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Decentralized Web Application for Real Estate Property Transaction using Blockchain and Smart Contract Technology

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Abstract: *Real Estate is a wide area consisting of a physical piece of land and the developments on it such as buildings, roads, and other infrastructures. Real Estate can be classified based on the purpose of usage of the property i.e. Residential, Commercial, or Industrial. Since longtime real estate is considered the most secure investment for good returns. But several issues arise in the field of property transactions which are based on the trust that the buyer or seller has in a third-party middleman/broker as well as frauds, inaccurate market statistics, time-consuming processes as well as high processing fees charged by the middlemen/broker. To provide a solution problem a decentralized web application for real estate transactions is proposed in the project. To attain the solution, in this project we propose to design and develop a decentralized web application using blockchain and smart contract technology that avails property buyers and sellers to interact with the help of a private Ethereum network and deploy smart contracts which create a precise and transparent digital property transaction process. This results in the advantages over traditional real estate systems by neglecting the requirement of non-trusted third-party entities, reducing transaction processes as well as transaction costs.*

Keywords: Blockchain, Smart contract, Real Estate, Transaction, Ethereum Network.

I. INTRODUCTION

For most people buying real estate is one of the most important decisions in their lifetimes, at the same time it is also one of the biggest investments they make ever. There are multiple agencies and agents, websites, and other channels through which people can find a property to buy or put their property up for sale. Such options have laid the advent of technology for many years which has brought ease to the buyer and seller to search for property and has provided both with better and more choices.

Real Estate transaction is a long process that may take a long time for the change of ownership from one person to another or from the seller to the buyer; even in this Tech savvy world Not only the time but the parties may also have to bear the unwanted cost for the land transaction. But there have been few technological advancements that have made these transactions more secure, safer, cheaper, and faster for the buyer, lender, and other stakeholders.

II. THEORY

2.1 Blockchain and Smart Contract Technologies

The blockchain is a mathematical, delivered, distributed journal that records all undertakings. It is a finish to survive the facts and the records of all undertakings. Data/undertakings on the Blockchain can't have misrepresented as it is a delivered table accompanying separate calculations spread across the network of consumers the one store and validate each block of news. Each bud on the network holds a copy of the Blockchain and so forth archival undertakings. Hence no sole consumer can maneuver the dossier. The blockchain is a tier for the computer network, providing an agreement for tokens priceless expected moved on a peer-to-peer (P2P) footing outside the need for main powers. Not only can these tokens be secondhand as a form of cash and a fee order but tokens can show additional forms priceless to a degree stock, bonds, votes, and in the case concerning this paper, land undertaking news.

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Data is established by all undertakings whether it's purchasing an apartment or some additional stuff like NFT etc. Several new dossier fundamentals are constituted in each undertaking. This dossier is covered as a block and the blocks are related as a chain eventually utilizing algorithms produce at each undertaking (hashes). No new block maybe amounted to the chain if the hashes are not copied by all the added consumers (namely growth) in the network. Thus, the completeness of the undertakings is asserted.

2.2 Blockchain Network

To receive this dispersed delivered arrangement, a network of growth is secondhand. This is forged by calculations that compete from across the globe. The network on the blockchain is a peer-to-peer network or P2P, which indicates that all the growth that use is of equal worth. The network of knots reaches unanimity by determining the new wanted blocks that hold a right block plunge and undertakings. The undertakings are wanted to be expected right and from that time forward, the new block is conventional in the blockchain network. Users can touch this network of growth and take part in recognizing new blocks.

2.3 Etherium

The Ethereum blockchain is identical to the Bitcoin blockchain. One main dissimilarity is Ethereum handles smart contracts. The code in the Ethereum contracts that is referred to as "Ethereum in the essence programming language" is most commonly inscribed utilizing thickness language that can encrypt some computing containing infinite loops. In Ethereum, skilled is an idea named undertaking fees, supposed vapor. The undertaking i.e. blockchain exercise demands an undertaking to have a massive computational task it is permitted to take. Each undertaking wanted demands gas from the person who sells goods to prepare the undertaking request. The total undertaking fee is deliberate by

$$transactionCost = gasUsed \times gas\ Price$$

2.4 Smart Contract

A smart contract is a contract, in the form of a calculating program that is to say performed instinctively before sure pre-programmed environments are appeased. Anyone can redistribute a smart to obtain an insignificant account to the main chain of the Ethereum blockchain. In Ethereum, the billfold has addresses, each contract has an address. Contracts can transmit and accept heavenly, just like wallets. The undertakings still contain a dossier about that function in the smart contract is named and a dossier for the limits. Smart contracts may be inscribed utilizing many various high-ranking sounds. The most accepted one for executing smart contracts is exhausted and thinking mainly about physical things word named Solidity, which is particularly planned to goal the Ethereum Virtual Machine (EVM). The EVM is the runtime surroundings for smart contracts and is unique, which means that the law running inside the EVM has no outside approach. In essence, the structure does not kill the contract terminology Solidity straightforwardly, alternatively, the contract law is assembled to depressed-level machine instructions named opcodes, that each shows individual depressed-level movement.

