

Blockchain-Based Rental Agreement System Using Solana Smart Contracts.

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1. Abstract

The real estate industry is changing fast because of digital technologies and this is creating a big need for a better way to handle rental agreements. The old ways of doing things like using paper or centralized digital systems are not secure. Can be changed easily. This can lead to documents, unauthorized changes, lost data and a slow verification process, which often results in legal problems and mistrust between landlords and tenants. To solve these problems we are proposing a system called a Blockchain-Based Rental Agreement Verification System Using Solana Smart Contracts. This system uses the Solana blockchain to create rental agreements that cannot be changed once they are approved. Smart contracts are used to automate the process of creating, approving, verifying and executing agreements, which makes the whole process more transparent and reliable. The system is built using a combination of technologies, including React.js for the user interface Node.js and Express.js for the backend, PostgreSQL for managing metadata and Solana Web3 technologies for integrating with the blockchain. To ensure that users are who they say they are we use blockchain wallet authentication.. Because all agreements are recorded permanently the system is more secure prevents tampering reduces disputes eliminates the need for middlemen and makes the whole process of managing rental agreements more efficient. This new system has the potential to revolutionize the way rental agreements are managed making it faster more secure and more trustworthy, for both landlords and tenants. By using blockchain technology and smart contracts we can create a transparent and efficient process that benefits everyone involved.

keywords:

* Blockchain

- * Rental Agreement Verification
- * Solana Blockchain
- * Smart Contracts
- * Decentralized Applications (DApps)
- * Digital Contracts
- * Blockchain Security
- * Wallet Authentication
- * Real Estate Management
- * Agreement Verification

2. Introduction

The way we do agreements is changing. We need an easy way to make digital agreements. The old way of using paper and central systems is not good. These can be fake or changed without asking. They can also get. Take a long time to check. This causes problems. Makes landlords and tenants not trust each other.

We have an idea. We want to use Blockchain and Solana Smart Contracts to check agreements. This system is fast and cheap. It can handle a lot of users. It makes rental agreements that cannot be changed. Landlords make the agreements and tenants say yes using a blockchain wallet. Once they say yes the agreements are recorded on the blockchain forever. This makes everything transparent and real. Nobody can tamper with it.

Our system also helps with checks and tracking agreements. It helps with managing renewals too. This is an efficient way to manage rental agreements. It is also decentralized. This is what the real estate sector needs today. With this system landlords and tenants can trust each other more. It is a way to do things. The Blockchain system is good for Rental Agreement Verification. The Solana Blockchain is very useful. We use Smart

Contracts and Decentralized Applications to make it work. We make Digital Contracts that're safe. The Blockchain Security is very strong. We use Wallet Authentication to keep it safe. This is good for Real Estate Management. It helps with Agreement Verification. The Blockchain is very useful, for this.

3.Statement of the Problem

Rental agreements are usually managed with paper or digital systems that're not very good. These old ways can be easily. Changed without permission. People can also lose the documents. Verify them by hand, which is not a good way to make sure the agreements are real and honest. When other people are involved it takes longer. Costs more to make sure the agreements are valid and to solve problems.

The digital systems we have now are not very transparent. They store all the information in one place. This makes them easy to hack. They can fail or be accessed without permission. Because of this people often disagree about who owns the contract what the agreement says, who paid what and if the documents are real. A lot of these systems also do not have features that automatically track the status of the contract remind people to renew or remind them to pay rent.

So we need a system that's secure, transparent and not controlled by one person. This system should use blockchain and smart contracts to create, verify and manage agreements automatically. It should also store the agreements in a way that cannot be changed and allow people to access them securely. The Blockchain-Based Rental Agreement Verification System using Solana Smart Contracts is a solution to these problems. It provides a platform that's efficient and can handle a lot of users for managing modern rental agreements digitally.

The Blockchain-Based Rental Agreement System is a way to manage rental agreements. It uses

Solana Smart Contracts to make sure the agreements are real and honest. The system is also transparent and secure. People can use it to create and verify agreements without worrying about someone changing them or losing them. The Blockchain-Based Rental Agreement Verification System is the answer, to the problems we have now with rental agreement management.

4.Objective:

The main goal of this project is to create a rental agreement platform that uses blockchain to keep contracts safe.

