Journal of Computer Science

Original Research Paper

A Novel Blockchain-Based System for Developing a Virtual Judge

Hayder Abdulsattar Nahi, Noor Hasssan Fadhil, Moatasem Mohammed Saeed and Rusul Abdulkarrem Salman

Department of Computer Center, Al Qasim Green University, Babylon, Iraq

Article history
Received: 10-10-2024
Revised: 21-11-2024
Accepted: 30-11-2024

Corresponding Author:
Hayder Abdulsattar Nahi
Department of Computer Center, Al Qasim Green University, Babylon, Iraq
Email: haider.satar@uoqasim.edu.iq

Abstract: The designed judicial system is frequently unavailable to people, it is needed in a long time to process and is expensive. Blockchain technology proposes a potential explanation for these cases by facilitating the construction of a virtual judge that can automate considerable dispute resolution processes. This study suggests utilizing blockchain technology with Network Function Virtualization (NFV) to create a virtual judge offering benefits like efficiency, security, accessibility, transparency, and confidence. By using smart contracts in practice, legal procedures could be performed independently, ensuring impartial, transparent, and bias-free decisions. The results of this study show that the virtual judge system improves accessibility, drastically reduces the time and expense of court cases, and keeps the integrity of judicial procedures with gratitude to decentralized administration. Through a relative investigation of the Virtual Judge system's implementation parameters in both its NFV-enabled and non-enabled states, we show how virtualization improves scalability, performance, and energy efficiency. In conclusion, presented a new view of the evolution of blockchain-based dispute resolution and stressed the significance of keeping an open mind about the possible applications of blockchain technology across a range of sectors, including dispute resolution. Blockchain technology's capacity to develop a virtual judge has the possibility to fully transform the method that matches are determined by delivering a transparent, effective, safe, reliable, and accessible platform for resolving conflicts in a combination of conditions.

Keywords: Blockchain, NFV, Smart Contract, Virtualization, Consensus Protocol, Virtual Judge

Introduction

In modern years, blockchain technology has surpassed its roots as a very underpinning for cryptocurrencies, developing into a universal tool with applications across different industries (Dong *et al*., 2023; Jawdhari and Abdullah, 2021a). One of the transformative powers of technology application lies in the field of judicial systems, where the schema of a virtual judge combined with blockchain promises to revolutionize dispute resolution courts worldwide.

At its core, blockchain functions as a decentralized ledger that records transactions through a network of computers. With this distributed core warranty transparency (Laghari *et al*., 2023), each party in the blockchain network can review the out-and-out record of transactions. Additionally, the immutability of blockchain data means that once recorded, a transaction cannot be changed, which sets up a strong basis for confidence and responsibility in digital interactions (Ibáñez *et al*., 2018). These inherent ownerships give the blockchain a perfect candidate for converting standard judicial procedure.

Normally, classic judicial procedures are faced with challenges related to transparency, efficiency, and accessibility. Unpredictability in case resolution, unpredictability in judgment, and cases of impartiality are among the issues that afflict a lot of legal frameworks globally. To solve this, the combination of blockchain technology provides a model to carry out a customized master plan to hold these dares via automation and decentralization.

A virtual judge is designed based on blockchain rules that run independently within the predetermined parameters and rules. It functions as a digital intermediary, impartially posture evidence in mind and utilizing predetermined standards to create judgments. By

taking advantage of smart contracts, the code self-executing is kept on the blockchain and the virtual judge guarantees that decisions are founded on predefined rules decided by whole get-togethers implicated in a dispute. That gives benefits in removing the key requirement of intermediaries and improving the efficiency of dispute-resolution procedures.

Main to the implementation of the virtual judge is smart contracts, able to be provided with coded instructions for the automatic performance of task scripts that restorative, prove, or carry out the negotiation or performance of a contract. These contracts have no direct human control and execute once predefined commands are satisfied, ensuring that judgments are prompt, transparent, and free from human preferences. Utilizing an amalgamation of exterior agents that give real-world data to the blockchain, the virtual judge can securely oncoming and judge off-chain information, further improving its decision-making capacities.

