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SECURE LAND REGISTRATION USING BLOCKCHAIN

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Abstract - The current land registration system in India involves a paper-based approach that is susceptible to fraud, errors, and security risks. The traditional method is time-consuming and involves a complex documentation process, which contributes to the rising cases of fraudulent activities. The blockchain model offers an immutable and decentralized public ledger that can enhance the accuracy and security of land records. Removing middlemen, the blockchain land registry platform can accelerate the validation process of land ownership, reduce costs, and decrease the time required for land registration. Prevent fraud, store land ownership records, and facilitate ownership transfer through cryptographic algorithms and smart contracts.

Keywords: Land Registration, Blockchain, Smart Contract, Secure .

1.INTRODUCTION

Land registration is a process of recording detailed information regarding land, such as ownership and property size. Currently, India uses a paper-based land registration system, which involves physically registering the land system is not transparent, recording of property sales is challenging, and storing data is also inadequate in terms of data security. Which causes fake identities, forged papers, and absolute loss of information. “Secure land registration using blockchain” is a digital approach for selling and buying land in a decentralized manner using blockchain. Proposed system based on blockchain technology which ensures data integrity and secure transaction

Land registration is a critical aspect of property ownership, ensuring legal rights and preventing disputes. Traditional land registration systems are often prone to inefficiencies, corruption, and fraud. Blockchain technology offers a promising solution by providing a secure, transparent, and immutable ledger for recording land transactions. This paper explores the concept of using blockchain for secure land registration, discussing its potential benefits, challenges, and implementation strategies. We analyze existing blockchain-based land registration projects, examine their strengths and limitations, and propose a framework for a robust and efficient blockchain-based land registration system. Our framework considers key factors such as scalability, interoperability, governance, and regulatory compliance to ensure the successful adoption of blockchain technology in land registration processes.

2. METHODOLOGY

A. Approach

To overcome multiple problems discussed earlier, blockchain implemented by hyper ledger fabric was proposed to replace the existing system. The Hyperledger fabric is a blockchain platform that is an open source and business specific distributed ledger technology. The working has been divided into 2 modules where module 1 gives a detailed description of the working of the administrator with regards to registration and invoking the smart contracts whereas module 2 gives a detailed brief of procedures related to change of ownership and completion of the purchasement of land. to register a land to their name. The platform is handled by an admin peer who acts as a super admin and manages all transactions and records.

1) Register Users : The admin adds users to the platform by filling in a form with their details that include their name, email, phone number, their unique identification (like Aadhar and pan card) details, their occupation, their account balance, their electricity bill to verify the address entry and the criminal history details of the user

2) Register Land : The admin then adds the land asset record by filling a form that contains the land identity number, the location of the land, the type of land, the price of land in units, the size of the land in acres, the 7/12 contract details to verify the land, the corresponding contract number and finally the identity number of previous owner and the current owner of the land.

3) Put a land for Sale : When requested by the User (owner) to put his land for sale, the admin invokes the Put For Sale transaction that in turn invoke the smart contract that contains the business logic for putting his land for sale

a) Changing Owner : The current owner is assigned to the previous owner attribute, while the buyer is assigned to the new owner attribute of the land asset.

b) Money Transfer : The seller gets the amount he quoted on the land into his account, while the buyer has to pay the quoted price along with some additional charges like the stamp duty and registration fee (to the registrar). The value of the fees vary from time to time and city to city.

c) Initializing state of land : The land asset now belongs to the new owner. It is up to him to put the land for sale or not. So this attribute

of the land is reset for the new seller until he decides to sell the land later

Proposed Framework

The proposed framework consists of several components designed to ensure the security and integrity of land registration records. These components include:

Blockchain Infrastructure: Establishing a blockchain network for recording land transactions, utilizing either public, private, or consortium blockchains based on specific requirements.

Smart Contracts: Implementing self-executing smart contracts to automate land registration processes, including transfer of ownership, payment of fees, and validation of transactions.

Consensus Mechanisms: Selecting appropriate consensus mechanisms such as Proof of Work (PoW), Proof of Stake (PoS), or Practical Byzantine Fault Tolerance (PBFT) to achieve consensus among network participants.

