Property Registration and Land Record Management using Blockchain

Raushan Kumar, Shobhit Raj, Ashish Kaushal

Department of Computer Science &Engineering, Nalanda College of Engineering, Chandi
Corresponding author: Raushan Kumar

ABSTRACT: The birth of Blockchain technology in form of Bitcoin, has triggered a wide interest by demonstrating the possibility of eliminating the need of an intermediary and revolutionized the interactions between people and machines by increasing trust. One such scenario is the problems in E-governance systems among the public domain sectors. In our Project, we mainly focused on the problems in the sector of Land and property management.

This paper will cover the detail about what problems occur in the sector of Land & Property Management and how using blockchain technology can overcome these types of problem. In this paper, we will discuss how a centralised Land Record at registry office using blockchain technology can easily defend different fraudulent cases.

I.   INTRODUCTION

Blockchain is a form of distributed ledger technology where data is distributed across a network of computers rather than being copied. And as it is distributed, not copied, danger of copies being altered across the network is removed. With Blockchain everyone who has access to network automatically receives any changes made to data. As blockchain serves as an immutable ledger, and use of blockchain in land registry protocol will enable almost instant transfer of property securely. Now some of states (Andhra Pradesh, Bihar, Karnataka) are shifting from paper-based land record to digital land record but even digital land records are very vulnerable to manipulation by government authorities and fraudsters. Earlier, the village accountants employed by the state government used to keep maintain the land records and any change that had occurred in ownership of lands. There were numerous accounts of allegations against the government officials being a part of corruption and exploitation of the rural poor, especially in case of 'mutation' or change of ownership of lands. And this type of distortion created a large-scale corruption and inefficiency in India's land market. There are reports claiming tech admin or insider altering the digital records and even deleting the traces of how it was manipulated.

Related Work, Motivation and Scope:

Currently in Karnataka, Bhoomi[1] a software mechanism to control changes to the land registry in Karnataka. The project was designed to eliminate the long-standing problem of inefficiency and corruption in the maintenance of land records at dispersed and poorly supervised and audited block-level offices known as "taluka" offices in South India and "tehsildar" offices in North India. The project development and implementation were done by National Informatics Centre. Many experiments with computerization have failed due to corruption. Although it was being hailed as a remarkable implementation of technology and a feather in the e-governance crown in India, Bhoomi[2] has not been able to eliminate land disputes in the state.

The proposed solution incorporates immutability characteristics of Blockchain, such that all transaction records are immutable. The records are permanently linked to system so that no one can ever tamper with or forge a record of their own. By integrating the blockchain technology in current land registry protocol, government will reduce the cost associated with monitoring, updating and validating the property ownership records[3].

Proposed Solution:

a) Experimental Setup:

System used in experiment have configuration: Windows 64-bit operating system running on an Intel Core i3-7020U CPU @ 2.30GHz with 8 GB RAM.

Tools used: WampServer, Visual Studio Code (Editor)

b) Land Record Management using Blockchain:

Currently all states in India, have

centralised Land Record Repository, consisting records of individual ownership of property and ownership transactions. Our idea is to implement a centralised Land Record Repository and securing it using Blockchain Technology. Each block consists of transactions at a particular registry office of single working day, making transactions of each day secured in a block. Further, block created on each day is linked with block created on next day via its hash value, evaluated based on transactions and other necessary parameters of that block. In this centralised[4] Land Record Management, each block is created at end of the day at registry office.
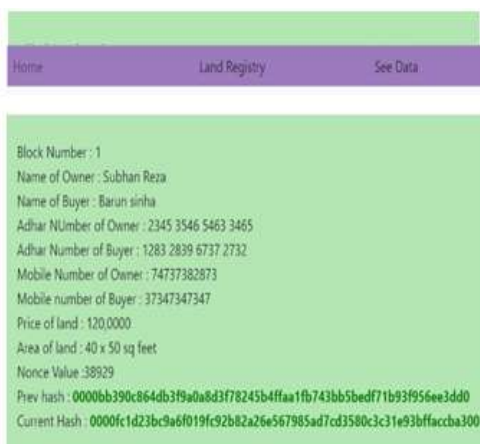

Figure 1

Using hash block and transactions of next day at registry office, next block is created and so on.
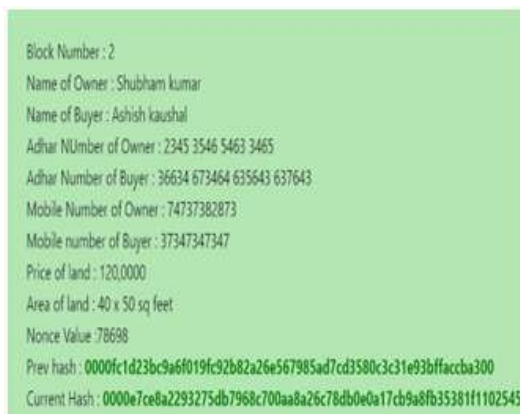

Figure 2

Each transaction is added to blockchain at end of day at registry office, once it gets added to block, transaction gets the property of immutability. And in case if anyone tampers with any transaction in blockchain, blockchain will invalidate any such change. Let's discuss the different fraudulent scenarios[5], which can be easily defended by this proposed solution:

Case 1: Fraudulently seller wants to undo the title of property back to himself, to do this, Seller has to delete the transaction record from the block in which that particular transaction is   present. If transaction is deleted from that particular block, that will result in change of hash value of that block, resulting invalidation of whole blockchain.

Case 2: Fraudulently buyer wants to increase the area of property of title transaction, to do this, Buyer has to modify the transaction record from the block in which that particular transaction is present. If transaction is modified from that particular block, that will result in change of hash value of that block, resulting invalidation of whole blockchain.

