

# ETHEREUM BLOCKCHAIN- BASED SECURE LAND REGISTRATION MANAGEMENT

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**ABSTRACT:** The transfer of land ownership is a significant yet cumbersome process plagued by paperwork, intermediaries, and verification hurdles, leading to reliability issues and increased forgery risks. Leveraging blockchain technology offers a solution by revolutionizing the land registration system. Blockchain's decentralized and immutable ledger eliminates intermediaries, reducing corruption and enhancing speed while instilling trust without centralized oversight. Through cryptographic techniques, consensus mechanisms, and hashing algorithms, blockchain ensures transparent and immutable transaction records. This work aims to develop a user-friendly blockchain-based land registration system to streamline processes while upholding security and trust. In regions like India with high volumes of land transfers, the excessive paper usage can be mitigated, benefitting both the environment and accessibility to technology for common people. By facilitating a transition from manual paperwork to digital records, this system not only modernizes land registration but also contributes to environmental conservation and technological inclusivity.

*Keywords—Blockchain, Land Registration, Security, Consensus, Immutable, Decentralized.*

**1. INTRODUCTION:** Land ownership and rights registration is a fundamental function of government organizations worldwide, crucial for maintaining property records, facilitating business transactions, and preventing fraudulent activities [1]. Across different countries, stringent laws govern land distribution and ownership, necessitating adherence to specific rules for land and property sales [2]. However, despite robust regulations, the current land registration system faces numerous challenges, including fraudulent transactions and unreliable property records [3]. Sale documents often lack clarity on ownership, relying heavily on historical records for verification, leading to disputes and conflicts [4]. In many regions, land documentation processes remain outdated and reliant on paperwork, resulting in inefficiencies and risks such as document loss or destruction [5]. While some areas have centralized land documentation systems, others still rely on traditional paper-based methods, leading to disparities and inconsistencies in land records

management [6]. The reliance on centralized databases administered by government authorities can also contribute to disputes and lack of transparency in land transactions [7].

To address these challenges, blockchain technology emerges as a promising solution [8]. Blockchain's decentralized and immutable ledger offers transparency and certainty in land ownership transactions, mitigating the limitations of centralized systems [9]. By decentralizing data storage and transaction execution, blockchain reduces reliance on centralized authorities, fostering trust and efficiency in land transactions [10]. Platforms like Ethereum provide a secure environment for executing logic over decentralized data, leveraging blockchain's decentralized storage system [11].

The aim of this study is to explore the potential of blockchain technology, particularly Ethereum, in revolutionizing land registration systems. By analyzing the limitations of current centralized land registration systems and the benefits offered by blockchain technology, this research seeks to propose a more secure, transparent, and efficient approach to land ownership registration. Through case studies, empirical analysis, and theoretical frameworks, this study aims to demonstrate the feasibility and effectiveness of blockchain-based land registration systems in overcoming the challenges faced by traditional methods.

Furthermore, this research aims to contribute to the existing literature by providing insights into the implementation and adoption of blockchain technology in the domain of land registration. By identifying best practices, challenges, and opportunities, this study seeks to inform policymakers, government agencies, and

stakeholders about the potential of blockchain technology in transforming land registration processes. Additionally, this research aims to highlight the socio-economic implications of adopting blockchain-based land registration systems, including enhanced trust, reduced fraud, and improved accessibility to property rights.

In summary, this introduction provides an overview of the challenges faced by traditional land registration systems and introduces blockchain technology as a potential solution. By outlining the objectives, scope, and significance of the study, this research aims to contribute to the advancement of land registration practices and promote the adoption of blockchain technology for more efficient and transparent land ownership management.

## **2. EXISTING SYSTEM:**

In literature they highlights issues, such as minimal transparency, accountability, incoherent data sets with different Government Departments relating to the same portion of land and delays in the current Land registry management process. They describes the current process of land records maintenance and land registration in the country. It emphasizes on the importance of smart contract for land registry applying the Blockchain.

### **Disadvantages:**

- 1.The existing work acknowledges minimal transparency and trust in the system.
- 2.The existing work points out delays in the current land registry management process.
- 3.The existing work does not explicitly address security concerns.

## **3.PROPOSED SYSTEM:**

We propose a secure land registration system using Ethereum blockchain. This will decrease corruption in the process by removing middlemen from the process. Also, it will increase the speed, and create trust in the system without even the involvement of any central agency. This system will use smart contracts, cryptographic algorithms, and consensus mechanisms to develop a userfriendly land registration system. Smart contracts are self executing contracts that have the contents of the agreement between sellers and purchasers directly put into lines of code. The code and the agreements found in it exist across a dispersed, open blockchain network. Without the requirement for a centralized authentication system, a formal legal framework, or an external compliance mechanism, smart contracts enable the execution of reliable transactions and agreements between dispersed, anonymous parties. They make transactions clear, irreversible, and traceable. The aim of this work is to develop a user-friendly, blockchain-based land registration system to ease the process while maintaining security and trust.

#### **Advantages:**

1. Our work emphasizes security through cryptographic algorithms, consensus mechanisms, and the tamper-resistant nature of blockchain technology.
2. Our work promises to increase the speed of transactions and streamline the registration process through automation and smart contracts.
3. Our work addresses this by creating a decentralized, trustless system through blockchain technology, ensuring transparency and trust without relying on central agencies.

#### **4. MODULES:**

To implement this project we used the following modules are user, seller.

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These modules description given below:

#### **User Registration**

Individuals seeking to participate in land transactions register by providing personal information including name, contact details, and address. Upon submission, the system generates unique login credentials comprising a username and password for each user. These details are securely stored in the system's database, ensuring confidentiality and accessibility for future reference. This streamlined process facilitates user access and enhances security in land transaction engagements.

