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Land Holding Using Blockchain

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ABSTRACT: Blockchain has been found of great use in various sectors and this technology promises much more because of the high level of security it provides and blockchain provides us trade without the need of any mediators so Land holding system seems to be a very promising area of interest.
All the countries around the world are now implementing blockchain in the area of land registrations in India, we should also consider it as a viable option. The blockchain has provided major security benefits in diverse fields. Therefore, this land holding system is implemented using a blockchain architecture.
In India main problems in traditional land holding system include space constraints, fraud in land registry, lack of uniformity and poor maintenance of land records, lack of single window title verification and investigation system, fear of destruction of records by force majeure events. Therefore, a blockchain is prepared to aid these problems in order to solve these problems we have analyzed, identified and developed an application with the help of blockchain smart contracts. In this paper we are developing a land holding System to encounter the problems in traditional systems.

KEYWORDS: Blockchain, Landholding, Smart contracts, Xamarin and Security.

I. INTRODUCTION

Although Blockchain technology was found in 1992, the name started to rise when the bitcoin started to grow. A blockchain may be defined as a distributed database incorporating information or a book that marks all the events and transactions, executed and shared among concerned parties. The transactions are verified and information entered can never be erased. Every transaction made had a verifiable record. Blockchain Technology finds its use in financial as well as non-financial sectors. Blockchains are public registers such that all transactions are accumulated in list of blocks. Blockchain is a collection of blocks connected in form of a chain to provide a secure mode of storing data. Each of these nodes are connected using hash cryptography and the chains are distributed over a number of nodes in a network. This serves two important benefits, first, making the chain impossible to attack practically and second, eliminating the hold of a central authority over the data. The Blockchain has becomes very popular in recent times due to its various advantages in almost all of the fields. There are many large institutions around the world which have conducted research around it [14,15,16] and have appreciated its true potential. According to reports we see that the blockchain technologies has passed all the peaks of inflations in growth and still going on strong. It is estimated the technology will reach the efficiency periods in 5-10 years. After this period, it is expected to mature at the end of this period. As the chain is distributed and immutable the data on the chain is transparent and visible to everyone. Besides providing safety and transparency to the data, it also cuts the middle man cost, the delays and the human errors. Blockchain has become one of the safest and automated method of transferring data from one location to another. The chain is verified by thousands of nodes on the network and each block on the chain has a unique record with the unique history. Modifying a block would require modifying the entire chain on the majority of nodes within a short span of time, which makes it practically impossible to be tampered. In recent years these features of blockchain has made it popular in various fields ranging from health sector to supply chain. Basically, it can be implemented in any field involving transaction or transfer of data. [17]its peer-to-peer network and decentralized currency features remove the need of trusted financial intermediators.

There are many features provided by blockchain mainly consisting of Hash cryptography, consensus protocol, public and private keys and Distributed peer to peer connection.

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Difference b/w traditional and blockchain landholding registration

Table I- Differences between different landholding systems

• Traditional Landholding	• Landholding using Blockchain
• Data Security a challenge • The registry being manual is prone to error and theft. • Transactions are not monitored properly. • Involves extra cost by middleman	• Blockchain provides cryptography and consensus mechanism to make data secure and intangible. • The process becomes automated reducing the chances of error. • The transactions are carried out using digital currencies and are 100% monitored. • No extra cost incurred.

A. Objectives

- **Eliminating the cases of Fraud**

In the past there have been many cases of fraud. Double selling the property, fake registries etc. These cases have been major problem victimizing many people. Using blockchain these frauds can be eliminated. The properties and transactions are stored on Blockchain and blockchains have important properties of transparency and immutability. The transactions are visible to everyone hence allowing people to verify against double selling. The data stored on blockchain is immutable i.e., cannot be modified, eliminating the chances of fake registries.

