Pune Institute of Computer Technology
Dhankawadi, Pune

A SEMINAR REPORT
ON

Blockchain based land registry system using ethereum blockchain

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CERTIFICATE

This is to certify that the Seminar report entitled

"Blockchain based land registry system using ethereum blockchain"

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has satisfactorily completed a seminar report under the guidance of Prof. V. S. Gaikwad towards the partial fulfillment of third year Computer Engineering Semester II, Academic Year 2021-22 of Savitribai Phule Pune University.

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Abstract

In India, as in many other countries of the world, land registration is a long and inefficient process. In the process of land registration, tons of problems are faced nowadays. We aim to develop a system which will make the land transfer more easier and fast for buyers, sellers, and government to transfer land ownership from peer to peer which absolutely possible by creating a distributed system/ledger which will stores all the records of transactions made through a blockchain-based land ownership system. The solution we're attempting to develop is built on the Ethereum Blockchain, which will keep all of the transactions that occur during the property ownership transfer process. We can trigger numerous events using the notion of smart contracts in blockchain technology, such as a cryptocurrency/money transfer from peer to peer following successful verification of the land ownership. This solution will address the issues that all three parties confront during the land registration process, as well as eliminate the need for intermediaries such as real estate agents. This approach makes the land registration procedure more resiliant and reduces the number of occurrences of fraud. Since immutable transactions are recorded and stored in the blockchain system even land validation process can be carried out using the system.

Keywords

Ethereum (ETH), Blockchain , Cryptography , Ledger , Distributed Transaction , Land Registration

1 INTRODUCTION

Blockchain: It's a technology which consists of a Global online database, which can be used by any person around the world, anywhere, with an internet connection. Now unlike different databases which are or can be owned by any central authority for example government, or bank, a blockchain doesn't belong to anyone and is Decentralized. With an entire network of people looking after it, cheating the system by faking documents, transactions and other information becomes nearly impossible.

Here's how it works, a Blockchain system stores information permanently across a network of personal computers. This step is very important as it not only decentralizes the system but also distributes the information along the network too.

So how do you expect a multi purpose online database whose users also include criminals work for everyday use? How does it stay relatively hack-proof? The answer to this is same, the network, Blockchains millions of users, they make it difficult for any one person to take down the network or corrupt it. The many users who run this system use their own personal computers to hold bundle of records submitted by the others on the system. Now this records are known as blocks. This each block has a timestamp and a link to previous block, forming a chronological chain. Its is like a giant google document with one key difference, you can view it and add to it but you cannot change the information that's already present. The blockchain enforces this by using a form of math called Cryptography, which means records cant be counterfeited or altered by someone else.

Real estate, anyone who owns a property or have bought a land knows how time consuming and complex the process is, above all else its risky and a lot expensive due to the involvement of third party like banks, dealer, land inspector, brokers, etc. What type of property do you want to buy, in which state, or country, this factors lead to the involvement of multiple middlemen and hence you're going to be paying a large cut at every turn, and that's where the blockchain comes in.

If we were to codify local , provincial and national Land registration rules and regulations on the blockchain, smart contracts could be used to drastically simplify the process, a particular seller would simply send a location, desired price and some other ownership information to the contract then pulling from the database of rules and regulations around the sale of real estate or land in the sellers location, the smart contracts could generate contracts, deeds tax records or anything required to make the sale of the house instantly. A perspective buyer then could meet with the seller agree on pricing in terms and then send their digital signature to the contract verifying their purchase and updating all the documents as required .

Now this all requires some backend work having provable and verifiable identities on the blockchain to ensure the contractors are who they say they are and hence there would be no disputes when signing similarly the land will need to be securely and clearly be registered on the blockchain to ensure easy transfer of owner ship.

