Land Registration Management and Litigation Resolution System using Blockchain

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Abstract: Currently, one of the most difficult issues facing the government is resolving illicit activity and fraudulent land registrations. The old and traditional methods of land registrations are the main reason for the arise of these illegal and fraudulent activities. The proposed system aims to harness the inherent benefits of blockchain technology, such as decentralization, transparency,and immutability, to create a more secure, efficient,and trustworthy framework for managing land transactions and resolving related litigations. An advanced technology is needed which is capable of correcting and maintaining these registrations andblockchain technology is having all sort of qualifications to solve. A crucial part of facilitating the integration of blockchain technology into various governmental organizations and public services is played by the Public Sector Blockchain Consultant. Primarily the consultant focuses on land registrations management and litigations revolving around itand solves them by taking some factors and facts into consideration. The consultant also emphasizes increasing efficiency by reducing procedures and removing pointless middlemen and paperwork, where there are high chances to cheat the public. The consultant facilitates automated and secure execution of transactions by employing smart contracts and decentralized platforms, decreasing the need for manual intervention and lowering the chance of mistakes or fraud. These developments enable government organizations to provide services to citizens more successfully while also saving time and resources. In conclusion, helping government organizations in adopting blockchain technology is vital and this is where the Public Sector Blockchain Consultant comes in to the picture. The consultancy wants to increase efficiency and transparency by using blockchain technology for **public** services, which would ultimately lead to increased public trust and betterservice delivery.

Keywords: Blockchain technology, Government agencies, Public services, Smart contracts, Decentralized platforms, Service delivery, Realestate.

1 Introduction

The proposed system revolves around solving a famous and complex problem which is becoming bigger day by day and that problem is litigations and fake registrations on lands. This situation arises due to multiple loop holes in the existing methods of the registration processes. These illegal activities has become a headache and tough for the government to solve them one by one particularly because the way of resolution of it is very time consuming for the government which is already in a hectic schedule. For, this reason there is a need of selecting and implementing some advance technologies and tools which can solve it easily. Here comes blockchain technology into the picture which became a trending technology these days by its unique features and benefits. Blockchain is an immutable shared ledger that makes it easier to track assets and record transactions in a corporate network. In the current traditional system have the following challenges such as lots of paperwork, lack of transparency, involvement of several intermediaries, and lower transaction speed. To resolve these issues, the present blockchain technology provides the following benefits in the field of land registry system. They are real estate tokenization, smart contracts, Automation, security and transaction control, property management, Removal of Middlemen, and ownership in parts.

Many advantages result from the use of blockchain technology in the public sector. The improved transparency it delivers is one of these benefits. Government organizations can use blockchain to build immutable public ledgers that let anyone check transactions, track funds, and guarantee the accuracy of public data like in the registration transactions of land. As every transaction is recorded and cannot be changed without consensus, the transparency offered by blockchain technology helps allay worries about corruption, fraud, and mismanagement. Blockchain not only increases openness, but it also increases the effectiveness of public services. Automation of operations and the abolition of middlemen are two benefits of smart contracts, which are self-executing algorithms on the blockchain. Its automation lessens the need for administrative work, expedites transactions, and lowers room for human error.

Public Sector Blockchain Consultants collaborate with organizations to find applications for integrating smart contracts, improving the effectiveness and efficiency of providing public services. An excellent resource for government organizations looking to incorporate blockchain technology into various public services is a public sector blockchain consultant. They contribute in improving transparency, efficiency, and trust in governmental processes by taking advantage of blockchain's decentralized, transparent, and secure features. With all these features, land registrations can be managed and taken care by blockchain technology in an efficient and convenient

manner which solves the problem facing by the government in maintaining the land registrations among public.

Problem Statement and Motivation
Now a days there are so many problems are arising due to improper and wrong registrations of land.This became a critical problem for the government to solve. The main goal is to create a reliable and accurate approach and appropriate tool to overcome the problem of land registrations by introducing a suitable mechanism by not giving any scope for ligations to arise at any cost.