Case 3: Public verifiability:During the preparation of sale deed in the DoSR, as the onus is on the buyer to have a thorough verification of the property title. Even after the digitization of the records, they often seems to be out of sync or not up to date. This is partly due to facts that the current system is prone to insider attacks or due to the lack of trust between the parties involved. Due to these discrepancies, the buyer has to go back to several decades of documents to verify the property titles and such a process is highly inefficient.

If the blockchain technology is successfully integrated to the current process, the public verifiability[6] can be easily provided using the cryptographic hash properties of the transactions and the hash linkage of the blocks can be used to provide the traceability of a particular record.

(**Implementation of this technique** @ https://github.com/thedark27/Blockchain_Implementation)

II. CONCLUSION:

In India, upkeep of land records and it's normal updation has been a difficult assignment. The residents even need a trust in the current frameworks predominant in the States. Residents are uncertain, in the event that they legitimately own a land, regardless of whether they have a genuine transaction deed. Others who need to purchase a land are uncertain about whether the seller legitimately possesses it. In a circumstance like in Bihar, where the flood annihilated paper records, Blockchain Solutions could have taken up as another option. Blockchain Technology allows us to fix a significant number of these issues and gives falling advantages. The arrangements recommended in this paper joins many key advantages of the innovation, for example, an unchanging history of conditional records, so nobody can ever question the credibility; records

are for all time connected to the framework, so no one can ever alter or fashion their very own record; and these records can be seen by any gathering, whenever. The presentation of Blockchain Technology for land possession and land registration procedure will get clear proprietorship, valuation and decrease false exchanges. This will likewise prompt better land the board and conveyancing, and improve the Gross Domestic Product (Gross domestic product) of the nation. Blockchain Technology will likewise encourage accomplishing Sustainable Development Goals (SDGs)[7]. The right and made sure about land records will reinforce the SDG objectives counting Peace Justice and solid foundations, as establishments will be successful and more responsible as the land exchanges will be nonrepudiable and open to all. The paper recommends utilizing the innate advantages of Blockchain, with an emphasis on smart contracts. The framework will catch and for all time record every exchange done either through sale of a property, legacy, court requests and land acquisition and so on. This implies you accomplish close to continuous refreshed records with precise recognizability and straightforwardness into the condition of the property records. This will make a single wellspring of truth of proprietorship status and history of a property exchange. The purchaser will be guaranteed that the land being purchased is the right plot, and that the dealer is unequivocally the proprietor, lessening the capability of imitation and questions, just as the expenses and time required, for some random exchange, clearing approach to actualize indisputable Land Titling framework with title ensure in the nation.

Future Research Directions:
The data identified with land records, enlistment and looking over is kept up at various levels like Tehsils and Blocks. All the information is not accessible midway, rather it is kept up in disconnection at various levels. Further, the limit updation of land bundles are still not refreshed and not plainly demarked for singular buyer. The individual exchanges should prompt clear, recognized substance or article. Henceforth all the bundle limits and offers ought to be unmistakably distinguished by limit organizes[8]. Before commencement of Blockchain execution, the States should concentrate on this point. Further the data should be maintained in central servers at appropriate hierarchy and it should be for all the Departments like Land Revenue Department, Registration and Survey and Settlement Department etc. Since the information is kept up at

various Departments, business process designing is required for each State to have a standard working system. Be that as it may, land being a State subject in our enactment, the State has the elite force regarding this matter. The Government of India should make standard working strategies for execution of Blockchain based frameworks pertinent to all the States. The current procedure of structuring of a Blockchain framework depends on the subject or setting. There is no non-exclusive and uniform structure of Blockchain accessible. The examination ought to be done in these ways. The heap on the Blockchain framework will step by step increment and the exchanges will expand in light of populace development. The legitimate prerequisites to address the issue of any debates if there should be an occurrence of Blockchain usage additionally requires to be advised by the Government. . In future, it is also essential to integrate Blockchain Technology with Artificial Intelligence [9] for making the complete land management ecosystem safer, faster, transparent and responsive.

REFERENCE:

[1]. https://rtc.karnataka.gov.in/Service78/
[2]. https://en.wikipedia.org/wiki/Bhoomi_(software)
[3]. Kshetri, Nir, and Jeffrey Voas. "Blockchain in developing countries."It Professional20.2 (2018): 11-14.
[4]. Mishra, Shailesh, and Shivam Kumar. "Smart Voltage Monitoring: Centralised and Blockchain-basedDecentralised Approach." arXiv preprint arXiv:2008.06747(2020).
[5]. Deininger, Klaus, and Aparajita Goyal. "Going digital: credit effects of land registry computerization in India."Journal of development Economics99.2 (2012): 236-243.
[6]. Shang, Qiuyun, and Allison Price. "A Blockchain-Based Land Titling Project in the Republic of Georgia: Rebuilding Public Trust and Lessons for Future Pilot Projects."Innovations: Technology, Governance, Globalization 12.3-4 (2019): 72-78.
[7]. Hughes, Laurie, et al. "Blockchain research, practice and policy: Applications, benefits, limitations, emerging research themes and research agenda."International Journal of Information Management 49 (2019): 114-129.
[8]. Torun, Abdulvahit. "Hierarchical blockchain architecture for a relaxed hegemony on cadastre data management and update: A

case study for Turkey."Proceedings of the UCTEA International Geographical Information Systems Congress. 2017.

[9]. Mamoshina, Polina, et al. "Converging blockchain and next-generation artificial intelligence technologies to decentralize and accelerate biomedical research and healthcare."Oncotarget9.5 (2018): 5665.