This platform will use contracts and a way to store things that is not controlled by one person.

Specific Objectives

- * The project wants to make agreements that cannot be changed using blockchain technology.
- * It will use contracts to manage agreements.
- * The project will make sure rental agreements are checked automatically.
- * It will remind people to pay rent on time.
- * The project wants to stop people from cheating and making documents.
- * It will make things more open between landlords and tenants.
- * The project will keep a record of rental transactions on the computer.
- * It will let people create and manage agreements online.
- * The project wants to reduce the need, for middlemen.
- * It will make people trust each other more by using a verification system that is not controlled by one person.

5.Literature Review

Sl. No.	Paper Title	Author(s) & Year	Objective of the Study	Methodology Used	Key Findings / Results	Research Gap Identified
1	A Survey of Attacks on Ethereum Smart Contracts	N. Atzei, M. Bartoletti & T. Cimoli (2017)	Analyze security vulnerabilities in blockchain smart contracts.	Systematic security analysis of Ethereum contracts.	Identified major vulnerabilities such as reentrancy attacks and access control issues.	Focuses on security analysis rather than practical rental agreement applications.
2	Making Smart Contracts Smarter	L. Luu et al. (2016)	Detect vulnerabilities in deployed smart contracts.	Static code analysis using the Oyente framework.	Demonstrated several security flaws in deployed contracts.	Does not address decentralized agreement management for real estate.
3	Ethereum: A Secure Decentralised Generalised Transaction Ledger	G. Wood (2014)	Introduce Ethereum architecture and smart contract execution.	Blockchain architecture design and Ethereum Virtual Machine specification.	Established the feasibility of programmable blockchain applications.	Limited scalability and higher transaction costs for real-time applications.
4	Blockchain-Based Smart Contracts: A Systematic Mapping Study	M. Alharby & A. van Moorsel (2017)	Review blockchain smart contract applications.	Systematic literature review.	Smart contracts improve transparency, automation, and trust.	Limited discussion on blockchain-based rental agreement systems.
5	Blockchain Meets IoT: An Architecture for Scalable Access Management in IoT	O. Novo (2018)	Develop decentralized access control using blockchain.	Smart contract-based authentication architecture.	Improved decentralized authorization and security.	Focuses on IoT environments rather than real estate applications.

6	Securify: Practical Security Analysis of Smart Contracts	P. Tsankov et al. (2018)	Detect vulnerabilities in blockchain smart contracts.	Static analysis and formal verification techniques.	Successfully identified security weaknesses before deployment.	Does not include agreement lifecycle management.
7	Blockchain and Smart Contracts for Decentralized Applications	Z. Zheng et al. (2020)	Study decentralized application development using blockchain.	Analytical review of blockchain frameworks.	Demonstrated blockchain's ability to support trustless applications.	Limited implementation for rental agreement verification.
8	Blockchain-Based Real Estate Transactions and Property Management Systems	M. Konashevych (2020)	Explore blockchain applications in real estate.	Comparative study of blockchain-enabled property systems.	Blockchain improves transparency and ownership verification.	Limited focus on rental agreements and contract automation.
9	Formal Verification of Smart Contracts	N. Bhargavan et al. (2016)	Examine verification techniques for secure smart contracts.	Mathematical verification and symbolic execution.	Improved smart contract reliability through formal verification.	High implementation complexity and limited real-world adoption.
10	Blockchain Revolution	D. Tapscott & A. Tapscott (2016)	Explain blockchain applications across industries.	Conceptual analysis and industry case studies.	Blockchain enables secure, transparent, and decentralized transactions.	Does not provide a dedicated framework for rental agreement management.

Literature Review Analysis

The literature I looked at says that blockchain technology is a way to make digital transactions more secure, transparent and trustworthy. Some people have shown that smart contracts can automate things and reduce the need for intermediaries, which means fewer people are involved. There are also studies that focus on making blockchain more secure by finding vulnerabilities verifying things formally and making sure smart contracts are secure which helps

protect assets from being changed without permission.

I found out that blockchain has been used successfully in areas like finance healthcare, supply chain management, digital identity and managing property ownership. These uses show that storage, records that cannot be changed and transparent transaction histories are better than traditional centralized systems. In the real estate sector blockchain has been used for things like land registration, verifying ownership and property

transactions, which helps keep data safe and prevents fraud.