2 Literature Survey

This research study sets itself apart from other ongoing studies by employing a variety of diagnostic techniques and technologies to reliably evaluate audio data and identify between individuals.

Li, X., Yin, & Ning (2022) discusses a reliable [1] announcement dissemination system using blockchain technology and vehicular cloud architecture. The study aims to enhance confidence and dependability in public sector announcements by leveraging blockchain security. [2] Shen et al. (2022) proposed a blockchain-assisted authentication solution for edge devices in the Internet of Vehicles (IoV). It emphasizes improving security and privacy in IoV communication, thereby enhancing transparency and trust in the IoV ecosystem. [3] Miao, Huang, et al. (2022) presented a framework for blockchain-assisted multi-copy verifiable data possession in multi-cloud storage systems. The system aims to improve fault localization and data integrity, ensuring verifiability and immutability of data across various clouds in public services. [4] Sharma, Pilli, et al. (2023) explore "BLAST-IoT: Blockchain Assisted Scalable Trust in Internet of Things," emphasizing the use of blockchain to increase trust in IoT networks. [5] Bodó and Janssen (2022) focuses on using blockchain technology for various public services to enhance efficiency and transparency in the public sector. It addresses the potential of blockchain to uphold confidence while improving the delivery of public services. [6] Shahaab et al. (2023) conduct a case study on the UK government agency Companies House, exploring the effects of blockchain on operational efficiency in the public sector. The study reveals that government organizations can enhance efficiency and transparency in various public services through blockchain technology. [7] El Khatib,et al.(2022) examines the use of blockchain in e- governance and decision-making for proposed system and program management. Their research demonstrates how blockchain can improve operational transparency and efficiency in various public services.[8] Alnahari, M. S., and Ariaratnam, S. T. (2022) investigate the use of blockchain technology in smart city infrastructure. The study focuses on helping government organizations implement blockchain for public services to increase efficiency and transparency in

smart cities. [9] Robert C. (2022) is a blockchain consultant for the public sector, specializing in implementing blockchain technology to improve transparency, efficiency, data security, and citizen trust in government operations. [10] Batubara, et al. (2022) proposed a study on blockchain-based e- Government, examining stakeholders' viewpoints and hopes for applying blockchain to public services. The findings offer insights for public sector blockchain consultants and decision-makers.

The existing system cannot solve the problem because of lack of safety measures, algorithms and tools which can help in solving the problem. Existing system follows the traditional and old way of solving which consumes more time and resources. Since there are numerous similar situations arising day by day that is, litigations and fake registrations on land, it is very important to choose an advanced technology which is capable of taking care of all these things particularly in detail. Also, the current system is deficient in selecting appropriate technology which solves the problem and there are numerous technical and security issues with the current system. Because of its reliance on data security and privacy, blockchain technology is the perfect answer for governmental organizations. So, in simple words, it can be determined that the existing system can be modified and is advisable for solving this problem. The current system drawback can be either avoided or updated according to the analysis of the latest trends in the market.