2.5 Swedish Real Estate System

To be intelligent to administer blockchain electronics to the real estate field, the tradition of the occupied bureaucracy is wanted. In Sweden, skill is no necessity for a property deal to search a land instrumentality. A survey of inevitable steps when selling land is a judgment of the feature, complying documents, notice, providing showings of the real estate for potential patrons, services, printing a contract, and permanently signing the characteristic achievement and handing over the solutions. The documents had a connection with the land concede possibility to be determined such as floor plans, Deed of trust, and Easements. For finding the property of land characteristics in Sweden, a few necessities need to be completed for the contracts expected genuine. The environments need to be expected completed before the owner may be moved and confirmed. If not accomplished right, the contracts could be invalid.

III. Research Methodology

Two methodologies were chosen, using a combination of qualitative methods and case study research. Due to the explorative character of this study, the research strategy is qualitative. It seeks to bring theory and practice together in the pursuit of developing practical solutions for parties involved in the real estate management process concerning blockchain

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technology and aims to develop a deep understanding of a situation; in this case, the position of the homebuyers and sellers. Qualitative data is rather expressed in words than numbers Gathering empirical results are based on two types of research methods, literature study, and interviews. The literature study covers the concept of blockchain technology and real estate market techniques and the current technologies offered in this area whereas the interviews taken to collect information from the concerned parties i.e builders, property owners, and government body focusses on the implementation of blockchain in real estate for the Indian market.

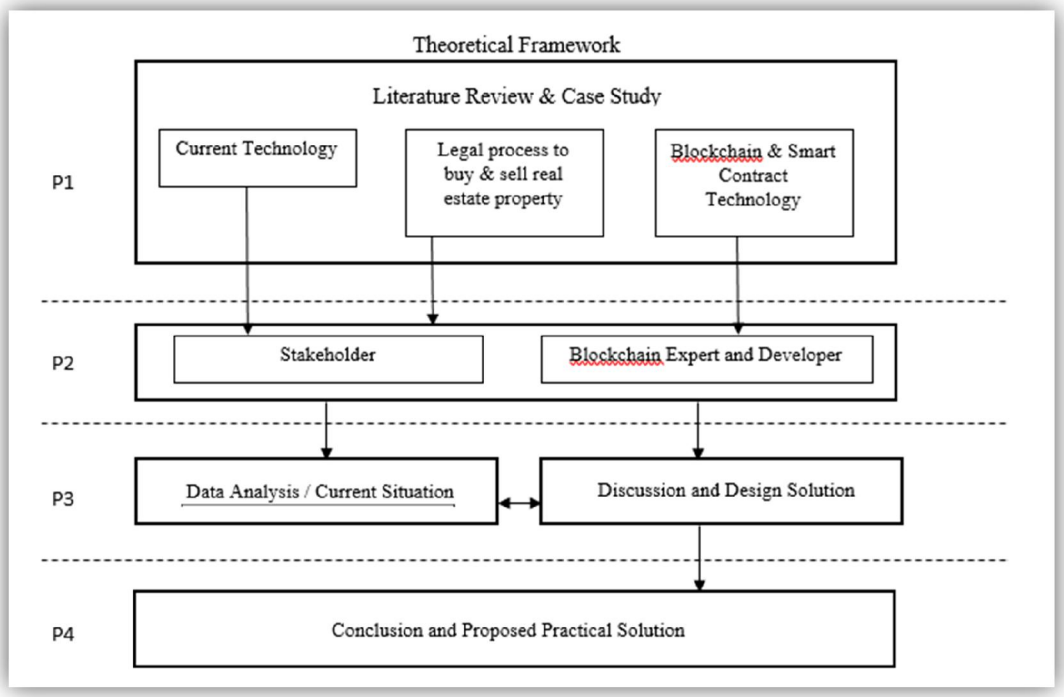

Figure 1: Research Methodology used for this project

3.1 Data Gathering

Regarding to answer the research related questions, relevant literature was explored. Looking into many real-world applications and their usage of blockchain. It was done to dive deep on how blockchain technology has been applied in various areas. Interviews and research were done to get an idea of the current situation in the market and to detect the problems related to real estate transactions. The literature was collected from different sources that could verify each other.

