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Registration of Land and Maintenance of Hierarchy with Blockchain Technology – A Review

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ABSTRACT
Land registry system denotes to the system that records the particulars of land ownership rights by government bodies. The deposited record can be used as the proof on right to avoid any sort of scam and legal transition wherever required. This system is used by governmental entities to keep track of the specifics of land ownership rights. The goal of this review is to propose a decentralized system to increase the consistency of land registration and storage of property records based on ownership hierarchy. The deposited record can be used as evidence of correctness to prevent fraud and provide a seamless transfer when necessary. Decentralized systems based on blockchain are now being developed to address the flaws of central systems. Blockchain is an associate electronic ledger of digital events, records, or transactions that are hashed cryptographically, and controlled through a distributed net of applicants. This discussion aims to promote consistent, secure and stable land administration, title registration and maintenance of ownership hierarchy supported with blockchain technology, which can enable in eliminating the weaknesses which are there in present land registration and administration method.

Keywords – Land Registration, Blockchain,

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I. INTRODUCTION

Organizations in charge of land registration are frequently held responsible in numerous nations for the alleged neglect and fabrication of land records. Several parties claim varied degrees of control over a valid plot of land because the property records are particularly vulnerable to fraud and misuse. In actuality, security threats have significantly increased since this data is pooled. The goal of distributed systems has been to improve these systems' reliability. To solve the drawbacks of centralised systems, decentralised systems based on blockchain are now being developed.

The existing land registry system has the following drawbacks:

- The outdated land records make it difficult to verify ownership of the land and might lead to fraud. As a result, several parties assert differing degrees of control over a particular piece of property.
- The land registry is unable to confirm any outstanding debts on the property.
- The primary motivation behind blockchain technology is the need for decentralization, which is met by dividing computation tasks among all of the blockchain system's nodes.

This aforementioned loophole can be solved by new technology and the problems with the land written record system is addressed by altering records and selling a section of land to one individual.

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II. OVERVIEW OF A BLOCKCHAIN TECHNOLOGY

The blockchain is a distributed, secure, immutable ledger that enables the tracking of physical assets such as home, automobile, sum of money, or piece of land or an intangible assets like copyrights, intellectual property, patents and branding, and the recording of transactions in a corporate network. A transaction made possible by blockchain technology is shown in Figure 1.

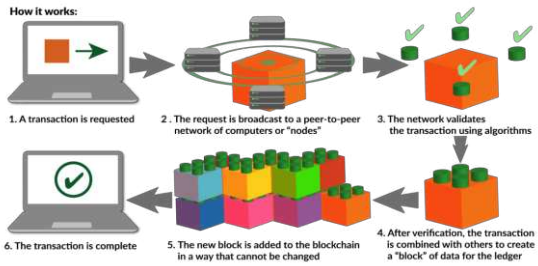

Figure 1. Transaction with blockchain

Using a private blockchain, the conceptual framework for land registration and preservation is envisioned. The process might also be extended in the near future so that the community might connect directly to the system and gather data on its assets.

III. RELATED WORK

According to [1], in order for the public to adopt blockchain-based solutions, they must be knowledgeable on how to manage cutting-edge technologies like blockchain. It is an outline on land registration and this may be utilized in the future to create a software structure. Finally, it can surely offer insights of the actual system.

This article [2] focused on the application of blockchain technology in crucial role in India's efforts to digitize property records. Blockchain is used by the land registry to secure property transfers. The idea of smart contracts allows for automatic updating of records, hence the confidence between participants to have transactions will increase. Additionally, it speeds up and improves the transactions of organization/corporate. Applications of blockchain technology are shown in Figure 2 for maintaining land records.

This paper [3] has proposed theoretical concepts of practice of blockchain technology with suitable features. Surveyed electronic land records in various states of India and are tabulated and analyzed the necessity of secure methods.