However I noticed that not many studies focus on using blockchain to verify rental agreements and manage their lifecycles. Most rental management systems still rely on systems and manual verification which makes them vulnerable to fake documents, unauthorized changes and delays. Also most blockchain systems are based on Ethereum, which has limitations and higher fees that make it less efficient for time rental management.

Research Gap Identified

From what I read I found the following gaps in research:

- There are not blockchain platforms that are specifically designed for verifying rental agreements.
- There is use of smart contract automation for managing the entire lifecycle of rental agreements.
- Most systems still use systems to validate and store agreements.
- The Solana blockchain is not used much for scalable rental agreement management.
- There are not systems that automatically track the status of agreements monitor renewals and remind people to pay rent.
- There is not support for decentralized verification and digital contract management that cannot be tampered with.

The Blockchain-Based Rental Agreement Verification System using Solana Smart Contracts tries to fix these gaps by combining decentralized blockchain infrastructure, smart contract automation, wallet-based authentication, transparent agreement verification and automated lifecycle management into one platform for managing rental agreements. This system uses blockchain technology to make rental agreements more secure and trustworthy. The blockchain technology used in this system helps to protect assets from being changed without permission. The Solana blockchain is used in this system to make it more secure and scalable. The system also uses contracts to automate things and reduce the need for intermediaries. The Blockchain-Based Rental Agreement Verification System is a solution, for managing rental agreements because it uses

blockchain technology and smart contracts to make things more secure and efficient.

6.Study Methodology

A. Description of the Area We Are Studying

The study is about creating a system for managing rental agreements in the real estate sector. This system uses blockchain technology. Is meant to be used by landlords, tenants and people who take care of properties. They need an transparent way to create, check and manage rental agreements.

The system we are proposing uses blockchain and smart contracts to provide a place where rental contracts can be recorded checked and watched without needing an authority.

We made a web-based system that lets landlords create rental agreements with all the details about the property, rental terms and payment schedules. Tenants can look at these agreements. Approve them using their blockchain wallet. Once they approve it the agreement becomes a contract on the Solana blockchain. This means that everything about the contract is safe, transparent and can be tracked.

We also added features like tracking the status of agreements reminding people to pay rent and sending notifications when it is time to renew the agreement. All of this makes it easier to manage agreements.

Our study looks at the process of creating this system including how we use blockchain create smart contracts and design the user interface. We want to see if our system can make agreements more secure prevent people from changing them without permission and make it easier to verify agreements.

We are not looking at how to register agreements with the government because our focuss on making a safe and decentralized digital platform for rental agreements.

B. Collecting and Analyzing Data

Our Blockchain-Based Rental Agreement System collects information about agreements and blockchain transactions. We get data about the landlord, tenant, property, rent and agreement details.

We also get data from the blockchain like transaction signatures, smart contract addresses and when agreements are verified.

We store some of this data in a PostgreSQL database and the important agreement records on the Solana blockchain.

We look at this data to see how well our system works, including how we can create agreements, how accurate our verification is and how reliable our system is.

We use metrics like how contracts we can deploy, how long verification takes and how safe our system is to evaluate our system.

We show this information on a dashboard that has reports about agreement status, verification history and transaction logs.

This helps us manage agreements, in a safe and transparent way reduces the work we have to do and supports reliable verification in the real estate sector.

