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Real Estate Land Transaction System Using Blockchain

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Abstract: ***Real Estate Management in India as well as in many parts of the world is a very inefficient and insecure process. Developing a secure system that not only accelerates the process of land registration but also makes it efficient and secure will be effective. Blockchain technology is one of the latest and secured technologies on the horizon and has evolved over the last 9-11 years. There is tremendous potential for usage of Blockchain technology in the land industry. This paper presents a blockchain-powered real estate management system that will impart transparency, efficiency, and security in Real Estate Management. The decentralized data storage application and its interactions with Ethereum Virtual Machine (EVM) are presented to point out the event of a sensible contract which will be used for blockchain smart contracts in real estate management. Further, a detailed design and interaction mechanism are highlighted for the estate owners and users as parties to a sensible contract. It will store all the transactions on a distributed blockchain which will be very secure and will not be prone to hacking. A list of functions for initiating, creating, modifying, or terminating a sensible contract is presented and this will help the user enjoy a more immersive, user-friendly, and visualized contracting process, whereas the owners and real estate agents can enjoy more business and sales. It is a practical solution to the real estate management problem in the real world.***

Keywords: Blockchain, Smart Contracts, Real Estate Management, Ethereum Virtual Machine, Transparent Contracting Process

I. INTRODUCTION

Traditionally, we depend on trusted third parties to register and transfer the power of land and real estate property. This model poses several problems. Documents are frequently non digitized, hard to reach, even harder to update, and occasionally lost in time. Blockchain technology is an innovative way of keeping records digitally. Blockchain aims to reduce the threat for corruption and fraud of records by enforcing decentralization. Decentralization means the records are kept within the blockchain without the need for a central authority. In other words, the information stored in the blockchain is kept by everyone, making nearly impossible to falsify.

II. LITERATURE SURVEY

A. Problems in the Current System

Real Estate Management in India as well as in many parts of the world is a very inefficient and insecure process.

For the current system, the buyer has to first pay the money to the seller and then has to pay the stamp duty charges to the government. This process can be done offline as well as online. Then both of them have to schedule an appointment with the local sub-registry office where they have to be present on a given date and time with all the documents along with the payment proof. Their documents are verified and this process takes too much time and many loopholes are there which are beneficial for criminals. After this process, the buyer has to manually go to municipal offices to change owner details in the municipal records.

There are Increasing numbers of fraud cases due to the non-availability of genuine data records to property buyers and a lack of transparency is in the system. It is all due to the fact that is data being unavailable in the public domain as well as there's no way to retrieve the number of properties owned by a person because the records are distributed. The government addressed this problem in the near past but the problem persist that, non-availability of genuine real data in the public domain and issue still needs to be addressed and this can be considered as a limitation or drawback of the system.

This process consumes lot of time and involves middlemen and third-party people who charge illegal fees to do the work. They rob many innocent people who are unaware of the process. This process takes more than 10-15 days which should be done rapidly in this digital fast-moving world. Now the government has moved towards digitalization and making records available digitally in a centralized database. But loopholes are there with the centralized databases. Some of the issues include data security and fraudulent data changes which are serious problems to focus upon. Loss of records in any disaster situation if present in traditional offices or in a centralized system is another issue.

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This system costs very high and it involves many people unnecessarily as in this digital world with the help of technology entire work can be automated. Apart from all these problems, there is another problem with the transfer of property by heredity or will. In this case, one has to go to the land sub-registry office with the death certificate of the person to transfer the property and so many procedures are needed to be followed in this case which is a very tedious procedure. There is not a single way to automatically transfer the property which should be implemented.

One other problem is with financial institutions that they can't verify easily the property status in case of property to be mortgaged for the loan. Even if the property is on lien being mortgaged there is no way for other persons to know that.