In this case, a safe land archiving system based on blockchain and majority consensus is developed. SHA256 is the hashing algorithm that is employed. The Proof of Work (PoW) process is also employed in addition to SHA256, enhancing the security of the deal-related data. The 12 nodes that make up the proposed land registry blockchain network compute the proof of work. Utilizing tamper-proof blockchain technology, provides a modern type of land register, 200 land transactions in total are logged. Elliptic curve cryptosystem (ECC) is used to generate signatures, which are then used to verify if the proprietor of the transaction actually signed the transaction or not.

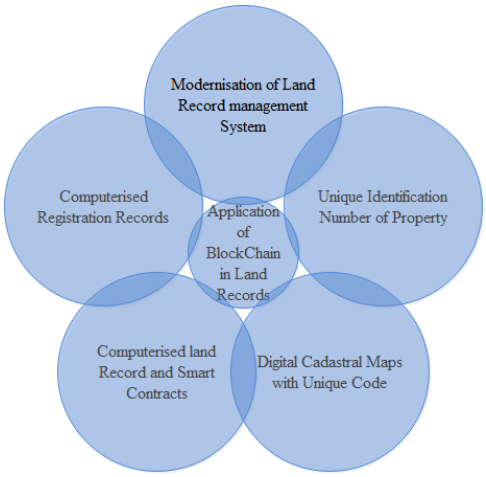

Figure 2 Land Records and Blockchain Technology

The security issue is greatly reduced when the land registration is carried out using blockchain technology. Thus, blockchain promises a 99% reduction in the amount of time spent manually maintaining records [3].

It has been proposed to employ a secure blockchain technology to build and trustworthy land registry system [4]. The suggested plan includes the idea of smart contracts to offers a pre-agreement solution at various phases of the land registry. Figure 3 shows the antiquated land register system. The integrating blockchain technology outlines the potential benefits of the land register system and a framework provided for doing so. The actual environment can support the implementation of the proposed structure and method.

This system [5], which was developed is based on the Ethereum Blockchain, which will store all transactions completed throughout the transmission of land ownership. Using the concept of blockchain technology's smart contracts, several occurrences such as the land examiner's access to land records and the buyer-to-seller transfer of funds following successful land ownership transmission confirmation is secured. This approach will address the challenges that all three parties had during the land registration process and get rid of middlemen like real estate brokers. Considering that immutable transactions are being recorded in the public ledger, it is also possible to authenticate the lands.

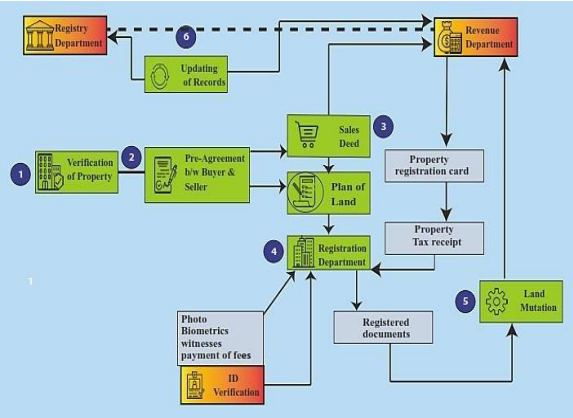

Figure 3 The antiquated land register system.

This paper [6] envisioned an outline that applies the idea of a feasible contract at various points in the documented land record. Offers a pre-agreement associate rule, i.e., a suggested an algorithm for initial business logic between a buyer and a seller. This also envisioned an outline that applies the idea of a feasible contract at various points in the documented land record. Discussed various features of blockchain technology in land registry system and offered a pre-agreement associate rule algorithm for a pre-agreement contract between a buyer and a seller. Also, discussed a number of blockchain's features for the land register system. Applying this on a large scale would also be one of the future scopes.

Here [7], deliberated about applications of blockchain technology in numerous areas like health care, agriculture, banking, land registry etc. Also, deliberated about features, types of blockchains, types of blocks ect,. Also, detailed about advantages of blockchain technology in present and future with respect to many applications and concluded that in close future, all will be tokenized and linked to blockchain one day.

