

Secure Land Registration

Aniket Andhale
SKNCOE BE Computer
Department(of SPPU)
Pune , INDIA
aniketandhale0612@gmail.com

Krishna Khurad
SKNCOE BE Computer
Department(of SPPU)
Pune , INDIA
krishnavkhurad262@gmail.com

Prassana Patil
SKNCOE BE Computer
Department(of SPPU)
Pune , INDIA
prasannapatil606@gmail.com

Jugal Gujrathi
SKNCOE BE Computer
Department(of SPPU)
Pune , INDIA
jugalgujrathi2003@gmail.com

Prof. Ganesh Jadhav
SKNCOE Computer Department
(of SPPU)
Pune , INDIA

Abstract: Land Registration is very long and troublesome process in many parts of the world. There are various intermediate agents or agencies involved in this process. This paper takes a good look to the possibilities and the problems that will be solved using Block-chain based solution. The system is a Ethereum based Blockchain system that stores all the transactions made during this Land-Ownership Transfer . We will use the concept of Contracts in Blockchain . In this Development various events such as User Registration , Uploading documents and fund transfer from buyer to seller will occur . The Proposed system solves the problem faced by all the three parties i.e. Buyer , seller and Government Officers. The system will also reduce the Frauds and the transactions will be Immutable due to blockchain. **Keywords**—component, formatting, style, styling, insert.

I. INTRODUCTION

Blockchain is a set of records which is bunched together in blocks and these blocks are expanding set of records. These blocks are linked together using Linked List. These records on the blockchain are stored on a distributed Ledger system i.e. DLT. In DLT every record is stored at multiple places and hence it's difficult to manipulate it. This makes blockchain very secure and a tough task to hack into. Next thing in blockchain is that it is decentralized. A large part of the Internet is centralized meaning all the data at one place. Decentralized means that data lives on the network. One of the cons of a centralized system is that if it gets hacked into, all of the data is exposed at once. The apps are built using the Blockchain's smart-contract interface. The participants, on the other hand, have the confidence to carry out a transaction because of the Blockchain's trusted design. Any changes made in one node will be mirrored in the others. An untampered ledger is used to record each company transaction. A secure hashing method is used to store the transaction. Similarly, before a transaction is stored on the public Blockchain, it must be authorized . In a permissioned Blockchain, however, all consensus is achieved by stakeholders.

Blockchain technology, initially conceived as the backbone of Bitcoin, has a rich history that has unfolded over the past decade. It all began in 2008 when an individual or group using the pseudonym "Satoshi Nakamoto" published the Bitcoin whitepaper, introducing the world to a revolutionary concept—a decentralized digital ledger. Bitcoin's blockchain, launched in 2009, served as a ledger for recording cryptocurrency transactions. It introduced Proof of

Work (PoW) as its consensus mechanism, enabling network participants (miners) to validate and add new transactions securely. Beyond Bitcoin, the blockchain landscape expanded rapidly. Litecoin, Ripple, and Dogecoin emerged as alternative cryptocurrencies, each introducing unique features and use cases. The true innovation came in 2013 with the introduction of Ethereum, which brought the concept of smart contracts to the forefront. Ethereum's blockchain allowed developers to create decentralized applications (DApps) that could execute self-executing contracts and automate processes. In 2015, the Linux Foundation launched Hyperledger, an open-source project focused on advancing enterprise blockchain solutions. This initiative marked the beginning of blockchain's integration into various industries beyond finance. The year 2017 witnessed the rise of Initial Coin Offerings (ICOs) as a fundraising mechanism, leading to the proliferation of blockchain-based startups and projects. In 2020, non-fungible tokens (NFTs) gained prominence, leveraging blockchain technology to create unique digital assets, such as digital art and collectibles.

Today, blockchain technology is in a state of constant evolution. Researchers and developers are exploring new consensus mechanisms, scalability solutions, and interoperability standards. Its adoption extends to sectors such as healthcare, supply chain management, and government services, promising innovative solutions to age-old challenges.

At its core, a blockchain is a distributed and immutable digital ledger designed to record transactions in a secure and transparent manner. Its architecture comprises several key elements

Blocks: A blockchain consists of a sequence of blocks, each containing a batch of transactions. These blocks are linked together in chronological order, forming a chain.

Decentralization: Unlike traditional centralized systems, a blockchain operates on a decentralized network of computers, known as nodes. Each node has a copy of the entire blockchain, ensuring redundancy and security.

Cryptographic Hashing: Blocks are linked using cryptographic hashes. Each block contains a hash of the previous block, creating a secure and tamper-resistant chain.

Consensus Mechanisms: To validate and add new transactions to the blockchain, nodes must agree on a consensus mechanism. Popular mechanisms include Proof of Work (PoW) and Proof of Stake (PoS), which ensure agreement and security within the network.

Immutable Ledger: Once a transaction is added to the blockchain, it becomes virtually immutable. Altering any data within a block would require the consensus of the majority of network nodes, making unauthorized changes extremely difficult.