B. Present Work

1) *In the paper published in (2020) named as Real Estate Management System based on Blockchain by A. Mittal:* He has proposed solution is a centralized system with a distributed blockchain network for secured and immutable data storage. It will be synchronized with the different departments for a real-time and efficient property transfer system. The data of the property will be in the public domain through a channel in the system and will be easily accessible to the people and all the departments for the trustworthy system. To get the details of property which are on lease we can scale the existing system. The transfer of the property will be cryptographically secured with the public key-private key cryptography and will be blockchain secured for immutable data records. Blockchain technology enables to achieve the goal of security as well as consistency of the data. The limitation of this system was the centralization of the entire network which can lead to failure if the central node fails. The network might get affected if privacy for a single node gets britches.
2) *In the paper published in (2020) named as a secured land registration framework on Blockchain by M. Nandi:* States that as compared to the single point failure armature of centralized systems, the frame grounded system has plant an upper hand in terms of the safety and undisputed data storehouse in the form of Directed Acyclic Graphs in every knot of the system. Falling prey to the uni-verification of the land power operation by a single reality has redounded in several forms of fall-outs, which requires a devoted source of time and fiscal support for the issues which also occasionally affect in another class of contestation. This system was robust in the terms of storing and security of data. It has achieved an enhanced form of scaling and authentication of realities of the system. A single agreement and binary agreement ensure the validity of every sale of land and property power. Also, the time- stamp of contracts like testaments and mortgage deeds are handled with a sense of executing only at the fixed and certain hours. Although the addition of any occupant wouldn't bear the agreement of the other reality of the Blockchain but the new member must be verified by the citizenboat record system of that respective state. Entire responsibilities of icing a new member till a occupant should be taken by citizenship record system of the country. Then, the member is authenticated by a token generation system against a information storehouse system along with that citizenship of particular member has proved. As every proprietor of the land is formerly recorded in newly developed list of Genesis in system, the background of a current proprietor of land which is outside of system is hidden and demolished. This system stands in correspondent with a decentralized backend law and it is liable for prosecution of all styles of the smart-contract of that original system. The style defines each land piece to a plot ID which is further divided in 100 million sub tokens for the bettered division of land in parts and it transfers incompletely / fully, by relaxing the distribution among different members of land's weight. The main limitation of this system is that it's entirely dependent on citizenship records which are completely centralized Government grounded and can beget failure if a single record gets lost or modified. Along with that this system assures only viewing of records but doesn't ensure sale- related functionality which in terms can give rise to third- party sale system involvement.
3) *A secured Land Registration Framework on Blockchain proposed by Suganthe R.C in 2021:* In this system, Smart contracts were concentrated. Smart-contracts are nothing but self-executing contracts which converts terms of the merchandiser-customer agreement directly into lines of law. The legislation and the agreements made in it live across a dispersed, open blockchain network. Smart contracts enable secure transactions and agreements between remote, anonymous participants without the requirement for centralized authentication, a legal framework, or an external compliance medium. They make transactions traceable, transparent, and untraceable. Smart contracts once stationed it can be penetrated encyclopedically. Miners are the parties who execute and certify these transactions. Miners are a group of computers that add a sale (a state addition or revision) to a public tally known as a block. A blockchain is made up of these several blocks. You pay some ether that is transformed into gas when you publish a smart contract, execute a smart contract function, or transfer plutocrat to another account. The limitation of this system was a failure in updating of record. As well as this system made buyers along with merchandisers pay for smart contract verification.

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III. RESULT AND DISCUSSION

A. Proposed Solution

Blockchain systems combined with the real estate business have offered an innovative solution in terms of speed and security, which may significantly minimize technological frauds. This revolutionary technology simplifies the process of data transfer and shortens the time between signing the preliminary sales agreement in real estate (i.e. smart contract). The automation of real estate transactions is enabled by new digital architecture.

This system only allows members to join the Blockchain and access the parcels for trade after they have verified their details.

Smart contracts, which are tone-executing contracts that are directly written into lines of legislation with the parameters of the agreement between merchandisers and buyers, will be emphasized in the proposed system. A distinction-free approach is used to handle a variety of different edge circumstances connected to the transfer of land and property.

For each sale, the system strictly respects the decentralized elements of mongrel Blockchain with medium of agreement of realities. The data stored on the system will be visible to only the members of the blockchain. Members outside the visual range will only be able to view the packets for trade at the cost of being enrolled in the blockchain, ensuring that the blockchain does not come into contact with unauthorized people in the restricted areas. For a reliable data storehouse, the authorization system redefines the essential concept of access control.