In [8], created a safe record-keeping system that can transform the information about physical assets into immutable, liquid token assets using blockchain. It is now possible to retain a digitally secure and selectively viewable record of ownership with the aid of brand-new block chain token asset. Here, Ethereum is being used and indicated that the processing time for transactions is relatively quick. In terms of Ethereum, the implementation has given users a sufficient transaction rate and cost. The entire process of land registration is shortened from many months to a few days by the use of digital signatures at every stage by automatically updating the record, smart contracts would speed up the procedure instead of requiring buyers to transfer ownership through an application form.

Described the current land registration and protection procedures in [9]. By utilizing blockchain, it emphasizes the significance of smart contracts for land archives. Governments all over the world are advised to incorporate blockchain solutions in the land registry process due to the permanent and un-hackable nature of a blockchain. By automatically updating the ledger, smart contracts would speed up the process instead of requiring buyers to transfer ownership through an application form.

Debated on potential identity models and their comparative analyses to decide which identity model would be most effective in resolving the individuality problems with land register systems [10]. Examined the shortcomings of the current land registration system. It makes the different blockchain types and their features apparent. It also assesses how well blockchain technology integrates with different land registration operations. The Self-Sovereign Identity (SSI) model is proposed and the primary goal is to issue identity identifications based on a trustworthy network between two parties. The results of the investigation show that the SSI model conforms to all identifying standards. This concept is better suitable for giving people a digital identity and overcoming the challenges with the blockchain-based land register system.

This article [11] proposed a blockchain-based system with the ability to significantly decrease the time it takes to sell or buy land-related assets, stop fraud, and provides a better level of ownership security. The government will benefit from the presentation of this system in land organization in terms of tax gathering, service delivery, and other aspects of governance. A blockchain-based system that can prevent fraud, drastically cut down on the time needed to sell or buy land-related assets has been proposed. It can also give owners a secure level of ownership protection. This type of land organization will be advantageous to the government in terms of taxation, service supply, and other facets of governance.

Developed a cutting-edge plan that makes use of the blockchain to carry out the land registration procedure and give people in Bangladesh real and unquestionable ownership rights [12]. Blockchain integration will increase ownership assessment transparency and stop illegal transactions in Bangladesh's current land registration system. The suggested system's distributed near-deed information will significantly lessen disagreements.

In [13], developed a plan to fix the problems with the current property registration system in a centralized manner. There have been discussions over a number of aspects, including Private Key, Public Key, Encryption Process, and Decryption Process. The issue of land registration on the blockchain is discussed, as well as how the decentralization and immutability of the data on the blockchain can assist in finding a solution. Noticed the shortcomings of conventional systems. An outline that addresses scam avoidance by combining the standard Blockchain technologies with either asymmetric or public/private cryptography.

It was hoped [14] that a novel mechanism would be created to enhance the Delegated Proof of Stake (DPoS) consensus in order to provide a private record-based system for managing land assets. The time it takes to acquire land is reduced from months to a few days. Possession is immediately and correctly confirmed. Because the entire system is digital and everything is logged into the Blockchain upon a transaction or registration, there is no need for a lot of paperwork. Strict security and anti-fraud measures are employed.

An identification [15] response must be given in order to have a trustworthy blockchain-based land register system. Researched the available SSI options, evaluated them in accordance with the SSI principles, and developed the optimal SSI option for a blockchain-based land register system. A reliable land register system built on a blockchain needs an identifying response. After carefully examining the various SSI solutions and evaluating them in light of SSI principles, the ideal SSI solution for a blockchain-based land registration system has been designed.

IV. CONCLUSION

This paper is focused on understanding the status of land registry system to maintain land records and hierarchy of ownership. In order to learn the process of land registration and blockchain techniques, thorough survey has been done. All concepts related to the work starting from abstract to results are studied. The status of land registration process of various countries has been studied. Most of the papers concluded with proposed framework of land registration process.

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