7. System Architecture

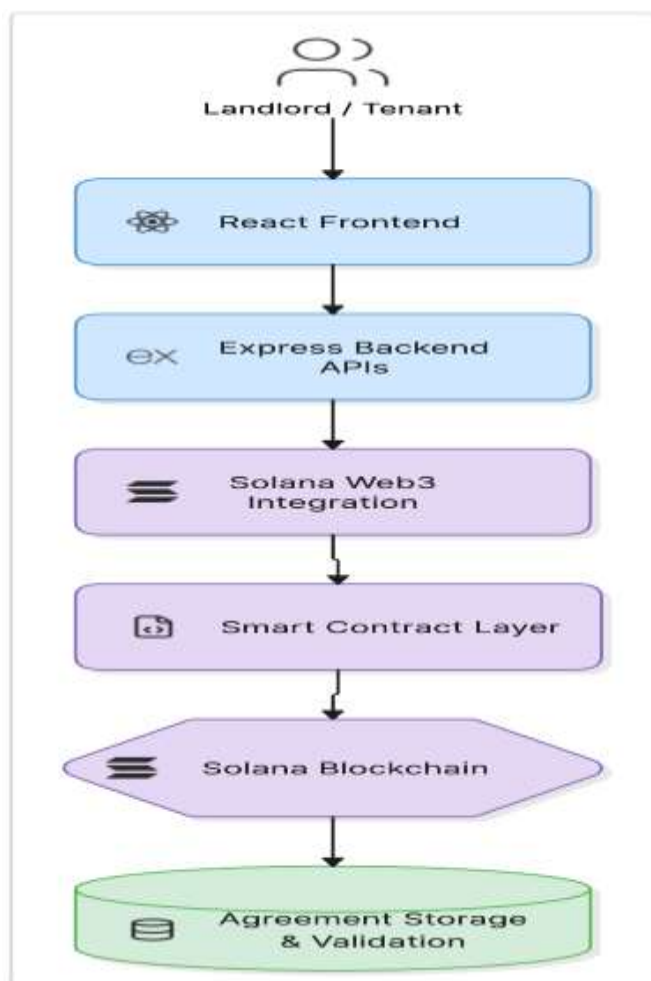


Fig 1: System architecture of Blockchain-Based Rental Agreement Verification System.

The Blockchain-Based Rental Agreement Verification System Using Solana Smart Contracts is made to be a decentralized and open way to

handle rental agreements. The setup uses web tools, blockchain systems, smart contracts, wallet login and decentralized checking services to fix the problems that come with old rental agreement systems. Of using a central database the new system uses the Solana blockchain to store rental agreement records. This makes sure the records cannot be changed are open for everyone to see and can be tracked throughout the time the agreement is active.

The setup is built in layers. Each layer does its job but also works with other layers to help create agreements get approvals put contracts on the blockchain check them and watch the whole process.

1. User Layer

The User Layer is where people interact with the system. It lets landlords and tenants use the platform through a website. Landlords can make agreements by putting in details about the house the rent, the deposit how often payments are made and how long the agreement lasts. Tenants can look at the agreements. Say yes using a secure blockchain wallet. People can also check agreements watch how they are going and get messages.

2. Application Layer

The Application Layer is built with React.js. It gives an easy-to-use website for managing rental agreements. This part deals with what users ask for checks the information shows the agreement details and talks to the end. It also has parts for connecting to a wallet making agreements checking them managing messages and showing information in a dashboard.

3. Backend Service Layer

The Backend Service Layer is made with Node.js and Express.js. It handles the rules of the system, user login making agreements talking to the blockchain, managing information and sending out messages. Before putting a contract on the blockchain the back end checks the agreement details and gets ready for the blockchain to handle it. It stores some information in a PostgreSQL database. Keeps the important parts on the blockchain.

4. Smart Contract Layer

The Smart Contract Layer has the code that runs the agreements. These smart contracts set the rules of the agreement. Do things like create the agreement

get approval check it update the status watch for renewals and check the agreement. Once they are on the Solana blockchain they can't be. They follow the rules without needing a middle person.

5. Solana Blockchain Layer

The Solana Blockchain Layer is the place where all the rental agreements are kept. Every agreement that is accepted is stored on the blockchain with a signature and the contract address. Solana is fast, cheap, quick to confirm. Can handle a lot of agreements. This makes it good for handling a lot of agreements in a safe and open way.

6. Authentication Layer

The Authentication Layer makes sure people are who they say they are using blockchain wallets. The system works with wallets like Phantom Wallet and Solflare Wallet. This means people can log in using signatures instead of user names and passwords. This makes things more secure and stops people from getting in.

7. Verification Layer

The Verification Layer lets landlords, tenants and other people check the agreements directly from the blockchain. It gets the agreement details using a signature or a contract number and checks if it is real who owns it when it was made and if it is still valid. Since everything is on the blockchain, no one person or company has to check it.

8. Notification Layer

The Notification Layer keeps an eye on what the smart contracts are doing and sends out messages during the whole time the agreement is active. People get messages, about when rent's due, when the agreement ends reminders to renew, when something is approved and when the agreement changes. These messages make it easier to follow the agreement and don't need people to check everything manually.

