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# Blockchain based E - Cheque Clearing and Verification

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**Abstract:** *This study work suggests a cutting-edge electronic check clearance system that is scalable. It is built on the blockchain, and all banks interested in using it must sign up for the proposed blockchain-based framework in order to provide their clients the speedier cheque clearance service. The suggested e-cheque solution is free from numerous security threats like e-cheque manipulation, double spending, and forged e-cheques. The suggested solution allows for the electronic or physical deposit of the e-cheque through teller machines. Because only 32.2% of nodes, on average, engage in the proposed trust-based consensus mechanism and because the number of messages exchanged during each consensus process is significantly lower than with the PoW strategy, the proposed system is highly scalable.*

**Keywords:** e-cheque

## I. INTRODUCTION

The MICR codes are printed On all checks and scanned by MICR readers to automatically identify the bank and branch of the drawer. Cheques are electronically transferred to the drawer's bank (scanned images of the cheques). The time it takes to clear checks is shortened by this method. In their discussion of numerous methods of forgery in digital cheques, Gjomemo et al. mention substituting a person's duplicate signature and altering the precision of the cheque amount using digital image processing techniques. To detect any cheque fraud, Rajendra and Pal [16] suggest a digital watermarking-based technique. The e-cheque framework's architecture is suggested by Anderson [1]. An electronic cheque system based on mutual drawer and payee authentication is proposed by Chang et al. large-scale e-governance applications based on blockchain, including

The main objective of the Blockchain Based Digital Cheque Clearance and Verification system is to develop an alternative to the regular and traditional Cheque Clearance system to faster Digital Cheque Clearance in very less time by the help of blockchain system

The traditional CITS which use Magnetic ink character recognition(MICR) and Optical Character Recognition(OCR) technologies which focuses on the features of watermarks, ultraviolet light (UV) rays, pantographic images and various microscopic features on the scanned copy of the manual cheque has a limited functionality. Therefore, inconsistency in name and amount, duplication of features using a photo editingsoftware, invisible ink usage, and damaged images may lead to security violations and consequently a forged paper cheque could be created

### 1.1 Project Aim:

The primary goal of the Blockchain Based Digital Cheque Clearance and Verification System is to create a replacement for the current and traditional cheque clearing system that will enable speedier digital cheque clearing in a short amount of time.

### 1.2 Problem Statement

The functionality of traditional CITS, which focus on watermarks, ultraviolet (UV) rays, pantographic images, and various microscopic features on the scanned copy of the manual check, is limited. These CITS use magnetic ink character recognition (MICR) and optical character recognition (OCR) technologies. Therefore, irregularities in the

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name and amount, the duplication of features using picture editing software, the use of invisible ink, and damaged photographs may result in security violations and ultimately result in the creation of a fake paper cheque

## II. LITERATURE SURVEY FOR PROBLEM IDENTIFICATION AND NEED OF PROJECT

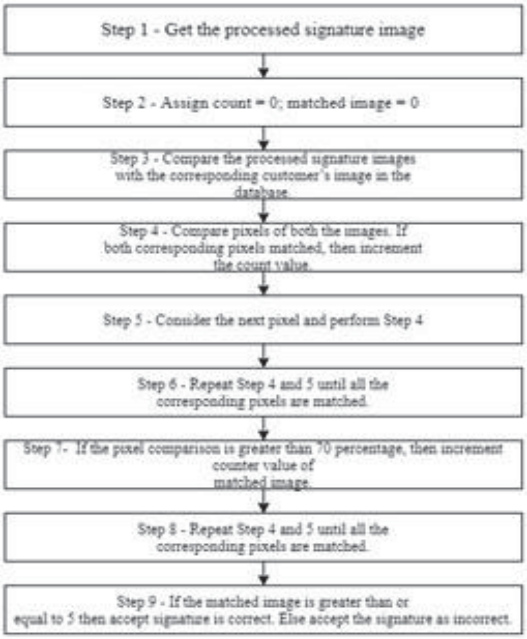
The 2008 global financial crisis imposed rigorous and rigid banking norms and regulations worldwide in an effort to stop and deflect a crisis of this nature from occurring ever again. Nguyen makes an effort to highlight the part played by blockchain technology in the creation of a financial system that is much more focused on the needs of the client and transparent. As an industry, Barclays is the first to use blockchain technology in its operations. Additionally, Santander began utilising blockchain technology for in-the-moment trade operations. The first blockchain application for the insurance industry is called InsurChain. Starbase also started utilising crypto-tokens for various types of crowd fundraising.

