

Secure Land Registry System using Ethereum Blockchain

Lavanya Shree D.P¹, Harish T. A², Shantala C P³

¹M. Tech Candidate, Department of Computer Science and Engineering, Channabasaveshwara Institute of Technology, Gubbi

²Assistant Professor, Department of Computer Science and Engineering, Channabasaveshwara Institute of Technology, Gubbi

³Professor and Head, Department of Computer Science and Engineering, Channabasaveshwara Institute of Technology, Gubbi

ABSTRACT

Land registration is a important process that involves the felony recording of land possession, rights, and transactions. The current land registration structures in many nations frequently face demanding situations including corruption, inefficiency, and lack of transparency. Land Registration is a use case which entails lot of middlemen and critical authorities within the method which then puts trust within the gadget. keeping traces of who owns which part of land is challenging when there are hundreds or lots of land information to maintain. the use of Blockchain will take away the middlemen within the system and also will reduce corruption and increase pace of the process. Land Registration is a easy decentralized application which is build the usage of the Ethereum Blockchain principals. we will use this registration system as a replacement to bypass the present machine flaws. here the user who owns the land registers his land information and additionally enters marketplace value of the land with the aid of presenting all the important proofs. A central authority who traditionally looks into land registry is assigned as a land inspector can do the registration technique. Lands coming underneath a selected village can be registered to the gadget best via the inspector who's assigned to that village. The smart contract used here is written in this type of manner that the owner has to transfer his belongings completely to the buyer and no transaction of the land can be partial. Even we allow a government authority is involved in registration system, the complete manner is obvious and the transaction takes place most effective among the two customers.

Keywords: Blockchain, smart contracts, Ethereum, cryptocurrency.

1. INTRODUCTION

Land register might be a gadget that records the factors of possession declare by way of many governments our bodies, way that it shops the records of land possession. however, the vicinity unit several troubles and loopholes within the current machine that bring about to corruption and disputes. For dedication those troubles we have a tendency to region unit mistreatment Blockchain Technology.

A blockchain is a continuously expandable list chain of statistics blocks that are connected through encrypted records exchange. each block typically consists of a reference. To the preceding block, a timestamp, and transaction records. one of the most famous blockchain applications is the crypto-currency

Bitcoin. due to the fact that the transaction statistics on all programs clients are visible for every body and traceable stored, this system is taken into consideration tamper-evidence and obvious.

Blockchain is a disbursed ledger technology that statistics all transactions that take place across a peer-to-peer community. Imposing land registration using blockchain can help prevent fraudulent sports, making the device more comfortable. Blockchain can also prevent illegal sports concerned in land transactions as it is difficult to duplicate. All contracts and ownership information are maintained in a decentralized manner, casting off the need for bodily intervention. therefore, it's miles simpler to tune records transactions, enhancing the overall security of the gadget. Blockchain presents a possibility to establish a sturdy gadget for virtual identification. the use of blockchain, every block within the community represents information involved in a land transaction, which include property identity, assets quantity, proprietor details, transaction quantity, mode of charge, and closing transaction details like the quantity paid for the transaction. Implementing applications the usage of blockchain guarantees the best of digital statistics. these days, technology makes use of password-based totally tactics for getting access to exclusive records. however, storing information in insecure structures is unreliable, especially for privacy and records safety troubles. The authentication schemes observed by blockchain-based totally programs are based totally on stringent identity verification based totally on public key cryptography. Individual processing steps of the process of transfer of ownership could be speeded up and made more transparent, so that the parties involved can at any time have an overview of the status of proceedings.

A cryptocurrency, crypto-foreign money, or cryptocurrency is a digital overseas money designed to paintings as a medium of exchange through a pc network that isn't always reliant on any primary authority, which include a central authority or financial institution, to uphold or keep it. Cryptocurrency does now not exist in bodily shape and is generally now not issued with the aid of a central authority. Cryptocurrencies usually use decentralized manage instead of a principal monetary organization virtual foreign cash at the same time as a cryptocurrency is minted, created previous to issuance, or issued through a unmarried business enterprise, it's far typically taken into consideration centralized. at the same time as achieved with decentralized control, every cryptocurrency works thru disbursed ledger generation, typically a blockchain, that serves as a public financial transaction database.