Data Encryption: Employing cryptographic techniques to encrypt sensitive land registration data, ensuring confidentiality and privacy.

User Authentication: Implementing robust authentication mechanisms to verify the identity of users participating in land registration transactions.

Interoperability: Ensuring interoperability with existing land registration systems and regulatory frameworks to facilitate seamless integration and adoption.

3. IMPLEMENTATION

This section outlines the practical implementation of the proposed framework, including the selection of blockchain platform, development of smart contracts, deployment of nodes, and integration with existing land registration systems. It also discusses the role of regulatory bodies and government agencies in overseeing and regulating blockchain-based land registration.

Benefits of Blockchain-based Land Registration

Blockchain-based land registration offers numerous benefits, including

Transparency: All transactions recorded on the blockchain are transparent and accessible to authorized parties, reducing the risk of fraud and corruption.

Security: Blockchain's immutable ledger ensures the integrity and security of land registration records, minimizing the risk of tampering or unauthorized modifications.

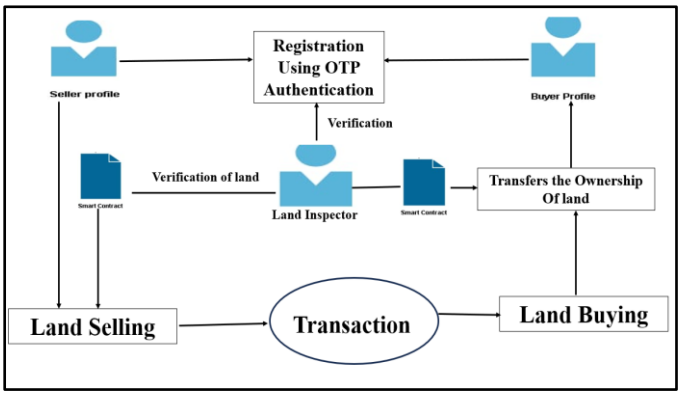


Fig.1 System Architecture

Efficiency: Automation of land registration processes through smart contracts improves efficiency, reduces paperwork, and eliminates intermediaries.

Cost-effectiveness: By eliminating the need for intermediaries and reducing manual processing, blockchain-based land registration can lead to cost savings for governments and property owners.

4. MODELING AND ANALYSIS

Land registration needs special attention to all its constraints. If a seller wants to sell a piece of land to the buyer A at a certain price x while to the buyer B at price y. The buyer A should be unaware of the price quoted to buyer B and vice versa. In this way the seller can deal with his buyers in a more personalized manner. Such transactions are possible only when using a permissioned blockchain network. This would not only help in increasing confidentiality of data among multiple customers, but also maintain the privacy of the business between the buyer and the seller. Other participants involved in the business are also not aware of the internal details of the deal. They only focus on whether the transaction can be validated according to the constraints specified in the smart contract. Blockchain technology has many approaches to a different problem statements. All these approaches have to be compared and based on the analysis the best approach for the current problem has to be selected.

Future Directions: The future of blockchain-based land registration holds promise for further innovation and development. Potential areas for future research and improvement include scalability solutions, interoperability standards, regulatory frameworks, and the integration of emerging technologies such as artificial intelligence and Internet of Things (IoT) devices.

5.RESULTS AND DISCUSSION

Capable of increasing transparency over ownership and valuation as well. In future, we will develop a prototype in the Ethereum blockchain platform, to show the stability, security, and effectiveness of our proposed system in land administration System is upgraded further and integrated with useful API then this will lead to faster transactions and will eventually lead to the easement of the entire process, thus making the entire system hasslefree and convenient in the long run which would be beneficial to the mankind. As our im-plemented system is currently subjected to deployment of transactions where we directly make use of all the documents which are already verified manually by the authority, in future our scope could be expanded by integrating our system with government API. By doing so we can verify the users and their deeds automatically in a simple manner. Also,incorporation of a language translation tool can be done to users who speak their nativelanguages. Lastly, we can also keep a track of the entire history of a piece of land and add various dimensions to our system and thus making it more reliable and user friendly.