In their study, Guo and Lang explain how blockchain technology combines a number of other current computer technologies, including distributed data storage, peer-to-peer networks, distributed consensus mechanisms, and encryption techniques. By taking the bitcoin system into account, Coccoetal discuss the long-term growth and possibilities of blockchain as a banking technology in their study. Eyal talks on the function and potential of blockchain technologies to meet the needs. The authors carry out an experiment to determine whether the blockchain can be used in safe networks and surroundings while researching the numerous uses of the basic Bitcoin protocol

### 2.1 NEED OF PROJECT

The primary goal of the suggested solution is to use the CheckMate automated cheque clearing system to speed up cheque clearing and improve the security of cheque transactions. Customers could receive a 24-hour service from the suggested solution. Additionally, blockchain-based technology for mobile devices offers a framework for e-cheque clearance that enables users to effortlessly issue and clear both digital and paper checks using a straightforward mobile application loaded on their devices. The suggested answer is to use the CheckMate automated cheque clearing system, which is based on CheckMate software, to expedite the cheque clearing process and boost the security of cheque transactions.

The flow diagram of the algorithm used to implement the strategy is shown in Fig. Each customer's sample signatures must be captured and kept in the database. The removal of a signature from a bank check is a challenging process [7] because the backgrounds of the checks are intricate. Utilising the MATLAB tool, the
algorithm has been implemented



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**SHA Algorithm**

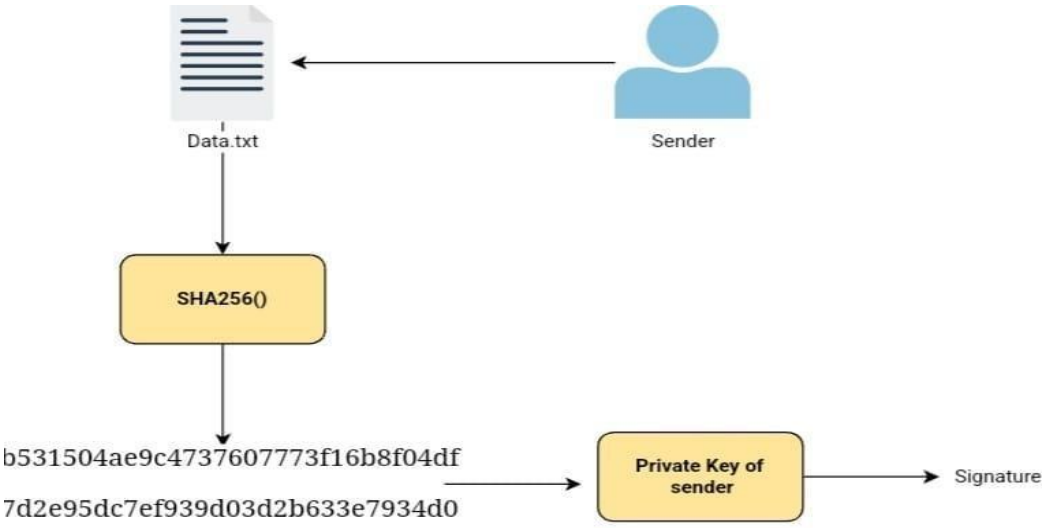
Secure Hash Algorithm, better known by its abbreviation SHA, is used to hash data and certificate files. Each item of data generates a distinct hash that is completely indistinguishable from any other piece of data. As a result of relying on the hash that is produced from the data, the subsequent digital signature is also unique. Secure Hashing Algorithm, or SHA. Data and certificates are hashed with SHA, a modified version of MD5. By utilising bitwise operations, modular additions, and compression functions, a hashing algorithm reduces the input data into a smaller form that is impossible to comprehend