3 Proposed system

The main intention and primary responsibility as a public sector blockchain consultant would be to help government organizations implement blockchain technology in order to solve the fake registrations problem which the existing system failed to do so. Assessing current land registrations procedures and identifying potential areas for blockchain. implementation to control present ongoing illegal activities and to prevent them accordingly. Studying the current systems and comprehending their drawbacks, such as data manipulation, a lack of transparency, and slowness, are necessary for this. To work with government representatives and IT teams to build a plan for using blockchain technology after these pain areas have been identified.
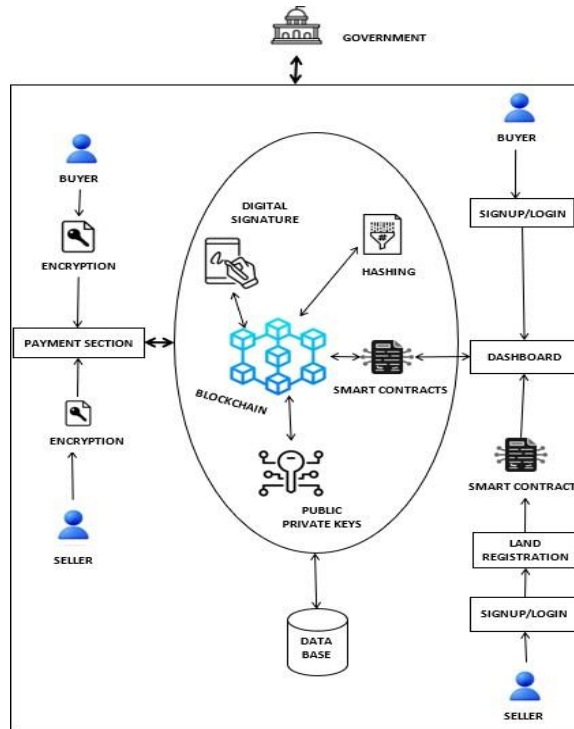
Fig. 1. Architecture of the proposed system

To implement this model, execution of program and necessary libraries have to be installed to perform certain functions. The successful implementation of the proposed system hinges upon a robust technical infrastructure and meticulous planning. Several key components comprise the technical implementation:

    a.   Blockchain Infrastructure

The selection of an appropriate blockchain platform and the establishment of requisite infrastructure constitute critical initial phases. Numerous blockchainplatforms, such as Ethereum, Hyperledger, and Corda,offer distinct features and capabilities. The choice of platform must align with the precise requirements of government service domains. Upon platform selection, the configuration of necessary infrastructure, components, including nodes and network settings, is imperative to support seamless blockchain integration.So, here Ethereum and other required blockchain technologies have been taken in to the consideration for the development of the proposed system.

    b.   Smart Contracts

Smart contracts serve as the lifeblood of the blockchain system. These self-executing contracts encapsulate the terms and conditions of agreements and automatically enforce them when predefined conditions are met. In the context of the proposed system, the development of smart contracts is indispensable. These contracts must accurately mirror the business processes they represent and conform to the legal requirements they are subject to. Rigorous testing is essential to verify the accuracy and security of these contracts, especially given their critical role in automating government transactions.

c.   User Interfaces

The creation of user-friendly interfaces assumes a pivotal role in ensuring the adoption and usability of the proposed system. Citizens, government employees, and other stakeholders necessitate intuitive interfaces to interact seamlessly with blockchain-based systems. These interfaces should abstract the complexities of blockchain technology, providing a frictionless and user-centric experience.

d.   Data Migration

Data migration constitutes a critical stride to assure the continuity of government operations. Existing government data must undergo secure migration to the blockchain, preserving data integrity and ensuring consistency with legacy systems. Data cleansing and transformation may be requisite to harmonize existing records with blockchain-compatible formats. Data migration further encompasses the conversion of existing records into formats amenable to the blockchain's data structures.

4   Implementation

In order to build an efficient, robust and a perfect working application, some appropriate building constituents should be used and implemented. The tech-stack that is used to build the proposed system is Html, Css, Javascript, React JS, Solidity, Hardhat, Mongo DB, Node JS. The building process of the proposed system includes the following modules.

Module 1: Land Registry

a.   **User authentication:** To register, users must provide their identification, email address, contact information, and Aadhar number. The information supplied will be verified by Digi locker before being incorporated into the system. After user details are successfully confirmed, users will have their own set of private and public keys generated by the system. The instrument for key generation is MetaMask.

b. **Buyer/Seller -** Sellers have the opportunity to transfer land ownership after registering. Before signing a conveyance deed, the land inspector will need to see a token from the buyer and seller. The seller transmits the buyer's email address, Aadhar number, and contact data as soon as the land inspector verifies the paperwork. The buyer can then choose to approve or disapprove the request after receiving an email notification about the land transfer process.