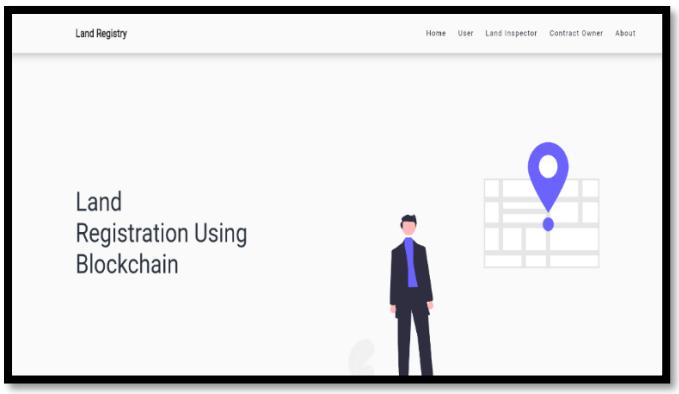


Fig 2. Home Pages of Land Registration System

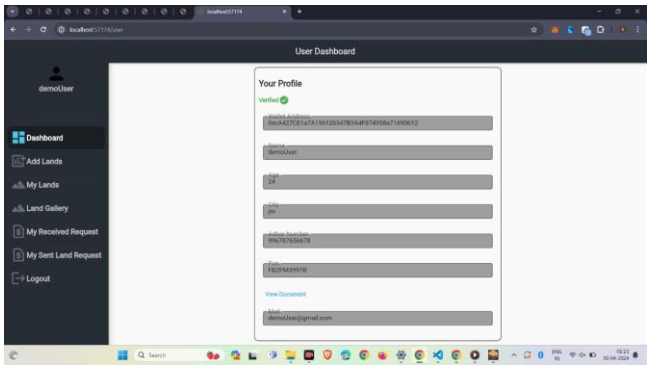


Fig 3. Create User Profile

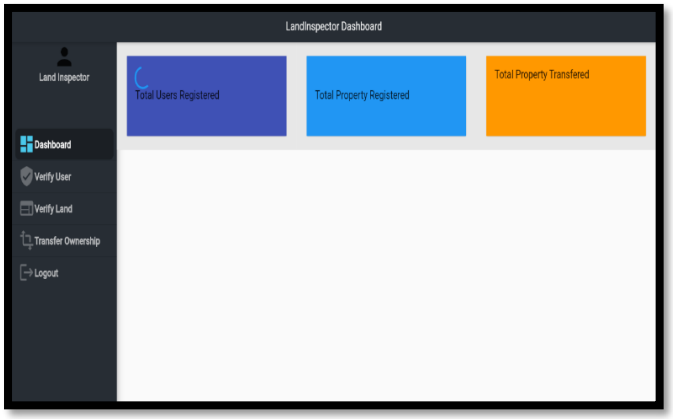


Fig 4. Land Inspector Dashboard

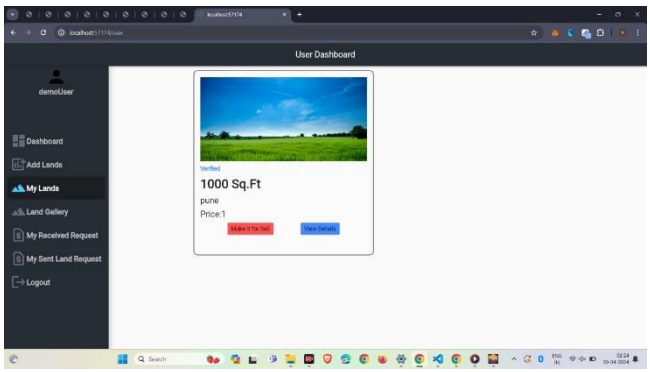


Fig 5.View Land

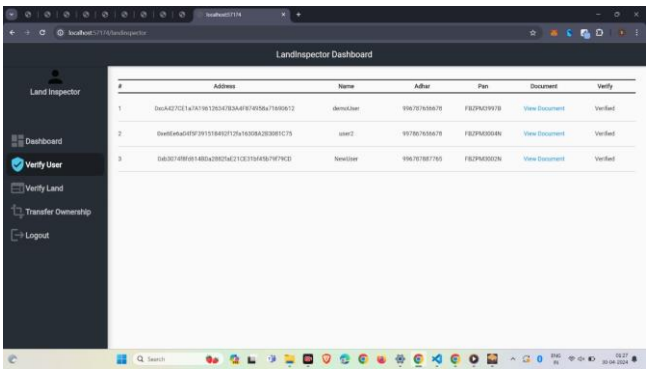
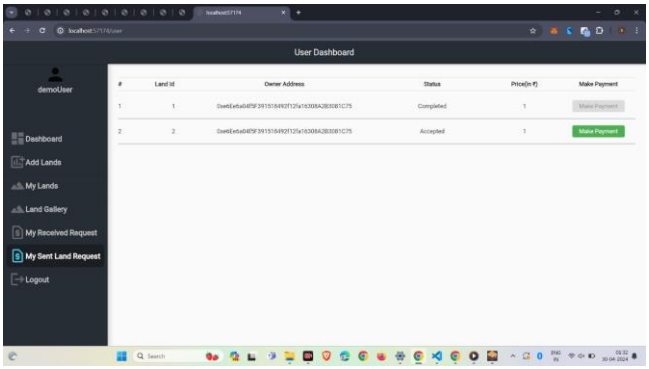


Fig 6. Verify User



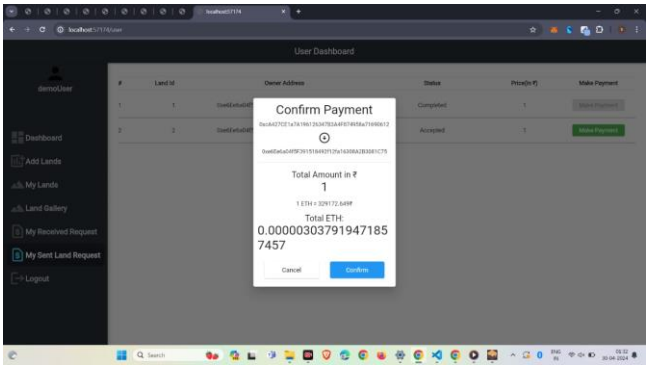


Fig 7. Make Payment

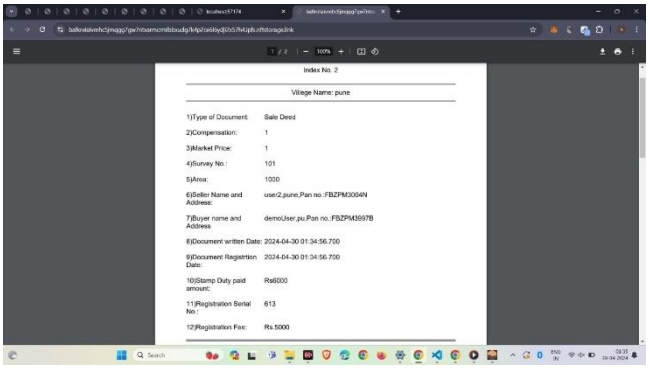


Fig 8. Sale Deed Document

6. CONCLUSION

In conclusion, blockchain technology offers a transformative solution for secure and transparent land registration. The proposed framework provides a comprehensive approach to implementing blockchain-based land registration systems, addressing key components such as smart contracts, consensus mechanisms, data encryption, and user authentication. While challenges exist, the potential benefits of blockchain-based land registration are significant, paving the way for more efficient, secure, and inclusive property ownership systems. We proposed a secure, smooth and easy to use platform to facilitate land registration. Blockchain-based land registry systems might offer a decentralized answer to the issue of public corruption, privacy breaches, and mismanagement. Blockchain is one of the most secure ways of storing data without it being changed. It is a distributed ledger that is open to anyone and once data is put into it, it is very difficult to change or meddle with it. Using this property of blockchain we want to put it to use into one of the most fraudulent systems in India, the Land Registration System. Our system uses blockchain with the employment of hyperledger. This gives rise to a system that is more evolved and features all the activities like buying and selling in an efficient and reliable way. Blockchain technology made this system secure and faster. If this kind of system is upgraded further and integrated with useful API then this will lead to faster transactions and will eventually lead to easement of the entire process, thus making the entire system hassle free and convenient in the long run which would be beneficial to the mankind.

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