SHA works in such a way even if a single character of the message changed, then it will generate a different hash. For example, hashing of two similar, but different messages i.e., Heaven and heaven is different. However, there is only a difference of a capital and small letter**.**

Secure Hashing Algorithm, or SHA. Data and certificates are hashed with SHA, a modified version of MD5. By utilising bitwise operations, modular additions, and compression algorithms, a hashing method reduces the input data into a smaller, unintelligible format.

**Digital signatures using SHA**

Transactions use digital signatures to maintain integrity, the information used in the transaction is hashed using SHA-256, and then it is encrypted with the sender's private key to generate a signature. The miner then verifies this signature to validate the transaction.




Digital signatures are used in transactions to ensure their integrity. To create a signature, the data used in the transaction is first hashed with the SHA-256 algorithm and then encrypted using the sender's private key. After that, the miner checks this signature to confirm the transaction.

## III. METHODOLOGY

The complete system Is implemented in four stages: (i) the paper cheque clearing process and error prediction algorithm; (ii) the paper cheque fraud detection process; (iii) the digital cheque issuing and clearing process utilising block chain; and (iv) the method for protecting cheque transactions. The methodology and approaches utilised for the four stages are explained separately in sections B, C, D, and E since different approaches were employed for constructing the full system and to better understand the system flow. The data sets used by the system are discussed in Section A

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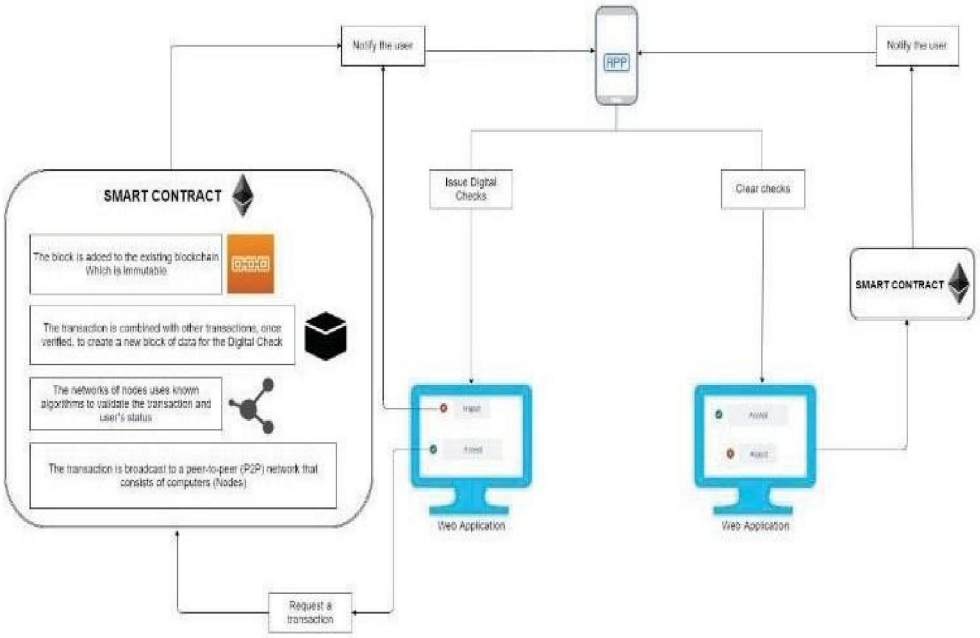
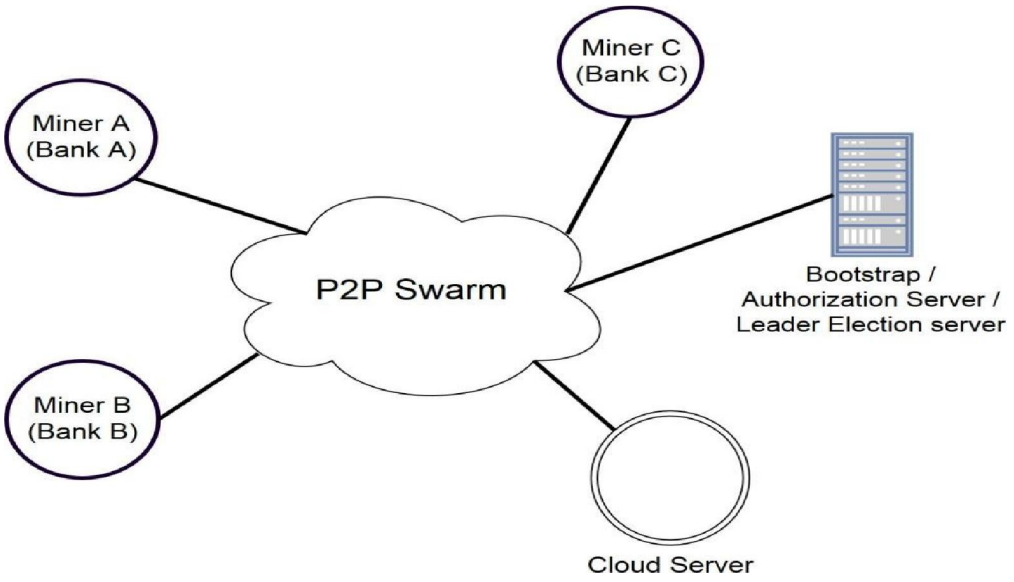
**Architecture Diagram**




