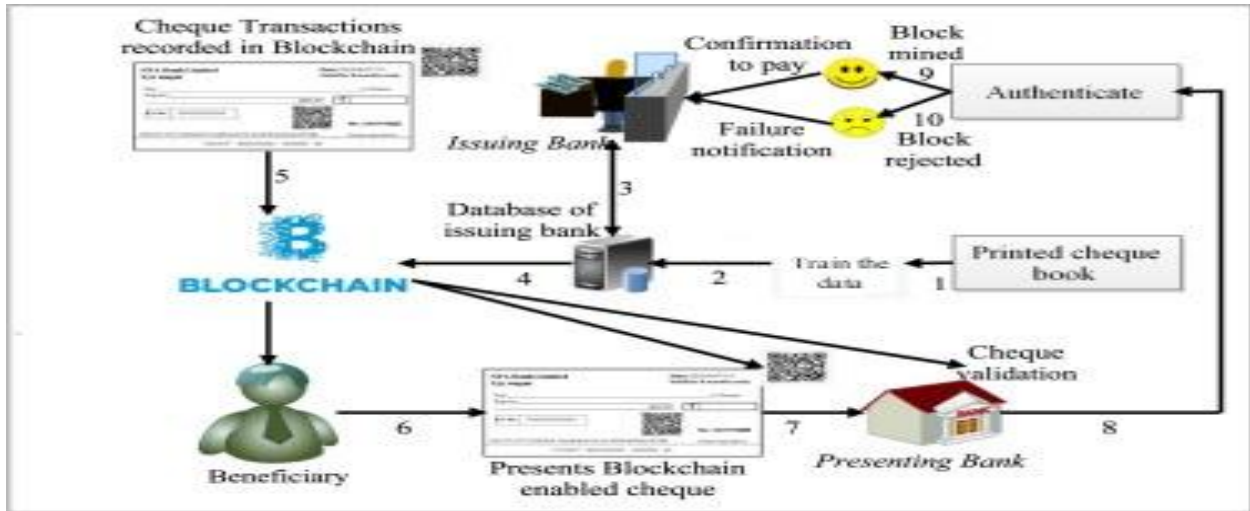client and the bank.

## SYSTEM ARCHITECTURE



Figure:5.1 System Architecture

### *View Credited Cheques*

Using this module user can retrieve all credited cheques from Blockchain

View Debited Cheques: using this module user can retrieve all debited cheques from Blockchain

In above screen user is entering signup details and then uploading his SIGNATURE template and then click on 'Register' button o complete signup process and here we can see this user matching signature is available in 3.jpg and while uploading cheque if I don't submit cheque with same signature then verification get failed

In above screen we can see signup process completed and now click on 'User Login' link to get below link

In above screen from drop down list user can select desired cheque receiver name and then upload cheque image and then enter amount and press button to digitize cheque.

In above screen in red colour text we can see 'Fraud Cheque detected' as user has not uploaded valid cheque and now upload correct cheque and see output.

In above screen now I am uploading correct cheque with valid signature as 3.jpg and then press button to get below output.
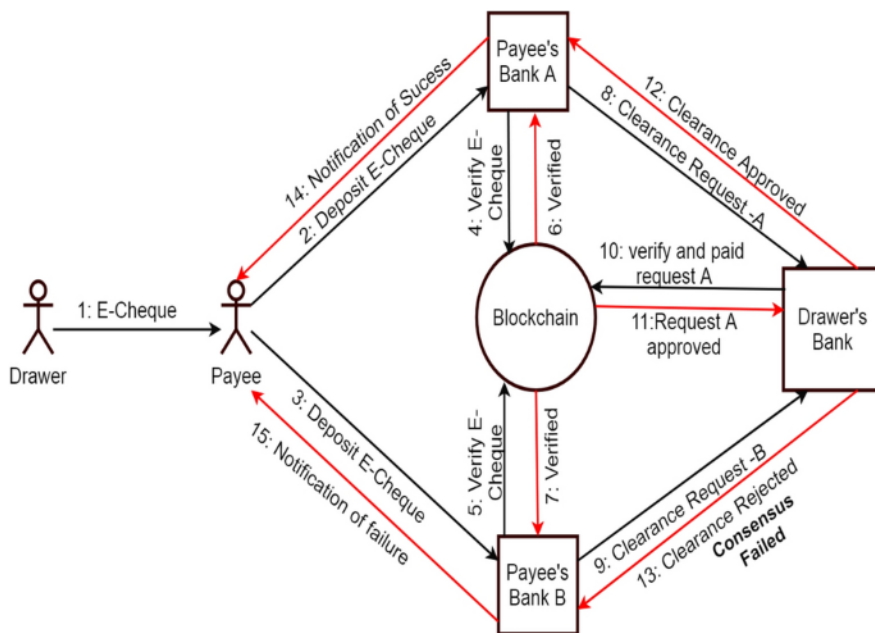


In above screen we can see cheque successfully digitized and now click on 'View Debited Cheques' link to get below output

## CONCLUSION

The block chain-based cheque issuing and clearing process. It will help to improve the functionalities of the cheque as well as improve and speed up the automation process. Furthermore, the digital cheques will reduce the costs combined with the paper cheque. Since this research component is based on blockchain based smart contact, the security of the cheque truncation system will be increased. Moreover, digital cheque will reduce the wastage of the paper and labor cost by replacing the paper cheque.The approach only analyzes the scope of three types of cheques; order cheques, cash cheques and dated cheques when clearing. CheckMate Mobile and web applications only supports English language for the moment. Ethereum which is a publicly available blockchain may lead for certain privacy and slowness issues than private or a federated blockchain. The principal restraint is that the methods must conform to specific bank cheque layouts, including color schemes from various banks including private and public banks. Other limitations that will be addressed in future research on the approach include the handling of defective and damaged cheques, background artwork and signatures written in multicolored ink.

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