3.2 Interviews

The interviews were held with three different stakeholders i.e. Real estate Investor, Government Representative regarding land registration and a Blockchain Expert. The participants were selected based on that they had experience with purchasing real estate or had knowledge of the process of buying real estate. We also had person with expertise in blockchain, which was necessary for providing a meaningful discussion of other key people. The participant discussed about their experience and understandings of the real estate market and the process of purchasing properties. A discussion followed where the interviewees shared their thoughts on improvisation regarding the real estate market and its benefits of applying new technologies to it.

IV. IMPLEMENTATION

4.1 Tools

Throughout the research phase, several tools were mentioned frequently in implementations of applications using Ethereum and smart contracts. So the following tools were looked into as being part of the prototype. Ethereum was selected

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because information regarding the ownership record transactions for the real estate can be made available for the next buyer. Public blockchains are difficult to tamper and once data is added to a block, it becomes immutable. This avails a verifiable and censorship option for transaction history to be open for the public. Ethereum was chosen because it has a lot of active nodes and is difficult to tamper.

4.2 MetaMask

This browser extension, briefly mentioned in subsection, is a wallet that runs in the browser and is used by, for example, CryptoKitties for the transactions in the application. The default network on MetaMask is the Main Ethereum Network, but it gives the option to change to localhost, for example, a private test net using Ganache.

4.3 Truffle

The most popular development framework for Ethereum. It has several features such as built-in smart contract compilation, deployment and testing. Part of the truffle suite is Ganache, a local Ethereum blockchain which can be used to deploy and interact with smart contracts. With automatic mining, the smart contracts and transactions are visible in a GUI after a few seconds

4.5 MySQL

MySQL is a relational database management system based on the Structured Query Language, which is the popular language for accessing and managing the records in the database. MySQL is open-source and free software under the GNU license. It is supported by Oracle Company.

4.6 IDEs and Editors

Spyder is a free and open source scientific environment written in Python, for Python, and designed by and for scientists, engineers and data analysts. It features a unique combination of the advanced editing, analysis, debugging, and profiling functionality of a comprehensive development tool with the data exploration, interactive execution, deep inspection, and beautiful visualization capabilities of a scientific package.

V. STEPS FOR PROPOSED SYSTEM

- Step 1: Identify key functionality which could benefit the users
- Step 2: Identify conditions required to be fulfilled for the smart contract
- Step 3: Create a structure/Architecture and design for the application
- Step 4: Implement application
- Step 5: Test and assess the system

VI. RESULT

6.1 Resulting Prototype

The final prototype is an implementation of a system for real estate transaction between a seller and a buyer. It sets up and deploys a smart contract to a Ethereum blockchain and runs on top of the smart contract. The Decentralized web application avails user to visit and list or search property alike the online market places that are available in current time. What we offer them ahead of listing & viewing property is providing platform for buying and selling the property virtually without any hassle. The required information regarding user, property details & transaction is added to the smart contract.

6.2 Usage of the System

To showcase the usage of the system a simple scenario for an apartment transaction using the system follows.

1. The users register and login.
2. After being verified, the Seller lists his property on the platform whereas the buyer searches a property according to his requirements and if interested puts an offer to the seller.
3. The seller on the other hand accepts or declines the request.
4. On accepting seller sends the title deed to the buyer, if the buyer finds it appropriate signs the draft title deed and

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send it again to seller.

Once the seller receives the signed deed from buyer, he sign the document himself and then sends it to the escrow (a government property registrar) who witnesses the transaction, The buyer on the other hand pays the amount to escrow and the escrow gives a final green signal for the exchange of property title and sends the amount to the seller.

