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Blockchain in Real Estate

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Abstract - *Digitalization and the development of new information technology is one of the strongest forces of change in society. The technology called" blockchain" is one of the most talked-about technologies in recent years, both within the IT community, but also within the financial services industry. Blockchain is making waves in the real estate sector with the level of transparency it provides. The technology is being considered for use in land registration with its ability to immutably record and share information. The immutable, decentralized nature of the blockchain network renders data transparent for any untrusted party to verify. With self-executable smart contracts, trust is enhanced between parties and outcomes are validated by everyone in the network. Traditional land transaction records can now be replaced by a distributed ledger protected by cryptography and consensus technology.*

Key Words: Blockchain, Smart contract, Land registration

1. INTRODUCTION

Land registration refers to a system whereby ownership and land-related rights are recorded by a government entity. These records provide evidence of title, facilitate transactions, and prevent fraud. Out-dated land registry systems introduce delays in ownership verification, slow down legitimate transactions, and in the worst-case scenario, could enable land misappropriation. According to the World Bank, 70 per cent of the world's population lacks access to land titles. For citizens, the status of land rights can affect their access to economic opportunities. For governments, records of land ownership are essential to collect taxes, provide services, and establish its territorial authority. Given the importance of land registration for economic development, the World Bank has been spearheading efforts to improve land registration in several countries. It also sponsors an annual Land and Poverty Conference and various Land Registration projects to improve and modernize out-dated registration systems.

1.1 PROBLEM STATEMENT

In dozens of cities across the developing world, land registries suffer from similar problems. Many citizens simply don't have confidence in the system. Some are unsure if they legally own a piece of land, even if they have a legitimate sale deed. Others who want to buy a piece of land are not sure if the seller legally owns it. In a situation like Haiti, where the disaster destroyed paper records, this would be avoided with blockchain for the proof of concept, we're leveraging the inherent benefits of the Ethereum blockchain, with a focus on smart contracts. This will create a single source of truth of ownership status and history of a property. The buyer will be assured that the land is being bought is the correct plot and that the seller is unequivocally the owner, reducing the potential for disputes, as well as the costs and time involved, for any given transaction. At a high level, it will capture and permanently record each transaction throughout the sale of a property. This means you achieve near real-time traceability and transparency into the state of the property.

1.2 OBJECTIVE

In developing countries, the challenge is twofold. On the one hand, securing land property rights is a key factor in promoting economic development. Land rights are essential to promote economic growth, address economic inequalities, alleviate conflict management, and support local governance processes. In addition, reliable land ownership records increase property values and reduce lender risk. On the other hand, in developing countries land records are typically kept on paper in a centralized location. This paper-based system is not only cumbersome to access a Land registration refers to a system whereby ownership and land-related rights are recorded by a government entity. These records provide evidence of title, facilitate transactions, and prevent fraud. Out-dated land registry systems introduce delays in ownership verification, slow down legitimate transactions, and in the worst-case scenario, could enable land misappropriation. According to the World Bank, 70 per cent of the world's population lacks access to land titles. For citizens, the status of land rights can affect their access to economic opportunities. For governments, records of land ownership are essential to collect taxes, provide services, and establish its territorial authority. Given the importance of land registration for economic development, the World Bank has been spearheading efforts to improve land registration in several countries. It also sponsors an annual Land and Poverty Conference and various Land Registration projects to improve and modernize out-dated registration systems.

2. EXISTING SYSTEM

Real estate has long been the investment choice of the rich. Very few assets manage to provide the same degree of passive income and capital appreciation. The problem is that the barrier of entering the real estate market has always been extremely high. These barriers could be citizenship, international bank accounts, Credit Score, financing, cash requirements, accreditation, and having accessibility to the right sponsors and fund managers. If you are investing in

international real estate then here are some of the fees that you will have to pay – exchange fees, transfer fees, broker fees, attorney fees, taxes, investment fees. Because of the sheer number of middlemen involved, foreign real estate investment can be an expensive process. Also, you will need to consult lawyers and accountants as well to make sure that your tax returns are in order.

2.1 PROPOSED SYSTEM

It enables end-users to perform several actions regarding Property Enlistment. The DApp has a simple easy-to-use User Interface which communicates with the Node.js Express Server through a REST API, using HTTP and JSON Data format.

- Property enlistment

Property enlistment is the core entity in the project. This API allows creating property enlistment in the database. Once created, it should be validated and either approved or rejected. Approval triggers the deployment of the Ethereum smart contract.