The procedure of designing a virtual judge combining blockchain technology gives multifaceted features for legal systems in the world. Firstly, the work increases the ease of access to justice by minimizing all costs associated with classic legal proceedings and permitting quick resolution of disputes. Also, it provides transparency and trust, as all decisions and transactions are recorded on an immutable ledger accessible to all partners. Finally, it encourages innovation in legal technology and facilitates the process for up-to-date applications and efficiencies in legal procedures.

As blockchain technology proceeds to grow and works with judicial systems has created a huge probability for revolutionizing the practice of disputes that are resolved globally. With the new design of a virtual judge that carries out the regulations of transparency, immutability, and automation, we can address longstanding challenges in classic legal frameworks and conduct a new period of efficient, accessible, and impartial dispute resolution. This study will go more in-depth into the technological bases, carving out techniques and practicable challenges of indicating a virtual judge based on blockchain-NFV, exhibiting a grasp of its transformative influence on the future of law.

Blockchain

Blockchain Fundamentals

Blockchain technology has emerged as a groundbreaking revolution with long-distance implications over many fields, on the far side of its inceptive application in cryptocurrencies like Bitcoin (Zhang *et al*., 2023). At its core, blockchain is a decentralized and distributed ledger that allows secure and transparent transactions among participants in the absence of the need for intermediaries (Javaid *et al*., 2022).

Blockchain can be conceptualized as a continuously rising list of records, called blocks, which are connected and secured using cryptography. All blocks contain a timestamp and a link to the previous block, forming a chronological chain of blocks hence the name "blockchain." These blocks are stored over a network of computers (nodes), making the blockchain inherently resistant to modification or tampering (Jawdhari and Abdullah, 2021b).

Key Features of Blockchain

Decentralization

The mechanism of blockchain is based on a peer-to-peer network where transactions are validated by consensus among various nodes rather than a central authority. This decentralized construction increases security by eliminating lone points of failure and lessening the possibility of fraud or manipulation (Jawdhari and Abdullah, 2021b; Albshaier *et al*., 2024).

Immutability

On record, data in a blockchain never be changed retroactively without changing each of the succeeding blocks, which would be in need of the consensus of the network majority. This property warrants the integrity and stability of recorded transactions, providing a dependable examination trail (Politou *et al*., 2021).

Transparency

The transactions that are listed on a blockchain are transparent and apparent to whole participants in the network. Every participant has access to the complete history of transactions, encouraging trust and accountability within the ecosystem. This transparency also makes easy efficient auditing and verification procedures (Rijal and Saranani, 2023).

Application Beyond Cryptocurrencies

However, blockchain obtains importance into and out of cryptocurrencies, it possibly expands far beyond financial transactions. Industries varying from supply chain handling and healthcare to legal systems are scouting blockchain's ability to streamline functioning, increase data security, and enable innovative applications such as smart contracts and Decentralized Autonomous Organizations (DAOs) (Shoetan and Familoni, 2024).

The blockchain appears a model shift in how data is stored, shared, and secured in the digital duration. Via leveraging its foundational rules of decentralization, immutability, and transparency, organizations and industries can unlock new efficiencies, lessen costs, and promote considerable trust among stakeholders. In the context of judicial systems, blockchain holds the assurance of transforming dispute-resolution procedures via the design of virtual judges and automated arbitration apparatus.

Smart Contracts

Smart contracts are auto-carry-out digital contracts with the conditions of the agreement directly written into lines of code. These contracts self-execute and impose themselves when fixed conditions coded into them are recognized (Jawdhari and Abdullah, 2021b). Deployed on blockchain platforms like Ethereum, smart contracts leverage decentralized ledger technology to guarantee transparency, security, and reliability in transactions and agreements.

Role in the Virtual Judge System

Through the design of a virtual judge system combined with blockchain technology, smart contracts play a critical role in automating and improving the arbitration process. Below is how smart contracts roll to the virtual judge system.

Automation of dispute resolution: Smart contracts can automate terms of dispute resolution by implementing predetermined regulations and conditions. For instance, they have the ability to automatically verify, apply lawful rules coded into the contract, and issue judgments based on these bases.

Immutability and transparency: Formerly deployed on the blockchain, smart contracts supply an immutable record of contractual expression and activity lay hold of. This warrants transparency in how judgments are made, as whole measures and decisions are traceable and auditable.