Ethereum is a decentralized blockchain with smart agreement functionality. Ether is the local cryptocurrency of the platform. amongst cryptocurrencies, ether is 2nd most effective to bitcoin in marketplace capitalization. it's miles open-supply software software. Ethereum lets in anyone to installation permanent and immutable decentralized programs onto it, with which users can interact. Ethereum additionally permits users to create and trade non-fungible tokens, which can be tokens that may be tied to specific digital belongings, which includes pics. additionally, many extraordinary cryptocurrencies utilize the ERC-20 token trendy on pinnacle of the Ethereum blockchain and have carried out the platform for preliminary coin offerings.

smart contracts are a laptop application or a transaction protocol that is supposed to robotically execute, manipulate or document sports and actions in step with the terms of a settlement or an agreement. The goals of clever contracts are the cut price of want for depended on intermediators, arbitration costs, and fraud losses, in addition to the discount of malicious and unintended exceptions. clever contracts are usually associated with cryptocurrencies, and the clever contracts delivered by Ethereum are commonly considered a essential constructing block for decentralized finance and NFT programs.

Solidity programming language is an item-oriented programming language created especially with the resource of the Ethereum network institution for building and designing smart contracts on Blockchain

systems. it is used to create smart contracts that put into effect business enterprise common experience and generate a series of transaction statistics in the blockchain gadget.

SHA-256 algorithm comfy hashing algorithm, or SHA. records and certificates are hashed with SHA, a modified version of MD5. by means of the usage of the use of bitwise operations, modular additions, and compression abilities, a hashing set of rules reduces the input facts right into a smaller shape that isn't always possible to understand. SHA is designed to offer a exceptional hash even if simplest one man or woman inside the message adjustments. As an instance, don't forget combining the difficulty subjects Heaven and Heaven Is unique. The only difference amongst a capital and tiny letter, although, is duration. the first message is hashed using SHA-1 to get the hash digest "06b73bd57b3b938786daed820cb9fa4561bf0e8e". The hash digest for the second, analogous message will seem like "66da9f3b8d9d83f34770a14c38276a69433a535b" if its miles hashed with SHA. The avalanche effect is what is understood for this. This phenomenon is vital for cryptography because it implies that even the smallest alteration to the message being entered completely alters the output. As a end result, attackers might not be capable of decipher what the hash digest first of all sad or determine whether or now not the message was altered even as in direction and tell the message's recipient. SHAs can usefully aid in identifying any changes made to an authentic message. A person can determine whether even one letter has been altered thru consulting the authentic hash digest since the hash digests may be totally special. The fact that SHAs are deterministic is one in each of their key talents. which means that any gadget or man or woman may reproduce the hash digest in the event that they understand the hash set of rules that grow to be used. every SSL certificate on the net ought to had been hashed with the SHA-2 approach due to the determinism of SHAs.

2. RELATED RESEARCH WORK

Blockchain for Land Administration" by Tarek Zeina Rohan Bennett: This paper explores the use of blockchain technology in land administration, including land registration. It discusses the benefits and challenges of using blockchain for land registration and provides a case study of a blockchain-based land registry in Sweden. "A Comparative Analysis of Land Registration Using Blockchain Technology" by Ismaila Temitayo Sinusitis: This study compares the use of blockchain technology for land registration in Nigeria and Ghana. It analyses the benefits and challenges of using blockchain for land registration and evaluates the feasibility of implementing blockchain-based land registries in these countries. "Blockchain-Based Land Administration: A Review of Applications and Potentials" by Julius Oladele Ogunremi: This paper provides a comprehensive review of blockchain-based land administration systems, including land registration, around the world. It evaluates the strengths and limitations of these systems and identifies the key challenges and opportunities for further research in this field.