- **Automating the process and saving middleman cost**

Blockchain allows to ensure trust with minimal human intervention. The purchase and registry process gets automated saving time as well as minimizing human intervention. Less human involvement guarantees less chances of human error. There is no need to pay any extra fees to a Central authority for validating transactions and providing trust. Blockchain provides an internal mechanism for secured transactions which are also immune to any frauds. This automation also makes the management of records easier.

- **Making transactions secure and surveilled**

All the transactions are carried out digitally using crypto currency and hence can be easily monitored. The use of public private key pair allows to uniquely identify the owner of the transaction. Signing using private key guarantees that the payee can be traced back anytime. Monitoring of these transactions provide a major advantage of eliminating any kind of black money involved. As currency used is blockchain based, therefore it is more secure and theft proof.

II. LITERATURE SURVEY

Blockchain offers various important features for securing data and carrying out transactions. In its initial years it was majorly used for cryptocurrency transactions but now in the present time it has found applications in almost every field [11,13]. Kshetri describes the potential benefits of blockchain for the developing countries [1]. This study talks about the potential of blockchain to bridge up the gap in the formal institutions. Lack of proper governance has resulted in land holdings in more than 61 countries. Blockchain provides transparent temper proof ledger of transactions ensuring transparency. [12] The main features of blockchain that make it useful in the registration field are immutability, decentralization, and traceability. In paper [2] talks about the challenges in the property and land system and how blockchain based technologies can address these challenges. Study by Goldman Sachs estimated an annual saving of 2 to 4 billion dollars implementing blockchain in real estate. This study also focuses on potentially replacing the expensive and timeconsuming functions with blockchain and smart contracts. [3] focuses on the legal side of the blockchain in real estate. The study talks about blockchain effectively implementing all the necessary criteria without relying on any legal body. Blockchain also eliminates any third party for enforcing the rights and controlling transactions. [4] talks about the vulnerabilities and how people use these to exploit the government. This paper majorly talks about the consensus protocol for providing security. [5] describes the implementation of blockchain in the land registration system in Europe. This study talks about the advantages including increase trust and efficient processing accompanied with cost reduction but also raises concern of lack of independent verification and external control on the transactions being carried out. Also describes the controversies related to the Blockchain land holdings in Europe.

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[6] describe the shift from electrical to blockchain-based land registry system in Germany. The study talks about major benefits circling around the core functionalities of blockchain and also talks about the obstacles legal and technical issues faced by the system. Also compare the system with the ongoing project in different countries and the major challenge of shifting the existing data to the blockchain. [7] talks about the present scenario of landholding system in India focusing on issues and pending disputes in the Indian courts. It describes a multi blockchain system where each blockchain is used for storing different kind of data and connecting the blockchains to form a land holding system. [8] talks about the land disputes in Cyprus and how blockchain as a potential for countering these problems. The study highlights the blockchain technology acting as a tool to resolve property right disputes on the island. [9] talk about a similar situation in Netherlands. It describes multiple propose solutions in volume blockchain technology for improving the real estate sector. At the same time the study talks about social implications emphasizing on the need for bringing entire value chain in favor of blockchain. it raises a major question of whether blocks in being a real game changer or just a technological disruption.

In the past few years, studies have been carried out in many countries, especially in developing countries for replacing the traditional land holding system with blockchain based solutions. The major motive is to improve the data security and efficiency in terms of cost and speed.

III. CONTRIBUTION

Traditional Land Holding systems since the very start have been vulnerable to many problems and faults. People have exploited these vulnerabilities for their personal benefits. Various problems like frauds, manual errors, black money etc. have been posing a constant threat to the financial systems. The idea behind this is to target and solve all these issues.

A. Blockchain Architecture

The entire paper is divided into three phases

1. Creating blockchain architecture
2. Creating a front end for property listing
3. Designing a wallet for carrying out transactions

1. Creating blockchain architecture

This is the first step that lays down the foundation of blockchain system. Design of blockchain, format of the blocks and a front end to display our blockchain. This acts as the backbone of the entire system. The first block of the blockchain is called the genesis block. This block is created when program is executed for first time. It stores the details of the miner and a 50-currency transaction which is awarded for mining the block. The transactions are stored in the blocks and these blocks are attached to form the chain using hash cryptography. sha 256 algorithm is used to generate the hash values. Every block has its own unique hash which acts as a fingerprint for the block. The block contains details like sender receiver and amount.