Distributed Ledger: Copies of the blockchain are stored on multiple nodes across the network. This distribution enhances security, resilience, and transparency, as no single entity controls the entire system.

Smart Contracts: Some blockchains, like Ethereum, support smart contracts—self-executing code that automatically enforces and executes contract terms when predefined conditions are met.

II. Literature Survey

"Blockchain based Land Registration System with Hierarchy Maintenance" The paper discusses a system that uses blockchain technology to manage land ownership records in a secure and transparent way. It includes features like verifying users, land, and transferring property.[1]

Aakash Shrestha, John Saud, Niraj Kumar Rauniyar, Sindhu K, "Land Registration System Using Blockchain Technology" The paper explores using blockchain technology to simplify land registration, reducing corruption and improving transparency.[2]

Sanjana Gate, Rohan Temgire, Atharva Bankar, Rohit Chavan, Priyanka Sherkhane, "Land Registry Management System Using Blockchain"

The paper introduces a Land Registry Management System using blockchain technology to simplify and secure land transactions[3]

Mohammed Shuaib, Salwani Md Daud, Shadab Alam, Wazir Zada Khan, "Blockchain-based Framework for Secure and Reliable Land Registry System" The paper discusses using blockchain for secure land registry systems. It aims to prevent fraud and disputes in land ownership. Blockchain's benefits and a framework with smart contracts are presented, along with case studies.[4]

Muhammad Irfan Khalid, Jawaid Iqbal, Ahmad Alturki, Amerah Alabarah, Saddam Hussain, "Blockchain-based Land Registration System: A Conceptual Framework" The paper discusses how blockchain technology can improve land registration by making it secure, transparent, and decentralized. It mentions that blockchain, particularly Ethereum-based smart contracts, can address data fraud and system failure issues in the current land title management systems.[5]

S. Humdullah, S. H. Othman, M. N. Razali, H. K. Mammi, "A Secured Data Storage Framework for Land Registration Using Blockchain"

The paper discusses the challenges in land registration and proposes using blockchain technology to enhance security, transparency[6]

Abid Hassan, Md. Iftekhhar Ali, Rifat Ahammed, Mohammad Monirujjaman Khan, Nawal Sufiyani, Abdulmajeed Alsufyani, "Secured Insurance Framework Using Blockchain and Smart Contract"

The framework utilizes blockchain technology and smart contracts to enhance security and transparency in the insurance industry. It allows clients to register, apply for policies, and make claims while maintaining a secure and immutable ledger.[7]

Rijwan Khan, Shadab Ansari, Sneha Jain, Saksham Sachdeva, "Blockchain-based Land Registry System Using Ethereum Blockchain" The paper suggests a blockchain-based land registry for efficient and secure ownership transfers, removing intermediaries[8]

Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System" The paper suggests a new way using math and computers to make payments without needing banks, which can be more secure.[9]

Bhabendu Kumar Mohanta, Soumyashree S Panda, Debasish Jena, "An Overview Of Smart Contract and Use Cases In Blockchain Technology"

The paper talks about how a special computer program called a "smart contract" can work with a digital ledger called "blockchain" to make things like buying lands[10]

	DESCRIPTON	ADVANTAGES	DRAWBACKS
1	This paper discusses a system that uses blockchain technology to manage land ownership records in a secure and transparent way. It includes features like verifying users, land, and transferring property.	Transparency: Ownership details are clear and accessible. Efficiency: Transactions can be processed faster.	Technology adoption: People need to learn and adapt to blockchain. Implementation complexity: Setting up the system may be challenging.

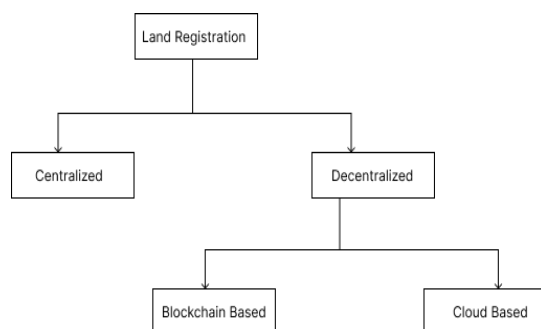
2	This paper explores using blockchain technology to simplify land registration, reducing corruption and improving transparency.	Speed: Land transactions happen faster with blockchain. Transparency: Everyone can see land records, reducing chances of fraud.	Learning Curve: Some people might find blockchain technology confusing. Dependency on Technology: If the technology fails, it can disrupt land registration.
3	This paper introduces a Land Registry Management System using blockchain technology to simplify and secure land transactions	Reduced Intermediaries: The elimination of intermediaries. Trust: Blockchain builds trust among parties involved	User Familiarity: Users may need to adapt to blockchain tools like Metamask, which could be a learning curve. Technology Adoption: Implementing blockchain in existing land registration systems may face resistance and require technological updates.
4	This paper discusses using blockchain for secure land registry systems. It aims to prevent fraud and disputes in land ownership. Blockchain's benefits and a framework with smart contracts are presented, along with case studies.	Enhanced Security: Blockchain ensures tamper-proof land records, reducing fraud and disputes. Efficiency: Faster transactions, reduced paperwork, and cost savings in land registry management.	Technology Adoption: Requires infrastructure and user training for widespread adoption. Privacy Concerns: Balancing transparency with data privacy can be challenging in public blockchain systems.
5	This paper discusses how blockchain technology can improve land registration by making it secure, transparent, and decentralized. It mentions that blockchain, particularly Ethereum-based smart contracts, can address data fraud and system failure issues in the current land title management systems.	Blockchain increases land registration security and transparency, reducing fraud and corruption, while also streamlining processes and reducing costs.	Implementing blockchain in land registration systems can be technically complex, require significant resources, and raise privacy concerns regarding sensitive land data.