- Approve enlistment

Approve property enlistment after manual validation. Successful approval triggers Ethereum smart contract deployment.

- Reject enlistment

Allows rejecting the PENDING property enlistment in case of failed manual validation. Sets the status to REJECTED. Rejected enlistments cannot be a queried.

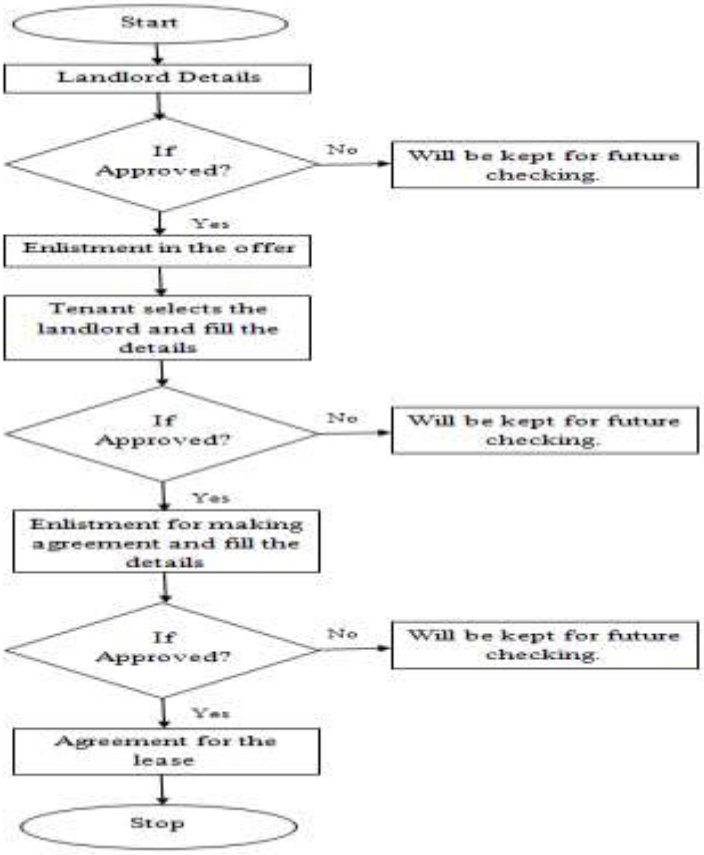

Fig -1: Flowchart of System

3. IMPLEMENTATION

The primary phase of the project involves searching on the problem and the technologies required to complete the task. So, we have started by searching on the topic by reading different case studies and papers published on blockchain and the smart contract, as a smart contract is required for the project to make transactions related to the land.

We found that to implement our project we should have good knowledge of blockchain so we started studying blockchain and more technologies to create the user interface through which a user can interact with the system.

Fig -2: Screenshot of result

Fig -3: Screenshot of result

The technology we decided to use are as follows:

- Ethereum: - Used for smart contract functionality
- Ganache: - Personal Ethereum blockchain which we can use to run tests, execute commands and inspect.
- Truffle: - World class development environment, testing framework and asset pipeline for blockchain using the EVM.
- Vanilla JavaScript: - It is a fast, lightweight, cross-platform framework. for building incredible, powerful JavaScript applications.
- Node.js: - Node.js is an open-source, cross-platform, JavaScript runtime environment that executes JavaScript code outside of a browser. Node.js lets developers use JavaScript to write command line tools and for server-side scripting—running scripts server-side to produce dynamic web page content before the page is sent to the user's web browser.

In this Real Estate Blockchain Decentralized Application project, the Access Control design pattern is implemented with Smart Contract. It works in 2 ways; either setting the address of the previous Smart Contract that calls or instantiates as the owner, or just adding the address to an admins mapping, so only admin addresses can access Smart Contract. State Machine design-pattern is implemented where all Offers and Agreements initiated within the contract must pass through different stages / statuses in an acquisition deal between the landlord and a given tenant. Circuit Breaker design pattern is implemented in this project. It works by setting the public state to true and using the modifiers to break the execution of the smart contract when debugging it. The Fail early design pattern is implemented which ensures that any amount send to the Smart Contract is greater than zero.

4. CONCLUSION

The project objective of safe and secure real estate agreement is achieve using Blockchain technology by storing all the transactions in the system inside the Blocks. These records provide evidence of title, facilitate transactions, and prevent fraud. This system reduces the chance of scam takes place in a traditional system. Thus, a safe and highly secure System is successfully developed.

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