Land, a treasured yet complex asset, poses challenges in monitoring possession modifications due to common shifts and fraudulent registries. those issues lead to prolonged possession disputes and waste sources. "Land Chain: A Blockchain primarily based Secured Land Registration system" in: 2020 1/3 ISEA conference on protection and privateness addresses these troubles, a Blockchain-primarily based system transforms physical property into cozy, immutable tokens, resolving the troubles and imparting efficient transaction processing using Ethereum. The assets registration method, in particular concerning land, may be a complicated and time-eating process in developing nations such as Bangladesh. "a novel Framework for Implementation of Land Registration and ownership control via Blockchain in Bangladesh" this paper sheds light on the challenges associated with traditional manual land registration

methods, which encompass troubles like transparency, centralization, authenticity, and reliability. In response to those demanding situations, the paper puts forth a novel technique utilizing Blockchain technology as a solution. It delves into a comparative evaluation of Blockchain-based totally virtual land file structures carried out in numerous nations. in the long run, the paper introduces a unique framework that leverages Blockchain technology to streamline the land registration manner, making sure authentic and irrefutable property rights for the citizens of Bangladesh. Land Registry documents, issued by the government as criminal evidence of land ownership, play a critical role in international locations like Bangladesh, wherein the traditional Land Registry system encounters sever challenges. To address these issues, “Blockchain primarily based Land Registry with Delegated proof of Stake (DPoS) Consensus in Bangladesh” indicates adopting Blockchain generation turns into vital. by means of leveraging Blockchain, a relaxed and transparent digital ledger may be maintained, revolutionizing the manner facts approximately land belongings are managed. though, the combination of a Blockchain-based system needs to be meticulously deliberate and executed. Our progressive concept revolves round enhancing the DPoS consensus, thereby facilitating the creation of a private ledger gadget tailored Forland asset transactions. This machine can seamlessly coexist with the traditional Land Registry, making sure a easy and efficient operation. keeping land data in international locations with widespread territories and populations poses significant challenges. Relying solely on a centralized database isn't always foolproof, given its vulnerability to cyber-attacks and fraud. To deal with this problem, “Land statistics gadget the use of Hybrid Blockchain” this paper suggests implementing a hybrid blockchain answer. on this proposed land information system, the government transfers present land information to the blockchain, with all land sales transactions securely recorded. These transactions go through verification by way of government-legal nodes, ensuring their immutability. Citizens can get admission to their land possession details and associated transactions however lack the capability to regulate any blockchain records. This hybrid blockchain combines the strengths of public and personal blockchains, supplying improved safety and reliability in comparison to traditional databases and paper records.

3. PROPOSED SYSTEM

The proposed system for a blockchain-primarily based land registration system objectives to decorate the transparency, protection, and efficiency of current land registration structures. The gadget may be based on a blockchain, in which only authorized parties can take part within the network. the subsequent sections describe the key functions of the proposed machine.

The proposed system could be decentralized; this means that that there will not be a single authority controlling the system. as an alternative, the system will be maintained by means of a network of nodes to be able to validate and file transactions. the usage of blockchain era will make certain that the gadget is obvious, and all transactions are visible to all legal events.

The usage of blockchain era will make sure that everyone transaction is and tamper-proof. once a transaction is recorded on the blockchain, it cannot be amended. this means that all land registration statistics may be relaxed and tamper-proof, lowering the threat of fraudulent activities.

The proposed gadget will use clever contracts to automate the land registration process. clever contracts are self-executing contracts which could automatically validate and execute the terms of the agreement. this could lessen the want for intermediaries and speed up the land registration procedure.

The proposed system will use digital identity management to make certain that handiest authorized events can participate in the community. All members could have a completely unique virtual identification, for

you to be used to affirm their identity and get admission to rights. The proposed device could be designed to combine with existing land registration systems. this will make certain that the transition to the brand-new machine is seamless and does not disrupt present land registration tactics.

The proposed machine for a blockchain-based land registration system has the capacity to revolutionize the way land registration is finished. The machine will enhance transparency, safety, and performance, and reduce the hazard of fraudulent activities. the use of smart contracts and virtual identity.