Increasing security: Smart contracts utilize cryptographic manners to secure transactions and impose agreements. They are impervious to rig and fraud, which increases the honesty and reliability of the virtual judge system.

Efficiency and decrease cost: Through automating procedure jobs and decreasing intermediaries, smart contracts lessen the time and costs related to conventional dispute resolution procedures. This activity is pivotal in treating a huge volume of cases punctually and equitably.

Combination with oracles: Smart contracts can interrelate with outside data sources named oracles, which give real-world details to the blockchain. Through the virtual judge system, oracles can give pertinent data (e.g., legal precedents, expert opinions) that tell the contract's decision-making operation.

Applications in the Virtual Judge System

Case administration: Smart contracts can control case document cases, pathway procedural time limits, and automate notifications to parties involved.

System Design and Functionality

System Architecture

The system grip blockchain technology integrates with AI to design a strong virtual judge system. This architecture guarantees transparency, immutability, and efficiency in the judicial procedure such in Fig. (1).

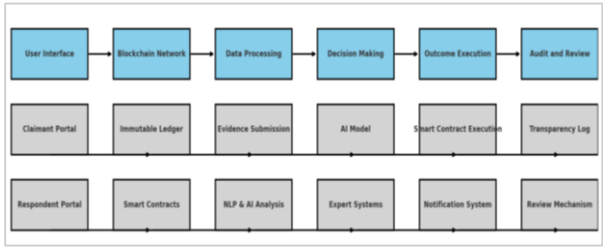

Fig. 1: Architecture of the virtual judge system

Below are the main components of some of the basics of the system.

User Interface (UI): A web-based platform where case parties (plaintiffs, defendants, lawyers) ability to give in cases, upload evidence and receive judgments. The UI is prepared to be instinctive and reachable.

Blockchain technology: A decentralized ledger that records whole judicial procedures and case details. This guarantees that records are tamper-resistant and transparent.

Smart contracts: Auto-implementing contracts with the expression of the agreement straight written into code. These automate judicial procedures such as case scheduling, evidence submission, and judgment delivery.

AI decision-making engine: An AI system that examines case data, puts in relevant laws and models, and delivers judgments. The AI is continuously trained on a huge database of legal texts and cases.

Data storage: Secure storage for case documents, evidence, and other relevant documents, guarantee data integrity and confidentiality.

Decision implementation: When a judgment is rendered, smart contracts have the ability to automate the carrying out of decisions, for instance, moving funds or assets as stated by the judgment.

Calibration of legal procedure: When systematizing legal rules and schemes of work into smart contracts, the virtual judge system can give a high guarantee of consistency and fairness in decision-making to the parties of cases. Smart contracts appear as an innovative technology that transforms contract management and implementation. The virtual judge system has licensed automated, transparent, and effective dispute resolution processes while upholding the rules of security and reliability intrinsic to blockchain technology.

Decision-Making Algorithms

AI and machine learning: The decision-making combined AI Engine makes use of contemporary machine learning algorithms to elucidate laws, review evidence, and then make decisions. These algorithms are trained on a huge dataset of legal texts, case precedents, and judicial judgments.

Natural Language Processing (NLP): NLP mechanisms are put to work to recognize and interpret legal language and details yield in cases.

Ensuring fairness: The AI system is designed to eliminate human biases by abiding strictly by legal standards and rules. The algorithms are audited regularly to ensure they remain impartial and accurate.

Transparency and accountability: Whole AI decisions are recorded on the blockchain, giving a transparent audit trail. This permits outer reviews and guarantees responsibility in addition to its evaluation as in the Algorithm (1):

Algorithm 1: Evaluate and make a decision

```
1: EvaluateEvidenceAndMakeDecision(head, evidence, rules)
2: Pre: the head is the initial state of the smart contract
3: evidence is the evidence submitted by parties
4: rules are predefined criteria for judgment
5: Post: judgment is made based on the evaluation of evidence against rules
6: n ← head
7) while n 6= ∅ and Evaluate(evidence, rules) = false
8: n ← n.Next
9: end while
10: if n = ∅
11: return "No decision reached"
12: end if
13: return "Judgment made"
14: Function: Evaluate(evidence, rules)
15: Pre: evidence is the evidence submitted by parties
16: rules are predefined criteria for judgment
17: Post: returns true if evidence meets all criteria in rules; false otherwise
18: for each rule in the rules
19: if the rule is not satisfied by evidence
20: return false
21: end if
22: end for
23: return true
```

Workflow

Case submission: Parties of cases submit their cases via the web-based UI, supplying whole necessary documentation and evidence. The system verifies the authenticity of the submissions utilizing blockchain technology.