#### **Central Authority LOGIN**

The centralized authority manages user registrations and land transactions for oversight and control. Upon logging in with secure credentials, the authority reviews and processes user registration requests, either approving or rejecting them based on specified criteria. Additionally, the authority manages land registration requests, ensuring compliance with regulations and standards. Through these actions, the centralized authority maintains control and oversight over the registration and transaction processes, promoting accountability and regulatory compliance.

#### **User LOGIN as Seller**

Sellers utilize this module to engage with the system, adding their land details for sale and monitoring request statuses. Upon logging in with unique credentials, sellers input land details along with ownership proof and relevant documentation for sale. They can then track the status of their land registration requests, staying informed about

approvals or any necessary actions required. This streamlined process empowers sellers to manage their land transactions efficiently within the system.

### User Login as Purchaser

Purchasers access the system to explore and track land transactions. After providing login credentials, purchasers browse through a list of available lands for purchase, viewing relevant details. They can then monitor the progress of their purchase requests, ensuring transparency throughout the transaction process. This streamlined approach empowers purchasers to efficiently navigate the system, facilitating informed decision-making and enhancing their overall experience in land transactions.

## 5.ALGORITHMS:

### Algorithm 1: Registration

**Input:** Aadhar number, PAN, Mobile number, Wallet address

**Output:** Confirmation of user registration

Begin

**Step 1:** Run the dApp

**Step 2:** Enter the required details and register

**Step 3:** Verification of details by central authority

**Step 4:** If (details are correct, user is registered move to next step

Else (Goto step 2)

**Step 5:** Add land details

**Step 6:** Verification of land by central authority

**Step 7:** If (verification is successful move to next step)

Else (Goto step 5)

**Step 8:** Land is added successfully and ready for sale

End.

### Algorithm 2: Transaction

**Input:** Khasra number of required land

**Output:** Transfer of land ownership

Begin

**Step 1:** Enter the khasra number of desired property

**Step 2:** Send buy request

**Step 3:** If (request accepted by seller goto next step)

Else (End the process)

**Step 4:** Initiate payment request

**Step 5:** Verification by central authority.

**Step 6:** If (verification is successful goto next step)

Else (Goto step 4)

**Step 7:** Ownership transfer successful

End.

## 6.GANACHE:

Ganache serves as a user-friendly interface facilitating Ethereum blockchain activities in the project. It presents critical details such as accounts, transactions, and smart contracts, offering a

convenient platform for users to interact with the Ethereum blockchain.

Ganache provides insights into individual blocks, offering crucial information like block numbers, timestamps, transactions, and gas usage. These insights aid in comprehensive blockchain analysis, enhancing the understanding of the system's performance and transaction dynamics within the project.

Ganache is employed to access data on the local Ethereum blockchain within the project. It encompasses information related to land record storage, system specifics, and user interactions, contributing to the overall functionality and data management of the project.

**7.METAMASK :**

MetaMask is integrated into the project as an Ethereum wallet and browser extension. It enables users to manage cryptocurrencies and access decentralized applications (DApps) seamlessly within the project's ecosystem.

MetaMask is utilized in the project for secure Ethereum transactions. It ensures transparent ETH deduction and efficient transaction processing, enhancing the security and reliability of financial interactions within the project.

**8.RESULT:**

Purchased By	Purchased From	Request Id	Land Size	Address	Price	Type	Amount Paid	Photo
name	name	3	200 square yards	Hyderabad	3000000.0	residency	4000000.0	

Fig 1 out put

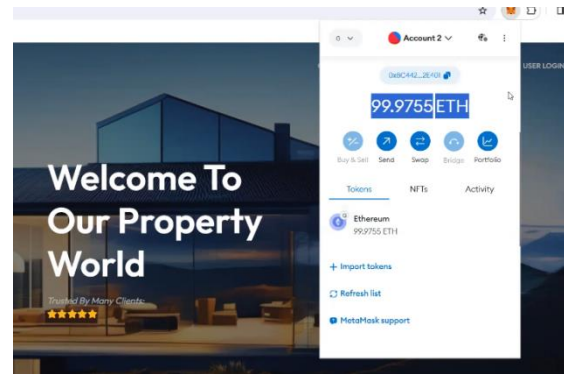


Fig 2 meta mask

BLOCK	MINED ON	GAS USED
92	2023-12-18 17:05:45	135476
91	2023-12-18 17:00:57	135214
90	2023-12-18 17:02:48	134984
89	2023-12-18 16:57:23	134974
88	2023-12-18 16:57:12	80600
87	2023-12-18 16:56:59	81130
86	2023-12-18 16:56:28	80800
85	2023-12-18 16:55:33	28645
84	2023-12-18 16:55:33	873267
83	2023-12-18 16:55:33	45745

Fig 3 ganache

**9.CONCLUSION:**

In conclusion, the development of a user-friendly blockchain-based land registration system marks a significant advancement in streamlining the complex process of transferring land ownership while minimizing paperwork. The project's decentralized approach effectively addresses corruption issues by removing intermediaries, thereby enhancing reliability and reducing the likelihood of forgery in land registration processes. Leveraging blockchain technology accelerates land registration procedures by eliminating multiple verifications, resulting in a more responsive and efficient system. Furthermore, the project's positive impact extends to environmental sustainability by reducing paper use in land record maintenance. By promoting technology adoption and eliminating

manual paperwork, especially in regions with high land transfer rates like India, the project contributes to environmental conservation efforts. Overall, the successful implementation of the blockchain-based land registration system not only enhances efficiency and reliability but also promotes transparency, trustworthiness, and environmental responsibility in land registration processes.

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