2 MOTIVATION

As it is well known, that today tons of mediators are involved in the current land written account system. The government has high involvement in todays land registry system as all the data and authorized records are kept with this third party. Our ownership information is being storend in this records which are also used to carry out transacions and prevent any fraud from happening. This current system is often faced with issues like delay in ownership verification of land. 70 percent of population lacks this access to the records of land.

Within the past, several analysis works were done to resolve the higher than declared drawback. Therefore the blockchain system introduced guarantees immutable security reducing the quantity of paperwork. Hence in this article the model created solves the issues with the current land registry system and ensures errorless, secure system.

In the year 2013, New delhi alone in India had a reported cases of 181 land and property frauds while Mumbai came on a close sector with 133 cases, To counter this issue government are partnering up with foreign startups to put our land registry on blockchain. One of the many interesting innovations we could be adding is the introduction of cryptographically secure digital fingerprints. This can help create a system of verifiable land owners which makes property transfer very fluent .

3 LITERATURE SURVEY

The Following table shows the literature survey by comparing techniques propose in various references:

Table 1: Literature survey

No.	Article name	year	summary	Limitations
1	Land registration: Global practices and lessons in India	2019	Immovable properties will be granted conclusive titles	substanstial research report show that drastic change in registration will not be followed by states
2	Efficient and accurate property title retrieval using blockchain	2019	carrying out Transactions in transparent manner	
3	National land records modernization programme	2008	Computerization of all land records and digital handling	Not as much secure as digitalization on a Blockchain system

4 A SURVEY ON PAPERS

4.1 Blockchain Security Attacks, Challenges, and Solutions for the Future Distributed IoT Network

The blockchain paradigm is dynamical the IT industry. Blockchain will pile up companies, governments, and even countries. Blockchain technology is widely known and extremely valued because of its suburbanised nature and peer-to-peer characteristics. the most takeaway of this review paper is that the authors have completely analyzed many attacks on blockchain and therefore the the security problems with blockchain with some real-world examples. Moreover, this paper mentioned the assorted security issues, challenges, vulnerabilities, and attacks that impede the enhanced adoption of blockchain technology whereas exploring these challenges in an exceedingly type of aspects. we tend to also explained different blockchain applications and benefits, and that we discussed several connected opportunities at the business level. Finally, we tend to summarized existing security solutions for various environments and open analysis issues.

4.2 Latency performance modeling and analysis for hyperledger fabric blockchain network

Fabric, AN ASCII text file framework to implement the permissioned enterprise-grade blockchain, is obtaining increasing attention from innovators. The latency performance is crucial to the material blockchain in assessing its effectiveness. several empirical studies we tend tore conducted to investigate this performance supported totally different hardware platforms. These experimental results don't seem to be comparable as they're extremely enthusiastic about the belowlying networks. Moreover, theoretical analysis on the latency of cloth blockchain still receives abundant less attention. This paper provides a completely unique theoretical model to calculate the group action latency under numerous network configurations corresponding to block size, block interval, etcetera Subsequently, we validate the planned latency model with experiments, additionally the results show that the distinction between analytical and experimental results is as low as . we tend to also establish some performance bottlenecks and provides insights from the developer's perspective.

4.3 The Role of Blockchain in Documenting Land Users' Rights: The Canonical Case of Farmers in the Vernacular Land Market :

This article advises us about the utiliazaion of blockchain services in overseeing land exchanges via VLM. VLM stands for Vernacular Land Market. Main objective of this conversation paper is to basically focus on an individuals relationship to the land he owns i.e , verifying lands and addressing them to its owner.

5 PROBLEM DEFINITION AND SCOPE

5.1 Problem Definition

To develop a Land registry system which will carry out land selling, renting, buying process more efficiently without tampering in the original documents thus avoiding scams .

5.2 Scope

As 70 percent of land in India is still not verified, introducing blockchain to handle land registration would be more secure in the future as land records will be maintained through a blockchain system.

This system is not only limited to lands but also property management can handled out securely without the involvement of dealer or broker.

Blockchain along with artificial intelligence can be used to solve various existing problems in economy and commerce more effectively.