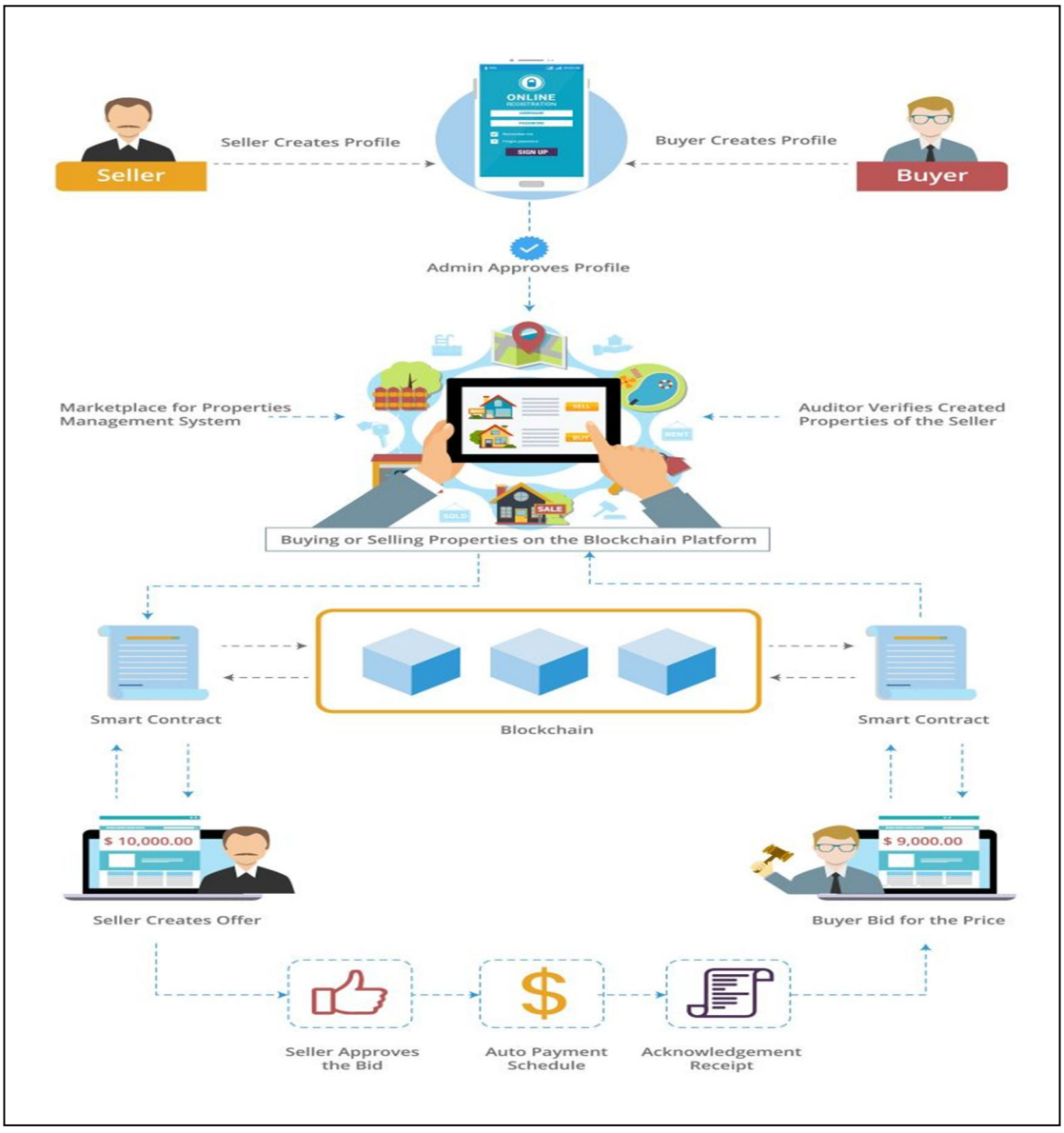


Fig 1: Proposed Solution

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B. Methodology

1) *Blockchain technology:* When Satoshi Nakamoto introduced Bitcoin in 2008, he introduced Blockchain technology for the first time. Later, this technology drawn the attention of governments along with many large non-govt enterprises. Due to this, various industries adapted to rapidly developing blockchain technology. Blockchain is basically a decentralized database of records or public registry of every transactions or digital events that have been carried out and later shared among participants.
2) *Real estate sale platform grounded on blockchain technology:* Ethereum platform acts as foundation for this platform. The primary purpose of this platform is to comprehend the critical estate sale information that is released and sold. It can also query historical transactions.
3) *Ethereum:* A decentralized, open-source blockchain known as Ethereum supports smart contract functionality. It's a blockchain platform with its own cryptocurrency, called Ether (ETH) or Ethereum, and its own programming language, called Solidity.
4) *Web operation subcaste:* The application layer is client arranged. It is the intelligent interface of the framework. It has a sign-in/join module, discharge message and drop exchange module, exchange module and read information/push information module. Through the website page, the hidden data set can be called to peruse and store information. Through the entryway, the land framework information can be called and the substance of the exchange can be pushed back to guarantee the continuous information.
5) *Smart-Contract:* The smart contract layer gives exchanges to information stockpiling inquiries and land exchanges. At the point when the page applies for information inquiry or capacity, the information stockpiling question brilliant agreement is called, which can finish the information inquiry or capacity. At the point when the land is executed, the exchange savvy contract is called, and the two gatherings sign the agreement to finish the land exchange.
6) *Consenus Layer:* Proof of work (PoW) algoritham portrays a framework that requires a not-irrelevant yet attainable measure of work to decide paltry or malignant employments of figuring power, for example, sending spam messages or dispatching refusal of administration assaults