6	This paper discusses the challenges in land registration and proposes using blockchain technology to enhance security, transparency	Enhanced Security: Blockchain technology provides a high level of security through encryption and decentralization, .	Technical Complexity: Implementing and maintaining a blockchain-based land registry system can be technically complex, requiring expertise in blockchain technology.
7	This framework utilizes blockchain technology and smart contracts to enhance security and transparency in the insurance industry. It allows clients to register, apply for policies, and make claims while maintaining a secure and immutable ledger.	Reduced Fraud: Blockchain's immutable ledger and smart contracts can significantly reduce fraudulent claims. Faster Claims Processing: Smart contracts automate claims processing.	Limited Adoption: Blockchain technology is still emerging, and its adoption in the insurance industry may take time to become mainstream. Complexity: Implementing blockchain and smart contracts may require technical expertise, making it challenging for non-tech-savvy individuals.
8	The paper suggests a blockchain-based land registry for efficient and secure ownership transfers, removing intermediaries	Efficiency: Blockchain streamlines land registration, reducing paperwork and delays. Security: Immutable blockchain records reduce fraud and ensure accurate ownership history.	Technical Barriers: Implementing blockchain may require significant technological and infrastructural updates. Regulatory Challenges: Adapting existing land laws and regulations to blockchain can be complex and time-consuming.

9	This paper suggests a new way using math and computers to make payments without needing banks, which can be more secure.	<p>Speed and Efficiency: Cryptocurrency transactions can be processed quickly</p> <p>Reduced Costs: Eliminates the need for traditional financial intermediaries, reducing transaction fees and making microtransactions feasible.</p>	<p>Complexity: Understanding and using cryptocurrencies can be challenging for non-technical users.</p> <p>Volatility: Cryptocurrency values can fluctuate wildly, making them risky for long-term savings or stable transactions.</p>
10	This paper talks about how a special computer program called a "smart contract" can work with a digital ledger called "blockchain" to make things like buying lands	<p>Smart contracts and blockchain make things like buying stuff or sharing information easier and safer.</p> <p>They reduce the need for middlemen, saving time and money.</p>	<p>It's a new technology, so not everyone knows how to use it.</p> <p>If there's a mistake in a smart contract, it's hard to fix, and you might lose your money.</p>

III. Observations and Findings

A.Related Works



The above figure shows the existing work on the land registration system. There are two types of land registration system. Firstly, The project has centralized system and secondly the decentralized system. In the decentralized system there are two types. One is the cloud based and another is Blockchain based.As per the survey, both can be used the blockchain system is more secure and more trustworthy. We will have a user, government agent and the buyer in this system. Thus, the final result will be created.

.Enhanced Security and Immutability :Each transaction is cryptographically secured and linked to the previous one, creating an immutable record. This ensures that once data is recorded, it cannot be altered, providing a high level of data integrity and security.

Elimination of Intermediaries: By leveraging blockchain technology, our system eliminates the need for intermediaries such as brokers and middlemen in the land registration process.

Reduced Fraud and Corruption: Elimination Of Intermediaries reduces the chances of corruption and fraud significantly

Transparency and Accessibility: The system enhances accessibility by allowing authorized users to access records from anywhere, reducing the need for physical presence at government offices.

B. Key Issues and Challenges

- 1.Lack of Legal Frameworks:** Many legal systems do not yet recognize blockchain as a valid form of record-keeping, leading to a lack of supportive legislation.
- 2. Cybersecurity:** Protecting the blockchain network from cyber-attacks, hacking attempts, and ensuring the security of private keys is essential to maintain the integrity of the system.
- 3. Energy Consumption:** Proof-of-work blockchains, like Bitcoin, require significant computational power, leading to environmental concerns due to high energy consumption.
- 4. Integration Challenges:** Integrating blockchain with existing IT systems, databases, and applications within government agencies can be complex and costly.
- 5. Community Participation:** Involving local communities and stakeholders in the design and implementation of blockchain systems is critical for gaining trust and acceptance.

IV .CONCLUSION & FUTURE SCOPE

This System highlights the potential of blockchain technology in enhancing land registration processes through the factors of security and transparency. Although , it is very Challenging and hard to implement. With more research and collaboration, blockchain has the capability to revolutionize land registration systems, providing enhanced trust, security and efficiency.

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