**Proposed Network Architecture for e-Cheque System**

The proposed system's network architecture consists of entities like various participating banks and their replicated web servers, miner nodes for each of these web servers, cloud data centres, and some professional miners who might also be employed because they have cutting-edge hardware resources. As depicted in figure 3.1, a shared p2p swarm network connects all the miners, and all the participating banks use the same common blockchain. Each bank offers a gateway via which customers can generate and deposit electronic checks. The teller machine retrieves data from the bank's and the cloud data center's miners. Any customer who is depositing an e-cheque must use a teller machine that can read the barcode and scan the check. The closed blockchain will keep all of the customer-generated and deposited e-cheques as transactions



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## IV. REQUIREMENTS

Hardware Requirements

Minimum hardware requirements are very dependent on the particular software being developed by a given Enthought Python / Canopy / VS Code user. Applications that need to store large arrays/objects in memory will require more RAM, whereas applications that need to perform numerous calculations or tasks more quickly will require a faster processor.

- Operating system : windows, linux
- Processor : minimum intel i3
- Ram : minimum 4 gb
- Hard disk : minimum 250gb

## V. CONCLUSION

The research project's results include a block chain-based procedure for issuing and clearing checks. It will assist in enhancing and accelerating the automation process as well as the functionalities of the cheque. Additionally, when used in conjunction with paper checks, digital checks will save costs.

The blockchain-based smart contact used in this study component will strengthen the security of the cheque truncation mechanism. Additionally, by replacing paper checks with digital ones, paper waste and labour costs will be reduced. There are certain limitations to the suggested system.

When clearing, the technique merely examines the three sorts of cheques: order cheques, cash cheques, and dated cheques. For now, the CheckMate mobile and web applications only support English.

Since Ethereum is a publicly accessible blockchain, it may experience more speed and privacy difficulties than a private or federated blockchain. The main restriction is that the techniques must adhere to particular bank cheque layouts, including colour schemes from different banks, including private and public banks. Future studies on the method will address additional drawbacks, such as how to handle cheques with errors and damage, backdrop artwork, and signatures with many colours of ink.

## ACKNOWLEDGEMENT

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