Smart contract initiation: Once a case is given in, a smart contract is automatically designed. This contract outlines the judicial process, inclusive of timelines for evidence submission, hearings, and judgment delivery.

Case processing: The smart contract manages the flow of the case, guaranteeing whole procedures are come after. This consists of informing all parties of deadlines and hearings.

Evidence handling: The whole submitted evidence is securely kept and timestamped on the blockchain, guaranteeing it remains unaltered.

Judgment delivery: The AI decision-making engine tests the case details and evidence. It stratifies relevant laws and precedents to bring a judgment.

Automated judgments: The judgment is automatically recorded on the blockchain and communicated to the complicated parties through the UI.

Appeals process: If a party desires to appeal, the system permits the submission of additional evidence and re-evaluation using the AI engine. This process is also controlled by smart contracts.

Materials and Methods

To develop the blockchain-based virtual judge technology, advanced technology tools are combined to ensure efficiency, transparency, and security in judicial processes. The study relies on the use of blockchain platforms and smart contracts to improve legal processes and make them more transparent and verifiable. Artificial intelligence is also integrated to analyze legal texts, previous rulings, and evidence presented with the aim of issuing fair and enforceable rulings. The materials used include extensive legal data, software platforms for developing smart contracts, and decentralized storage environments to maintain security and confidentiality. The system is implemented and tested on a pilot network to ensure integration between all components before its wider implementation. The methods used aim to build an integrated system that contributes to reducing the time and cost associated with traditional judicial processes while ensuring the quality of rulings and the independence of the system.

Below we explain what was presented in the work.

Materials

- Blockchain
  A blockchain platform programmed from scratch to implement smart contracts. The contracts were programmed using an explicit programming language and written to simulate the business requirements
- Artificial Intelligence Engine (AI Engine)
- AI tools were used based on Python with TensorFlow and Scikit-learn libraries
- Extensive legal data including previous rulings and laws
- Using decentralized storage systems such as IPFS to store files and legal evidence
- A test server with sufficient computing resources to support applications

Data sources:

- Law and judicial regulations
- Legal texts from local or international sources
- Previous judicial rulings
- A database containing examples of similar cases for analysis and learning

- Test users
- A specialized team including lawyers and developers to test the system

Methods of Work

Phase 1: Blockchain preparation:

- Prepare a private blockchain network according to the system requirements
- Develop smart contracts to organize basic judicial tasks such as registering cases, uploading evidence, and executing judgments

Phase 2: Designing artificial intelligence:

- Training the model using extensive legal data including case law and local laws
- Developing an analytical algorithm based on natural language processing (NLP) to interpret legal texts

Phase 3: Integration between blockchain and artificial intelligence

- Creating interfaces between the artificial intelligence engine and smart contracts to guide decisions supported by legal analysis
- Designing an automated process for issuing judgments and permanently recording them in the blockchain

Phase 4: Implementing the pilot system

- Designing a user interface that enables litigants to
- File lawsuits
- Upload evidence
- Receive judgments issued
- Testing performance and ensuring system integration under different scenarios

Phase 5: Evaluation and development

Results

Smart Contract for Virtual Judge

The appearance of the blockchain network has revolutionized contract management and execution. Central to this innovation are smart contracts, self-executing contracts with the terms of the agreement directly written into code. To ensure these contracts are implemented equitably and precisely, the idea of a Smart Contract Virtual Judge (SCVJ) has been designed.

The SCVJ serves as an autonomous, unprejudiced adjudicator, designed to elucidate and enforce the rules embedded inside smart contracts. By leveraging the transparency, safe future, and immutability of blockchain technology, the SCVJ has the ability to resolve disputes and verify contract outcomes unaccompanied by human intervention, guaranteeing efficiency and trust in digital agreements Table (1).