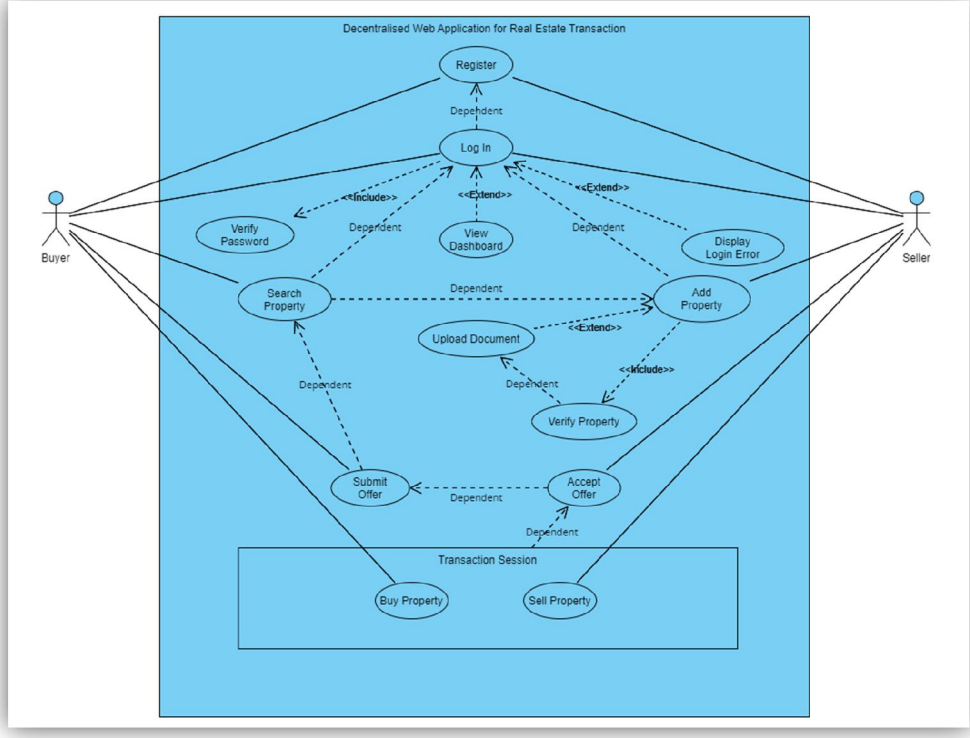

Figure 2: Use Case Diagram of Buyer and Seller Property Transaction

VII. CONCLUSION

It is clear that blockchain has the time to impact land manufacturing in the age before.At the moment, the future of blockchain science depends on the wider agreement by any novelty experienced and future-ready land firms and administration experts. . The impact of blockchain can only be adequately obtained when the united corporations select it completely in their day to era movements.

Whether it is the capability to have a liberated, unchangeable and provable record of the title of each possessions or the electrical profession of possessions that smart contracts specify, skilled are many freedoms for blockchain to become a fundamental part of our manufacturing that by threatening risks, costs and undertaking opportunity. We wish the valid blockchain - experienced innovation at hand in killing experience if it goes hand in glove accompanying next age electronics in the way that the Internet of Things (IoT) and Artificial Intelligence (AI). We anticipate it to organize the complete original-class biological clock. We plan the manufacturing collaborators balance to adopt and administer blockchain finishes in their processes. As the science is not a cheap answer or an smooth alternative in the existent habits, blockchain enactment will delay to form allure place in the here and now. We expect that it will go to the bathroom through many changes and upgrades as stock exchange mature over occasion.

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REFERENCES

[1]. Somi S. Thota Data Architect and specializes in Big Data, Cloud, Data Integration and Data Analytics, "Blockchain for Real Estate Industry", 2019.

[2]. Moa Hermansson, "Real Estate Transactions using Blockchain Technology", Department of Applied Physics and Electronics Fall 2019.

[3]. Leena S. Alotaibi and Sultan S. Alshamrani, "Smart Contract: Security and Privacy", Department of Information Technology, College of Computer and Information Technology, Taif University, Tech Science Press, 2021

[4]. Surabhi Arora, Senior Associate Director, Saif Lari, Assistant Manager, "Impact of blockchain on Indian real esatate," Colliers Radar, India Office, 2018.

[5]. David Nadler Prata, Humberto Xavier de Araújo, Cleórbete Santos, "A Literature Review about Smart Contracts Technology," International Journal of Advanced Engineering Research and Science (IJAERS), 2021

[6]. Ashish Sharma & Dinesh Bhuriya, "Literature Review of Blockchain Technology," Volume 6 issue 1, 2019.

[7]. Jubil Gea Joy, Mr. Kishore Sebastian, "Blockchain in Real Estate," 2020, Department of Computer Science and Engineering St.Josephs college of Engineering, Pala, Kerala, India

[8]. Jyotsna Yarlagadda, "Blockchain for Real Estate", ResearchGate, Dec 2020.

[9]. Fabian Knirsch, Andreas Unterweger and Dominik Enge, "Implementing a blockchain from scratch: why, how, and what we learned", EURASIP Journal on Information Security, 2019

[10]. Arnab Kumar, Tanay Mahindru, Punit Shukla and Aalekh Sharan, "Blockchain: The India Strategy", NITI Aayog, Jan 2020

[11]. Fran Casino, Thomas K. Dasaklis, Constantinos Patsakis, "A systematic literature review of blockchain-based applications: Current status, classification and open issues", ELSEVIER, Telematics and Informatics, 2019

[12]. Maher Alharby and Aad van Moorse, "Blockchain Based Smart Contracts: A Systematic Mapping Study"

[13]. Evgeny Pankratov, Vladimir Grigoryev and Oleg Pankratov, "The blockchain technology in real estate sector: Experience and prospects", IOP Publishing 2020

[14]. Bastiaan Don, Dharma Rajah, Stephan Ott, Ken Fromm, "Real Estate Use Cases for Blockchain Technology", Enterprise Ethereum Alliance – Real Estate Special Interest Group, 1 March 2019