8. Overall Working of the Proposed System

The system starts when the landlord makes an agreement by putting in the necessary property and rental details on the website. The landlord enters all the details and the system checks everything. Then the tenant gets the agreement request. Looks at the terms. The landlord and the tenant both say yes to the agreement using a kind of wallet that is safe and secure. After they agree a smart contract is made on

the Solana blockchain. This agreement cannot be. Anyone can check it at any time. The system keeps an eye on the agreement. Sends messages to remind people about important dates. It also lets people check the agreement without needing someone in the middle.

The good things about this system are:

- The rental agreement is stored in a place where nobody can change it.
- People can check the agreement without needing someone in the middle using the blockchain.
- The system uses contracts to make sure everything runs smoothly.
- The wallet is safe. People can use digital signatures to say yes to things.
- The Solana blockchain makes sure things happen fast.
- It does not cost a lot to run the system. It can handle a lot of people.
- Everything is clear and easy to see so people can trust the system.
- The system sends reminders about rent. When it is time to renew the agreement.
- People do not need to rely on others to make things happen.
- The system is safe, trustworthy. Makes things easier, for people who rent properties.

Working of the Proposed System:



Fig 2: Dashboard of Blockchain-Based Rental Agreement Verification System.



Fig 3: System architecture of Blockchain-Based Rental Agreement Verification System.



Fig 4: Notification model of Blockchain-Based Rental Agreement Verification System.



Fig 5: Blockchain verification model of Blockchain-Based Rental Agreement Verification System.

9.Implementation / Experimentation

The implementation phase of the Blockchain-Based Rental Agreement Verification System Using Solana Smart Contracts focuses on building a decentralized web application that can securely create, manage and verify agreements using blockchain technology. The main goal of the implementation is to show how smart contracts and the Solana blockchain can stop document forgery, automate agreement verification and create an secure rental management platform. The system brings together web technologies and blockchain infrastructure to offer secure login, decentralized storage and smooth agreement management.

The platform was built using React.js for the end Node.js and Express.js for the back end PostgreSQL for storing application data and Solana Web3.js for connecting to the blockchain. Phantom Wallet was used to let users log in securely and approve agreements digitally. The implementation was tested in situations to look at how well it works how safe it is, how clear it is and how fast it performs.

Development Environment

The front end was built using React.js, JavaScript, HTML5, CSS3 and Tailwind CSS which gives a simple and easy to use interface for landlords and tenants to make agreements, connect wallets, check contracts and track the status of agreements.

The back end was made with Node.js and Express.js which handle the business rules, processing of agreements, blockchain transactions sending messages and talking to the Solana network.

A PostgreSQL database was used to store user details, agreement information, message logs and transaction history. Important agreement records and smart contract data were kept permanently on the Solana blockchain to make sure they cannot be changed and can be checked in a way.

System Modules

The platform has parts that work together to help manage rental agreements securely.

User Registration and Authentication Module

This part lets landlords and tenants sign up on the platform and log in using blockchain wallets. Users connect their Phantom Wallet to create a decentralized identity before they can use the system.

Rental Agreement Creation Module

Landlords can make agreements by putting in details about the property the rent, the security deposit, the time of the agreement how payments are made and the terms of the contract. The system checks the information before getting it ready for the blockchain.

Wallet Authentication Module

This part connects the wallet to make sure the login is safe. Users approve login requests using their blockchain wallet so only the right people can. Sign agreements.

Smart Contract Generation Module

After the agreement is checked the back end turns it into a Solana contract that has the landlord details the tenant details, the property information, the agreement time the payment schedule, the contract status and the agreement hash. The contract is then put on the blockchain.

Agreement Approval Module

Before putting it on the blockchain both the landlord and tenant sign the agreement using their wallet. The contract only starts after both sides agree making sure everyone is on the page.

Agreement Verification Module

This part gets the contract details directly from the Solana blockchain using transaction IDs or contract numbers. People can check if the agreement is real who owns it the status of the contract and the history of transactions without depending on a group.

Notification Module

The notification system keeps an eye on the status of the agreements. Sends automatic messages about when rent is due when the agreement ends, when it is time to renew and when the contract changes. This helps people follow the agreement better and cuts down on the need for checking

Experimental Scenarios

To see how well the system works several tests were done.