c. **Conveyance Document**: After the buyer and seller have agreed through the notification, relevant private keys are taken out of the Amazon Web Services key management store, a digital signature is created and saved on the blockchain, and the buyer receives the digital document. Following the conclusion of the land transfer procedure, a blockchain transaction is started, setting off a series of events and utilizing a smart contract's land ownership feature to notify the landowner.
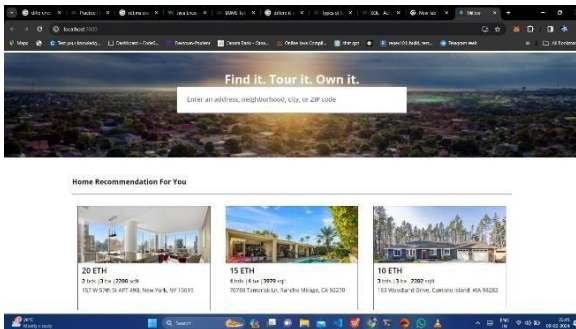

Fig 2. Web Interface

Module 2: Section of Confirmation

Throughout the validation step, a number of external entities participate in the verification of owner and land details by submitting a digital document into the system. The third party receives an email including the land details and the owner when the digital file is compared to blockchain records. The organization then sends an email to cross-verify the digital file with the blockchain records of the system and demands more information from the system. The owner and the specifics of the land are emailed to the bank upon finding. Maintaining transparency, digitally verifying property records without middlemen, and safely preserving the history of land ownership transfers are all critical functions of blockchain technology. Among the instruments used in this procedure are:
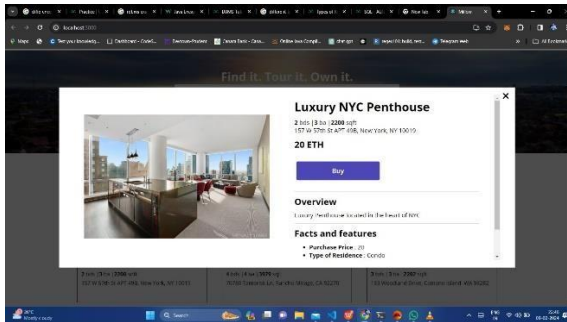
Fig. 3. Buyer side user interface

Module 3 - Implementation and Testing Module With the help of the technologies and features of blockchain mentioned above a sequential process flow is maintained and implemented accordingly to make the execution of the proposed system easier and also by maintaining the efficiency and transparency of the confidential documents and other key things during the transactions and registrations of the property. A unique reference identity number will be created and allotted to the particular transactions accordingly.

The proposed system outcomes are expected to revolutionize the way land ownership and transactions are recorded and disputed. The immediate result is a drastic reduction in the number of disputes over land ownership, as the blockchain provides a clear and uncontestable record of transactions and ownership history. Moreover, the adoption of smart contracts automates the execution of agreements related to land transactions, minimizing human error and the potential for disputes. These contracts, programmed to execute automatically when certain conditions are met, reduce the need for intermediaries and streamline the transaction process. This not only cuts down on time and costs associated with land registration but also limits the scope for litigation by ensuring that all contractual terms are met without bias or error. Another notable result is the enhancement of property rights protection. With a secure and transparent registry, property owners have a reliable record of their assets, which is crucial for the protection of their property rights. This system also facilitates easier access to credit, as financial institutions can rely on the blockchain records to verify the ownership and encumbrances on a property before approving loans.

5   Conclusion

In conclusion, the Public Sector Blockchain Consultant system is a critical resource for government agencies wishing to use blockchain technology to improve public

services. It allows for better service delivery, simpler data management, and secure, irrevocable record-keeping. Because to its strong features and wide support, the system may significantly increase the overall performance and effectiveness of public sector companies. In future this proposed system can be further expanded as per the requirements which implies the scalability feature of the system that is designed and proposed.

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