This step has two units:

- Blockchain front end
- Blockchain client

a. Blockchain front end

Front end includes mining and refreshing for mining the transactions and displaying the mined transactions. It has two more pages Coinbase and configure. Coinbase displays all the blocks including their details and the order in which they are connected and configured page allows us to connect and add more nodes to implement consensus protocol and distributed peer to peer network.

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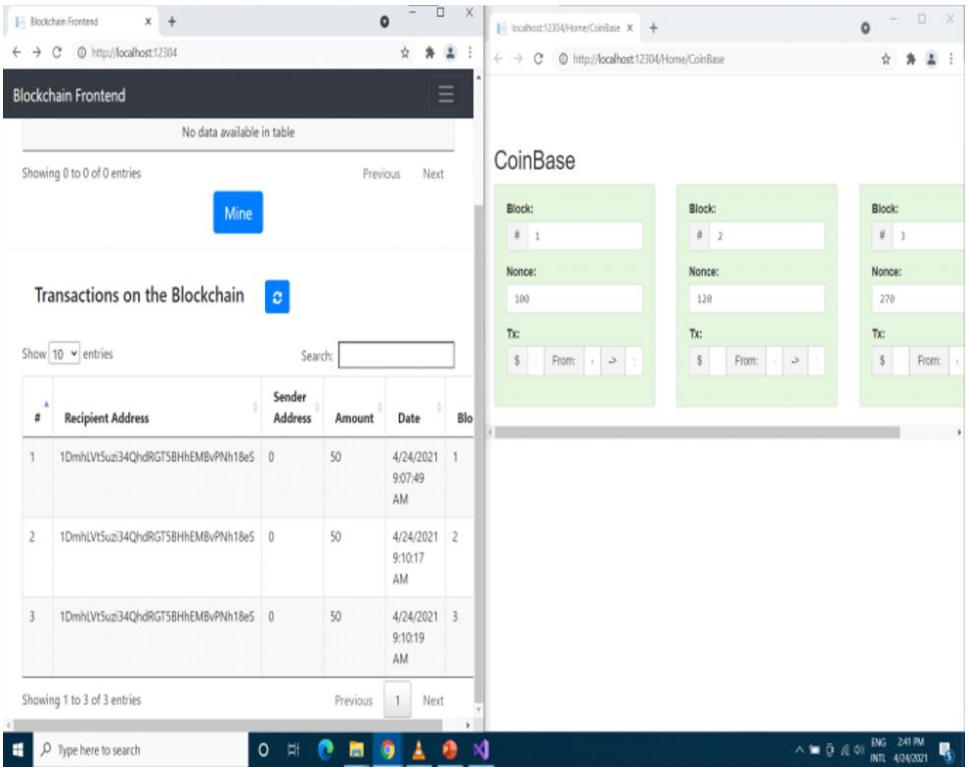

Figure I- Blockchain Front end

b. Blockchain Client

The blockchain client, it allows to generate public and private keys for wallet to make transactions and display the wallet transactions. This functionality in the first phase allows to test the blockchain and see whether all the transactions are being stored properly.

2. Creating a front end for property listing

The second step of the project is to create a front end displaying the details of all the properties. This act as an intermediate between the wallet and the Blockchain. It displays various details of the properties live location cost a video walk around and a QR code. Here QR code is one of the most important attributes as it stores the price and the owner details. By scanning the QR code in mobile wallet all the details are displayed in the mobile app. Then choose to pay the amount to buy the property by clicking pay option. This frontend establishes a connection between the blockchain and the wallet. The basic conditions are checked which include user ID and wallet balance. If the wallet balance is sufficient the transaction is approved and is ready to be mined in the next block. Click the refresh button on the blockchain front end to see the details of transaction and click mine to add the block to the blockchain. This front end serves two major purposes first displaying the details of property to the user second allowing communication between blockchain and the wallet.