Inside the Remix IDE we are able to begin with the writing and deployment cutting-edge clever contracts. Remix is a web primarily based software, so to apply it, all we need is a web connection and get proper modern-day entry to a web browser. on this Remix IDE we have file Explorer. this is the phase presentations all the folders and documents in the IDE. To create new folders and documents using the upload button furnished within the interface. It additionally allows us to post all documents to GitHub on the facet state-of-the-art uploading documents and folders from your 255fb4167996c4956836e74441cbd507 pc to the IDE. in this record explorer section, we want to create a report under the contracts by means of getting into the record name then the editor will be opening, we want region our code there. within the Remix IDE, navigate to installation and run transaction panel, and there, pick out out the network on which you want to install the smart agreement. here you will able to pick out the community surroundings similarly to the account cope with and its balance in ether. with the useful resource contemporary default, the surroundings decided on through the Remix IDE is its personal take a look at environment. Remix IDE provides the consumer with its very own take a look at environment to test the clever settlement earlier than deploying it to the primary community. however, at the same time as deployed at the Remix check environment, the clever agreement isn't always seen outside the Remix Ide. you may no longer be able to see the settlement outside the Remix surroundings. it is time to installation the smart settlement. you may discover the 49a2d564f1275e1c4e633abc331547db efficiently compiled agreement on the settlement tab.

Equipped to be deployed. once you have got decided on the surroundings to which the agreement is to be deployed. click on at the installation button. this will open up your meta masks transaction builder if you are using some other network in preference to the default surroundings supplied by the Remix. signal the transaction, and the Remix IDE will do the relaxation modern day the work robotically. Please remember that for signing a transaction, you want to have some faucet to your account if you are the usage of a test net. After the transaction is successful, you could see it on the block explorer the use of its transaction hash. as soon as the smart settlement is deployed, its features are ready to be used and interacted with. as quickly as the clever settlement is effectively deployed, you may be able to engage with its function inside the installation and run transaction panel. The deployed agreement might be seen underneath the Deployed Contracts panel. in this we will create our personal cryptocurrency from the Meta mask then we connect it to the Ganache and Remix IDE to get the transactions.

4. Conclusion

The conventional belongings registration system has numerous flaws that demanded focus of researchers to address the identical problems. amongst many problems, tampering of file, misuse of property and unethical practices concerning poor finance control, that lead traditional belongings gadget a place for studies. This takes a look at presents a solution for controlling transparency and provides a trusted belongings registration machine over the Blockchain. The infrastructure gives many functions to the

stakeholders related to the buying and selling of assets. The transparency, integrity of the file, and trust issue is ensured thru a tamper-evidence ledger.

5. References

1. Vos, J. (2016). Blockchain-based land registry: Panacea, illusion or something in between. In Proceedings of the IPRA/CINDER Congress, Dubai, UAE (pp. 22-24).
2. Shrivastava, A. L., & Dwivedi, R. K. (2023). Blockchain-based secure land registry system using efficient smart contract. In 2023 International Conference on Intelligent Data Communication Technologies and Internet of Things (IDCIoT) (pp. 165-170). IEEE.
3. Arif Furkan Mendi, Kadir Kaan Sakaklı and Alper Çabuk. (2020). "A Blockchain based totally Land Registration device suggestion for Turkey" in international journal of generation Diffusion (IJTD)
4. Abu Bakar, Noraziah, et al.(2022). "Securing Land Registry by Blockchain: At the Crossroads against Land Fraud Registration." International Journal of Academic Research in Economics and Management Sciences, vol. 11, no. 2, p. Pages 165-175.
5. Adam, K. (2020). Blockchain-technologie für unternehmensprozesse. Sinnvolle Anwendungen der neuen Technologie in Unternehmen. Berlin, 20.
6. Lee, J. Y. (2019). A decentralized token economy: How blockchain and cryptocurrency can revolutionize business. Business Horizons, 62(6), 773-784.
7. Manzoor, Ahsan, et al. (2018). "Demo: A Delay-Tolerant Payment Scheme on the Ethereum Blockchain." 2018 IEEE 19th International Symposium on "A World of Wireless, Mobile and Multimedia Networks" (WoWMoM), IEEE, pp. 14–16.
8. Ante, Lennart, and Aman Saggi. (2024). "Time-Varying Bidirectional Causal Relationships between Transaction Fees and Economic Activity of Subsystems Utilizing the Ethereum Blockchain Network." Journal of Risk and Financial Management, vol. 17, no. 1, p. 19.
9. Santhi, N. Jaya, et al. (2024). "Online Secured Land Registration Using BlockChain." IARJSET, vol. 11, no. 3.
10. Rakesh, et al. (2023). "Smart Land Registration Using BlockChain." 2023 International Conference on Computational Intelligence for Information, Security and Communication Applications (CIISCA), IEEE, pp. 194–99.