Scenario 1: Rental Agreement Creation

A landlord made an agreement by entering the necessary details. The system checked the information. Made the agreement ready for the blockchain without any problems.

Scenario 2: Smart Contract Deployment

After both the landlord and the tenant approved the smart contract was put on the Solana blockchain. The agreement could not be. Got a special transaction ID.

Scenario 3: Agreement Verification

The agreement that was put on the blockchain was checked using the transaction details. The system got the agreement information. Showed that it was real directly from the blockchain.

Scenario 4: Unauthorized Modification Attempt

Tries to change an agreement that was already on the blockchain were stopped. This showed that the system is safe from changes and illegal changes.

Scenario 5: Wallet Authentication

people, with the right wallet access could sign agreements and do blockchain actions. This proved that the wallet-based login works well.

Performance Evaluation

The platform that was built showed that it works well in all the parts of the system. Renting contracts were made, checked, put into action and confirmed with little time needed to process them. The Solana blockchain made transactions happen quickly and cost little while keeping the contracts safe and open for everyone to see.

The system that works on its own without needing a group to check things was able to find the contract details from the records on the blockchain. It did not need any help from a checking service. The system that sends out messages on its own was able to make reminders for rent, warnings about when a contract's ending and messages for when a contract can be renewed during the time the contract is active.

Overall the way this was built proves that the Blockchain-Based Rental Agreement Verification System is a safe, open and growing way to manage renting contracts today. It brings together blockchain technology, contract automation checking that works on its own and safe ways to log in into one system.

10.Results and Analysis

The Blockchain-Based Rental Agreement Verification System Using Solana Smart Contracts was. Tested to find out if it works well at making renting contracts safe, open and not controlled by one place. The system was tested in situations, including making contracts checking peoples identities putting smart contracts on the blockchain checking the contracts on the blockchain and sending messages on its own. The results from the tests show that the system works well at fixing the problems of renting contract systems while making things safer faster and more trusted.

The system proved that landlords could make renting contracts by giving information about the place, how much to pay how security money, how long the contract lasts and when payments are due through the website. The system checked the

information before it was put on the blockchain, which made mistakes and made sure that all the contracts were the same.

The way to check who is who using Phantom Wallet worked well to make sure that both landlords and tenants were who they said they were before they agreed to the contract. Signing the contract with signatures made the checking safe without needing to use regular passwords, which made it less likely that someone could get in without permission or pretend to be someone else.

After both sides said yes the renting contracts were put on the Solana blockchain as contracts. Each contract made a signature and address on the blockchain, which made the contracts stay forever and not be changed. Once they were there the contracts could not be changed without permission, which made sure that the contract details stayed the same.

The part of the system that checks the contracts was able to get all the details from the blockchain. People could check if the contract was real who owned it if it was approved, when it was made and what happened with the contract over time without needing anyone in the middle to check. This way of

checking made things more open. Made it easier to do things without needing a central group.

The part that sends messages worked well by making sure that people got alerts about when rent was due when the contract was ending, when to renew and updates about the contract. These messages made managing the contract by making sure that landlords and tenants talked to each other at the right times during the contract.

Performance Analysis

The system that was built worked well in all the parts that were made. The Solana blockchain made transactions happen quickly. Had very little time between steps and cost very little which makes it good, for managing many renting contracts. The way the part of the system the back part, the database and the blockchain network worked together was smooth and had no big problems.

Table 10.1 Performance Evaluation

Performance Parameter	Observation	Result
Rental Agreement Creation	Successfully created digital agreements	Successful
Wallet Authentication	Secure digital signature verification	High Accuracy
Smart Contract Deployment	Successfully deployed on Solana blockchain	Successful
Agreement Verification	Retrieved contract details from blockchain	Accurate
Unauthorized Modification	Blockchain prevented data alteration	Prevented
Notification Service	Generated automated reminders and alerts	Successful
Transaction Processing	Fast confirmation with low latency	Efficient
Overall System Performance	Stable and reliable execution	Excellent

Analysis

The study shows that blockchain technology makes rental agreements much safer. It gives a way to store information that cannot be changed. It also lets many people check things of just one person.. It makes agreements happen on its own without needing someone to do it manually. Smart contracts help by taking the need for people to check things by hand. This makes everything clearer. Takes less work. Wallet-based login makes the system even safer. It makes sure only the right people can say yes to deals.