3. Designing a wallet for carrying out transactions

The third and the final step is to design the wallet. Xamarin platform is used to design the wallet. The wallet includes functionalities like saving keys scanning QR code and viewing transactions. The first step in the mobile wallet is to save the keys. This connects the wallet to the blockchain. Now user have two options one is to scan and pay and the other is to view all the transactions. Clicking on scan QR code, camera pops up, scan the QR code present on the webpage. On scanning the QR code one can see the details of the property. Then choose to pay or scan other QR codes. On clicking pay button a background check is done on the blockchain end and if the transaction is good to go a popup is displayed with the message transaction being successful. On clicking view transactions one gets all the details including current balance amount spent amount received and the entire history of their transactions. The wallet is the outermost layer which interacts with the user.

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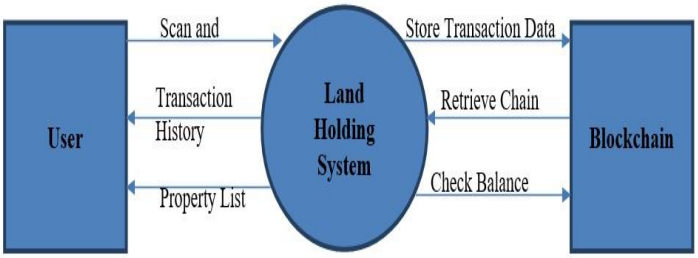
Complete Transaction Flow Algorithm-

- User scans QR code using mobile app.
- Relevant details including cost and receiver address are fetched.
- On clicking pay the control moves to web page.
- Web page forwards a balance check request to blockchain.
- If the minimum balance is satisfied the transaction is ready to be mined on the next block.

A confirmation is forwarded to wallet via webpage regarding successful completion of transaction.



Level 0

Figure II- Transaction flow

IV. RESULT

Land holding system is implemented using blockchain. It provides security to the data and makes it transparent at the same time. It successfully counters all the problems present in the traditional landholding system. Transaction data is protected using hash cryptography and is immune to any kind of modification or deletion. Also, the distributed peer to peer network and consensus protocol provides additional security to the data. It was developed in three stages first creating a blockchain second developing a front end for interacting with user and third creating a wallet for carrying out transactions. The blockchain front end provided a user-friendly displaying of blockchain data. Coinbase provided individual details of the blocks and the manner in which they are connected. The webpage display details of all the available properties along with their price and a QR code to carry out transaction. This webpage also acted as an interface between the blockchain and the wallet. The wallet is the outermost layer of the project which interacts with the user and allows the user to purchase property out of the list. Wallet was developed using Xamarin platform. QR code is scanned using the mobile wallet. The wallet fetches the details of property and user clicks on per button to purchase the property. The transaction is stored on the blockchain as soon as it is mined by a miner. the sold property is unavailable for the transactions. Hence eliminating the scenario of double selling. This provides a new and improved method to carry out land holding transactions with major benefits including fraud protection cutting the middle man cost speeding up the entire documentation process and eliminating human error.

V. CONCLUSION AND FUTURE PLAN

This work successfully tackles the drawbacks of traditional landing system. It ensures safety of our data and also keeps it transparent. All the blockchain properties play major role in enhancing their respective areas. The hash cryptography and consensus protocol provide data security and immutability. Public private key pair allows to monitor the transactions and automating the entire process reduces chances of human error. It has a major impact on the present a system. It eliminates all kinds of fraud, cuts the middleman cost and reduces chances of human error. Basically, it provides a new improved approach to the present land holding system which is more efficient in terms of security, time and cost. Still there is some scope for improvement. The user interface could be improved making it more interactive. The web page would also be enhanced providing a better user experience. Some other functionalities including background verification for loan can also be incorporated in the future.

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