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Secure Land Registry System using Blockchain Technology

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Abstract: *In moment's world, property power is one of the most vital aspects of an existent's wealth and identity. still, traditional land registry systems suffer from inefficiencies, corruption, and vulnerabilities similar as data tampering and loss. This paper proposes a secure and transparent Land Registry System using Blockchain Technology, aiming to attack these issues by offering invariability, decentralization, and translucency. Through the perpetration of blockchain, land records can be digitized, securely stored, and made accessible in a tamper- evidence manner, revolutionizing how property rights are managed. The proposed system demonstrates significant advancements in security, data integrity, and trust between parties.*

Keywords: Land Registry, Data Security, Smart Contracts, Property Management

I. INTRODUCTION

The process of land enrollment is frequently complicated, regulatory, and prone to fraud. Traditional systems largely depend on homemade records, making them vulnerable to tampering and manipulation. With the rise of blockchain technology, a new occasion arises to transfigure land operation by making it more transparent, effective, and secure. Blockchain's decentralized tally ensures that formerly a property sale is recorded, it can not be altered without agreement across all network actors. This characteristic makes blockchain an ideal technology for land registries, icing trust in the authenticity of records without counting on a central authority. This paper explores the design and perpetration of a blockchain-grounded land registry system that not only improves data security but also reduces processing time, cost, and mortal error.

II. SYSTEM ARCHITECTURE AND DESIGN

A. Overview

The proposed result for the Secure Land Registry System utilizes blockchain technology to ensure a transparent, secure, and tamper-substantiation platform for land registration and deals. The system is structured with five distinct layers user, Frontend, Blockchain Layer, IPFS, and Backend as shown in Figure 1.1 below. The user caste serves as the interface for squatters, buyers, and merchandisers to interact with the system. The Frontend caste, erected using web technologies, allows stoners to initiate and manage deals, view land details, and pierce their account. The Blockchain Layer, predicated on Ethereum, ensures the stability and translucence of land records by exercising smart contracts written in trustability. The IPFS caste is used for securely storing documents combined to land power, while the Backend caste manages the business sense and ensures smooth communication between the system's factors. Smart contracts play a vital part in automating land deals by icing the conditions of each exchange are met before executing the transfer. These contracts autonomously spark when predefined conditions are satisfied, thus administering the integrity of the trade process. For illustration, once a user uploads land-related documents and a trade is initiated, the smart contract verifies the authenticity of the data and ensures that the land transfer process follows the legal conditions. Upon evidence, the smart contract automatically executes the transfer, streamlining the blockchain with the new power details. This not only reduces the eventuality for fraud but also ensures that all parties involved in the trade act up with the agreed terms.

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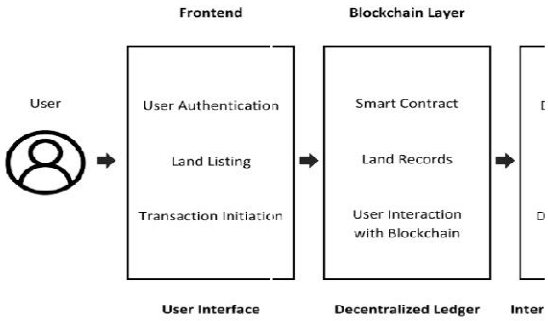
B. Smart Contract Functionality

Smart contracts play a vital part in automating land deals by icing the conditions of each exchange are met before executing the transfer. These contracts autonomously spark when predefined conditions are satisfied, thus administering the integrity of the trade process. For illustration, once a user uploads land-related documents and a trade is initiated, the smart contract verifies the authenticity of the data and ensures that the land transfer process follows the legal conditions. Upon evidence, the smart contract automatically executes the transfer, streamlining the blockchain with the new power details. This not only reduces the eventuality for fraud but also ensures that all parties involved in the trade act up with the agreed terms.



III. IMPLEMENTATION

A. Technologies Used

Reliability is used to write the smart contracts that govern land deals and ensure the invariability and translucency of the land registry system. Metamask is integrated for managing user deals and enabling secure wallet functionality, allowing users to interact with the blockchain network seamlessly. The Ethereum blockchain is stationed for storing and managing land ownership records, ensuring that all deals are decentralized and secure. IPFS is used for decentralized storage of land-related documents such as title deeds and agreements, ensuring tamper-evidence data management.

B. Development Process

The development of the Secure Land Registry System began with the creation of smart contracts in trustability, which automate the land transfer process by vindicating predefined conditions, similar as payment evidence and document authenticity. Metamask was integrated to insure secure, stoner-friendly relations with the blockchain network. To insure the integrity and security of the system, the Ethereum test network was firstly used to emplace and test the smart contracts, allowing us to pretend real- world scripts without the pitfalls of planting on the main network. IPFS was enforced for document storehouse, icing that all land- related records are securely stored and fluently accessible by authorized druggies. After thorough testing, the system is ready for deployment on the Ethereum mainnet for real-world operation.

IV. RESULTS AND ANALYSIS

The decentralized nature of the blockchain ensures the stability and translucence of land deals, furnishing a tamper-proof system for the land registry. All land ownership transfers are securely recorded on the blockchain, creating a transparent ledger that is accessible by authorized parties, thereby preventing unauthorized alterations. The system was tested on the Ethereum test network to assess its performance regarding transaction speed, gas costs, and overall reliability. The results indicate that the system performs efficiently under typical operation, with minimal delays and respectable transaction costs, ensuring a seamless experience for users when interacting with the blockchain network.

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V. CONCLUSION

This paper highlights the potential of blockchain technology in revolutionizing land registry systems by enhancing security, transparency, and efficiency. By utilizing smart contracts, the proposed system automates land transfer processes, ensuring that transactions are secure, immutable, and transparent. The system provides a reliable solution to the challenges faced by traditional land registries, such as fraud and data manipulation. Future work may focus on optimizing the system for scalability and deploying it on the Ethereum mainnet for broader adoption, further enhancing its impact in land management.

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