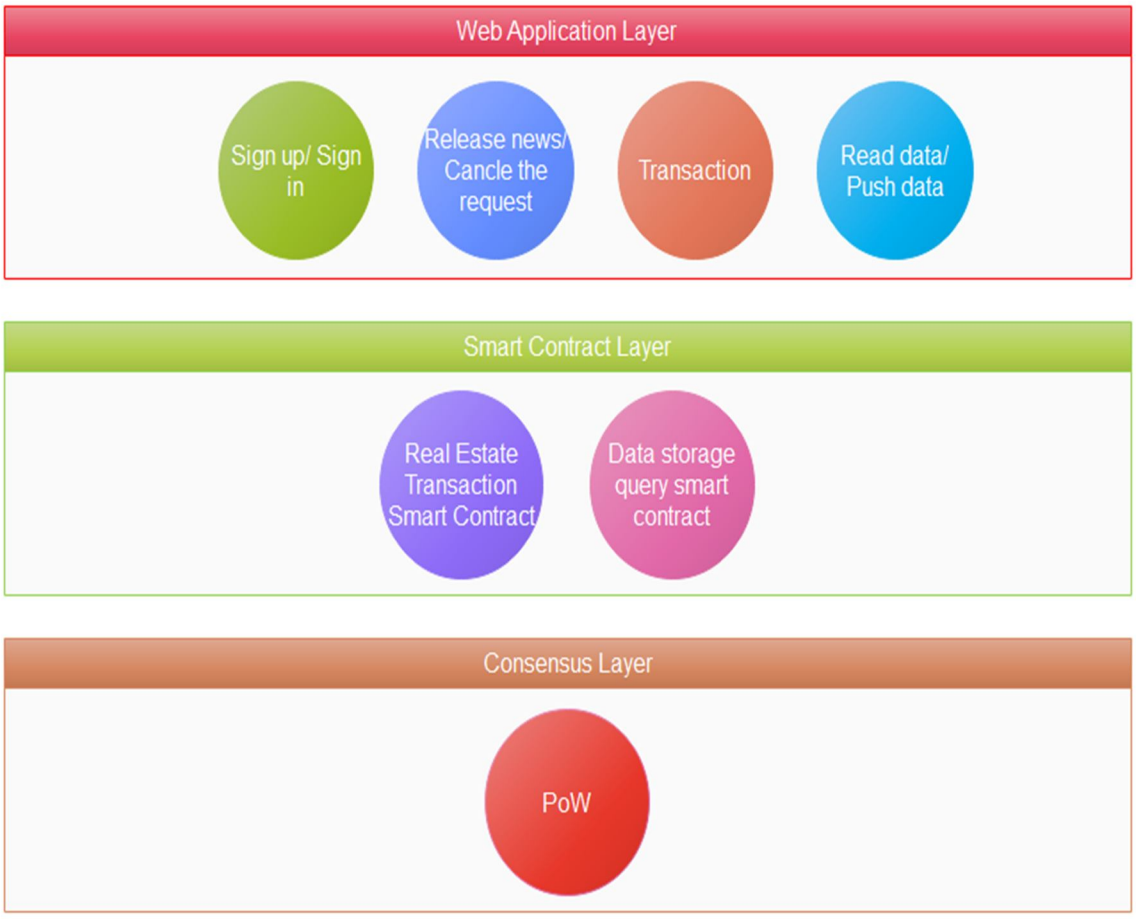


Fig 2: System structure

Table 1
COMPARING EXISTING TECHNOLOGIES

	Traditional Method	Internet finance method	Blockchain Method
Customer experience	Uniform scenarios	Rich scenarios	Rich scenarios
	Homogenous service	Personalized service	Personalized service
	Poor customer experience	Good customer experience	Good customer experience
Efficiency	Many intermediate links	Many intermediate links	Point-to-point transaction, disintermediation
	Complex clearing process	Complex clearing process	Distributed ledger, transaction clearing
	Low efficiency	Low efficiency	High efficiency
Cost	Large amount of manual inspection	Small amount of manual inspection	Completely automated
	High cost		Low cost
Safety	Centralized data storage and can be tempered	Centralized data storage and can be tempered	Distributed data storage and cannot be tempered
	Easy to leak users' personal information	Easy to leak users' personal information	Use of asymmetric encryption, hence users' personal information is more secure
	Poor safety	Poor safety	Good safety