When compared to ways of managing rental agreements the new system is better. It is more open has information that doesn't change makes people trust each other more costs less to run and checks agreements faster. Using the Solana blockchain helps a lot. It can handle transactions quickly and easily. This makes the system good to use in life when dealing with modern digital real estate.

In the end the results show that the Blockchain-Based Rental Agreement Verification System Using Solana Smart Contracts is a way to manage rental agreements. It works well is safe and can grow as needed.

Discussion

The proposed Blockchain-Based Rental Agreement Verification System Using Solana Smart Contracts shows how blockchain technology can change the way rental agreements are handled. This system brings in decentralization, transparency and automation. Traditional systems use databases and manual checks. The new system uses contracts and the Solana blockchain to make digital agreements that can't be changed. These agreements can be checked anytime.

The tests show that using blockchain makes rental agreements much safer and more reliable. Once the smart contract is on the Solana blockchain, no one can. Delete it. This stops documents and changes without permission. The unchangeable nature of blockchain makes both landlords and tenants trust each other more. It also keeps the information real during the agreement.

The system also uses wallet-based authentication of regular passwords. People use blockchain wallets like Phantom Wallet to log in. They use signatures. This makes it harder for someone to steal their identity or get in without permission.

This way the system is more secure and easier to check.

Another important part of the system is that it automatically handles the process of the agreement. Smart contracts take care of approval, checking, tracking and making sure the contract is valid. There is also a part that sends reminders for rent when the agreement ends and when it needs to be renewed. This makes things run smoother and takes work from the people in charge.

Using the Solana blockchain makes the system better. Compared to blockchains Solana has more transactions per second lower costs and faster checks. This makes it right for rental agreements where it needs to handle a lot and work fast.

Even though the system has good points there are some problems. It works on the idea that people know about blockchain wallets and apps. Also not all places accept blockchain agreements. That might make it harder to use in life. The system now only handles agreement checks and not the full legal side or linking with government records.

Overall the Blockchain-Based Rental Agreement Verification System proves that combining blockchain, smart contracts, login with wallets and handling the agreement from start to finish is possible. The tests show that this system makes agreements safer checks them faster depends less, on the people and gives a way to handle real estate in the future.

11.Conclusion and Future Work

Conclusion

The system that uses Solana Smart Contracts to check agreements based on blockchain is a safe, clear and decentralized way to handle digital rental agreements. This system works well by using blockchain technology, smart contracts, wallet-based login and modern web tools to fix the problems of rental agreement systems. These problems include papers, storing data in one place checking by hand and not working well with people in charge.

The system shows that rental agreements can be made safely signed digitally put into contracts that can't be changed and checked directly on the Solana blockchain. Using blockchain makes sure the data is correct and can't be changed. Smart contracts help with checking the agreements and managing them. Wallet-based login makes the

system safer by letting people check their identity with encryption of old passwords.

Testing shows the system works with all the main parts. These parts include making agreements putting them on the blockchain checking them in a way sending messages and managing contracts. Using the Solana blockchain gives checks, low costs and the ability to grow making the system good for real rental agreement use.

In total the system gives a way to manage rental agreements online. It helps trust between landlords and tenants makes need for middle people makes things more open and makes checking agreements easier with blockchain.

12.Future Work

The system can be made better by adding features and using more advanced blockchain ideas. Future work may look at the following changes:

- Connecting with government land registration and property check databases to make sure rental agreements are legal.
- Allowing contracts with more than one person signing, like landlords, tenants, legal people and others.
- Using AI to find activities and fake property details.
- Creating a phone app so people can check agreements on phones and tablets.
- Adding decentralized identity systems to make logging in safer and protect privacy.
- Adding ways to pay with cryptocurrency or digital money through the blockchain.
- Connecting with blockchains so rental agreements can be checked on more than one system.
- Building dashboards with reports to watch history, agreement details, money trends and how contracts do.
- Using cloud-based blockchain setups to make the system more available grow better. Not break as much.
- Improving contracts with ways to solve conflicts and follow the rules, in different areas.

These changes will make the system stronger, safer and easier to use. They will also help the real estate business get better at using tools.

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