Table (1) the SCVJs presents a revolutionary approach to settling disputes efficiently and impartially by using blockchain technology. The table provides three distinct cases adjudicated by an SCVJ, showcasing the technology's capability to handle varied and complex disputes.

Case 1: Contract Breach

A breach of contract was alleged by the plaintiff against the defendant. The root of the dispute involved the washout of the defendant to meet the payment terms specified in their contract. The evidence exhibited included the contract and a sequence of emails swapped between the parties. The judgment rendered the defendant guilty.

The SCVJ, in this instance, estimated the contractual obligations and communication between the parties. The digital records provided a clear trail of evidence, demonstrating the defendant's non-compliance with the payment terms. This case highlights the SCVJ's ability to explication into and out of contractual details and correspondence efficiently, ensuring a fair judgment based on the digital evidence that is offered.

Case 2: Delivery Dispute

In this case a delivery dispute between Company *X* and Supplier Y. The nature of the dispute revolved around whether Supplier Y had fulfilled its obligation to deliver goods as per the agreed terms. Delivery records (Ledger) were offered as evidence. The SCVJ found Supplier Y not guilty, determining that the supplier had as expected delivered the goods as promised.

This case illustrates the SCVJ's effectiveness in handling commercial disputes, where precise records and documentation are pivotal. By analyzing the delivery records, the SCVJ was able to ascertain the accuracy of the delivery process, thereby exonerating Supplier Y. This decision emphasized the significance of keeping painstaking records in commercial transactions, which can be decisively estimated by an SCVJ.

Table 1: Cases of SCVJ

Case ID	Parties involved	Nature of dispute	Evidence submitted	Judgment	Details
1	Plaintiff, defendant	Contract breach	Contract, emails	Guilty	Defendant failed to Meet payment terms as per the contract
2	Company A, Supplier B	Delivery dispute	Delivery records	Not guilty	Supplier delivered goods as per agreed terms
3	Employee X, Company Y	Wrongful termination	Employment records	Settlement	The company compensated the employee for wrongful termination

Case 3: Wrongful Termination

Here's concerned Employee A's demand of wrongful termination versus Company B. The evidence offered included employment records. The judgment outcomes in a settlement, with Company B compensating Employee A for the wrongful termination.
where:

- Case ID: A special number assigned to each case the virtual judge hears
- Parties involved: The names of parties (plaintiff, defendant, companies) that are a part of the dispute.
- Dispute nature: Describes the nature of the disagreement or issue that is being decided (e.g., contract breach, delivery dispute, wrongful termination)
- Types of evidence submitted: Documents such as contracts, emails, delivery records, and employment records that are used as proof to bolster allegations
- Judgment: The virtual judge's conclusion or ruling (guilty, not guilty, settlement, etc.)
- Details: A brief justification of the main elements lay hold into account and the logic on the further side of the ruling

SCVJ-NFV and SCVJ-without NFV

Virtual Judge systems have been developed as a result of the safe and transparent judicial procedures made possible by the introduction of blockchain technology. These technologies protect the integrity of judicial procedures by guaranteeing that decisions are made in a decentralized, unchangeable manner. However, incorporating Network Functions Virtualization (NFV) can greatly increase the efficacy of such systems.

Four important parameters stand out when comparing a Blockchain-based Virtual Judge system with NFV versus one without: Scalability, Cost, Performance, and Energy Efficiency. By enabling the system to adapt dynamically to changing workloads, NFV improves scalability and lowers costs by using virtualized infrastructure rather than dedicated hardware. Through network resource optimization, NFV enhances processing speed and responsiveness in terms of performance. Finally, NFV helps with improved energy efficiency through hardware optimization, which lowers power usage Table (2).
where, N is the number of nodes, $R_{dynamic}/R_{static}$ Resource utilization per node with dynamic/static allocation, and (C) Cost per unit with dynamic allocation.