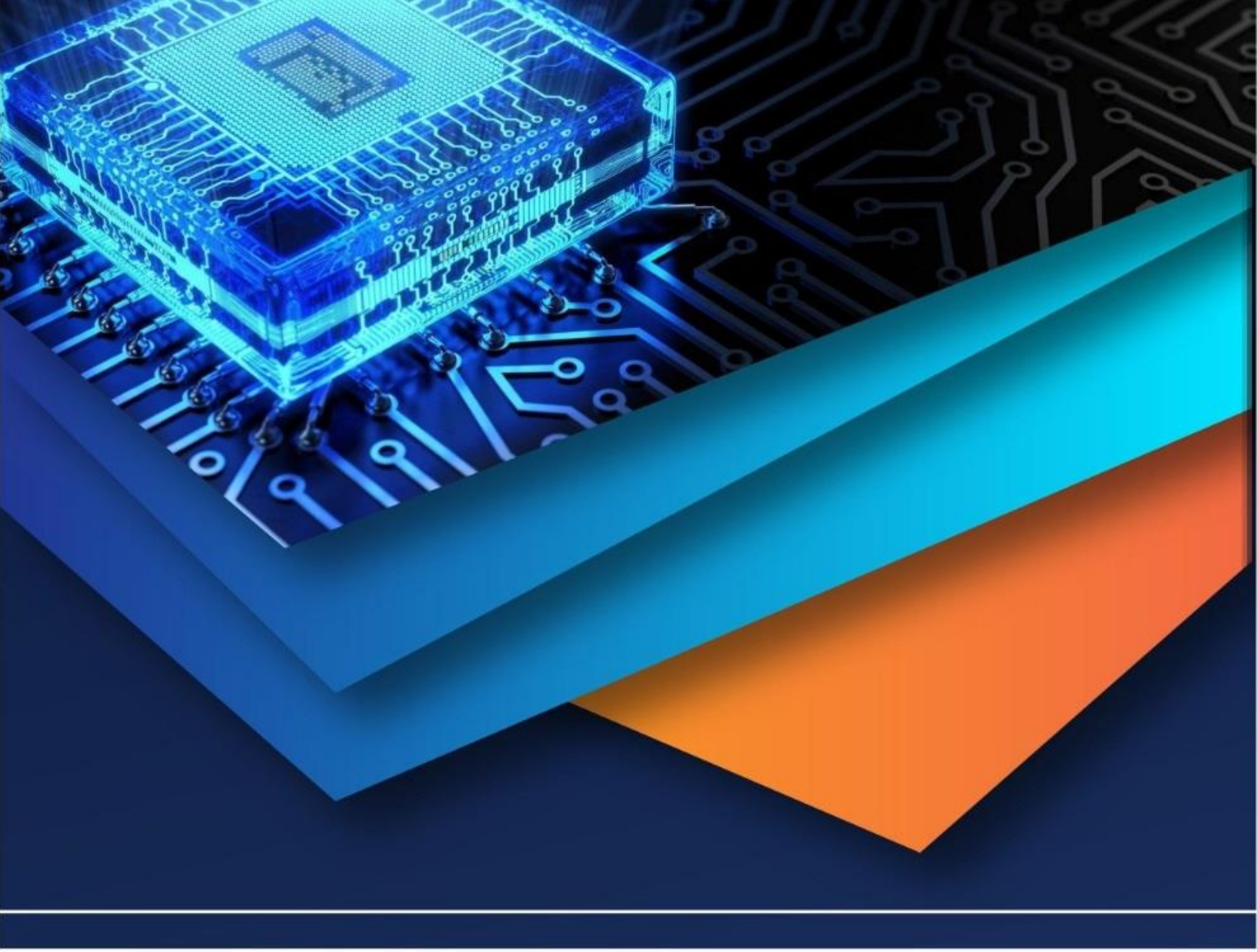
IV. CONCLUSION

The blockchain-based system proves to be apt for handling all the cases of land ownership transfer at the value of the participating entities of every transaction within the network because it has the potential to drive accountability, competency, and profitability within the important property industry by removing the prevailing inadequacies within the system.

Traditional land ownership transfers constitute an investment of the prodigious amount of some time and money. Many cases associated with fraud and duplicate papers for one piece of land can even be produced by a corrupt system. To cope with such challenges, the concept of Blockchain has been applied within the proposed system.

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