6 METHODOLOGY

Step 1: Users register to the platform: Users will first need to register/make an account on the blockchain platform. For further verification we'll ask to submit details like Aadhar card or pan card. After verification hash will be generated for the user which will be stored in the blockchain.

Step 2: Sellers transfer the property specifications on the platform: Now if a user wants to sell his property he will upload images of the land with required docs attached on the chain which will be recorded. After uploading the given, other users will be made available for other users to see.

Step 3: consumers request access to the listed property: Now if a user is interested in buying any property listed on the chain by the seller he can simply request it. Sellers receive notification for property access requests. they'll either deny or settle for it by gazing the buyer's profile. Consumers can read the previous possession records of the property and send asking to get it and initiate the transfer. To ensure traceability and transperacy even the requests made are recorded in the chain .

Step 4: Sellers will approve the request and land inspector will be informed : Land inspector will be notified once seller approves the transfer request and smart contracts will be triggered and provide the required land documents. Meeting for land transfer will be scheduled once all the documents are verified by the land inspector.

Step 5: Verification of dealing by Land Inspector and initiation of transfer: After verifying the documents the land inspector will upload the records on the blockchain system. This transfer initiation triggers the smart contracts which sends funds to the previous owner and land possesion to the buyer . There is no need for seller to wait for the fund transfer as it ll be transferred to him as soon as the contract triggers.

Step 6: Registered Land Document Validation and Authenticity: There is no need to worry if any dispute arises regarding the land ownership as the authorized user can claim ownership by uploading the required documents and an unbiased party search ny passing a hash function.

7 Implementation

7.1 Smart Contracts

Allthe tasksregarding land transactions/records aremanaged by smart contracts.Within the planned model, we have a tendency to assumed there are solely 3 types of individuals on the network, the manager, the owner who owns the property and the buyer who wants to purchase the particular property. The proposed land registry system consists of 2 smart contracts specifically LandRegistration and Transfer

7.2 Transfer Contracts:

Next step is to create transfer contracts as shown in the below figure:

```
pragma solidity ^0.4.17;

contract Transfer {
  address public owner;
  uint public last_completed_transfer;

  constructor() public {
    owner = msg.sender;
  }

  modifier restricted() {
    if (msg.sender == owner) _;
  }

  function setCompleted(uint completed) public restricted {
    last_completed_transfer = completed;
  }

  function upgrade(address new_address) public restricted {
    Transfers upgraded = Transferss(new_address);
    upgraded.setCompleted(last_completed_transfer);
  }
}
```

7.3 LandRegistration contracts

The step one is registration of the user on the Dapps to upload land records. The LandRegistration smart contract will take care of this method without any flaws. The register operate is employed for registering the land on the DApp. Thisfunction will take land' details such as plotNo, location, landmark, and owner's wallet address together with the cost at that owner is interested to sale the land.

8 CONCLUSION

In this paper I have put forward a way to for a easy to use platform which can be used for land registration in an effective way. Involvement of brokers, middleman, etc are some of the many problems faced in land registration system. This platform will help us solve all those issues not only in India but other Nations as well. All the steps regarding land registration are mentioned in the above article. Being paperless is not the only advantage posed by this system as we can securely claim land insurance during any naturally occurring disaster. In the era of bitcoin blockchain technology is rising at a much faster rate due to the high level security is provides. Therefore immutable records can be easily created to save the land transaction records. There are several extra features that are value-added to the platform of land registry.

9 REVEIW LOG

Table 2: Reveiw Log

No.	Date	Points discussed	Suggestions
1	28 AUG 2021	Discussed various Domains and intrests	Adviced to go through various traditional ways of land registry system
2	7 SEP 2021	Presented topic with abstract and refrence research paper	Advised to go through recent research papers and find valid concepts
3	18 SEP 2021	Abstract and topic approved	Advised to add reveiw log and read more about the selected topic

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