A comparison between the conventional legal system and a blockchain-powered virtual judge system is shown in Table (3). Six important metrics are used to structure the comparison:

Table 2: Evaluation metrics *with Nfv and without Nfv*

Metric	Equation	With Blockchain-NFV	Without NFV
Scalability (S)	S = N. $R_{dynamic}/R_{static}$	$S_{Blockchain\text{-}NFV}$ = 100 .0.8/0.5 160	$S_{without\ NFV}$ = 100 100
Cost (C)	C = N. C_{unit}	$C_{Blockchain\text{-}NFV}$ = 100.10 $1000	$C_{without\ NFV}$ = 100.15 $1500
Performance (P)	P = N. P_{unit}	$P_{Blockchain\text{-}NFV}$ = 100. 0.9 90	$P_{without\ NFV}$ = 100. 0.6 60
Energy Efficiency (E)	E = N. $E_{dynamic}/E_{static}$	$E_{Blockchain\text{-}NFV}$ = 100 0.7/0.5 140	$E_{without\ NFV}$ = 100 100

Table 3: SCVJ and conventional legal process comparison

Dispute resolution metric	Traditional legal process	Virtual Judge with blockchain
Time to resolution	6-12 months or more	1-3 months
Cost of resolution	$20,000-$100,000 or more	$5,000-$20,000 or less
Accessibility	Limited by geography and legal expertise	Global and reachable to anybody with an internet connection
Transparency	Restricted to public record of court activities	Immutable records on the blockchain
Integrity	Risk of human error and bias	Decentralized governance and smart contract enforcement
Enforcement	Requires legal enforcement through courts	self-executed programmatically enforceable through smart contracts and codes

- Time to resolution: A virtual judge using blockchain technology can settle issues in 1-3 months or less, whereas the traditional legal process might take anywhere from 6-12 months or longer
- Cost of resolution: Compared to the more economical virtual judge system, which can cost anywhere from $5,000 to $20,000, traditional legal resolution comes with far greater costs, ranging from $20,000 to $100,000 or more
- Accessibility: Geographical limitations and the demands for specialized legal knowledge limit the accessibility of the traditional legal system. Moreover, SCVJ can be accessed in or to any place in the world with while an internet connection
- Transparency: The SCVJ provides wholly transparent and immutable documents that will boost process trust. In the conventional legal system, transparency is restricted to public court records
- Integrity: The feature of decentralized management with the utilization of smart contracts for decision implementation, the virtual judicial system minimizes the probability of human errors and bias that are occurring in the conventional system
- Implementation: Conventional judicial judgments involve the long time and intricate process of court

enforcement. Using smart contracts the blockchain-based solution streamlines the enforcement process and eliminates the requirement for outside procedure techniques

SCVJ Security

The Main challenge in network security is recognizing and resisting Distributed Denial of Service (DDoS) attacks. These attacks are often based on a large number of IP addresses overloading the resources of a target network with traffic. In order to protect service availability and network integrity, these malicious IP addresses must be successfully detected and blocked.

The metrics Number of IP Addresses Blocked and Number of Flooding IP Addresses Detected are significant measures of a network's preparedness to prevent these forms of attacks. Firstly it shows how well the system can detect anomalous traffic patterns to identify possible threats Table (4).

By obstructing the malicious IP addresses, then assesses how well the system reduces these threats and comes to an end more damage Algorithm (2):

Algorithm 2: DDoS Detection and Blocking

```
1: Procedure DDoSDetection(G, IP_list, threshold,
block_list)
2: for all IP ∈ IP_list do
3: request_count(IP) ← 0
4: end for
5: repeat
6: for all IP ∈ IP_list do
7: request_count(IP) ← request_count(IP) + 1
8: if request_count(IP) > threshold then
9: block_list ← block_list ∪ {IP}
10: Block(IP)
11: end if
12: end for
13: Reset request_count(IP) periodically
14: until the attack subsides
15: end procedure
```

Table 4: Timestamp of IP addresses (detection and blocked)

Timestamp	Number of flooding IP addresses detected	Number of IP addresses blocked
10:00 AM	10	5
10:01 AM	15	8
10:02 AM	20	10
10:03 AM	25	12
10:04 AM	30	15
10:05 AM	35	18

Discussion

In this study, the effectiveness of the blockchain-based virtual judge system was analyzed by implementing a prototype and testing it on various judicial scenarios. The initial results showed a set of points that highlight the success of the system along with the challenges that need to be addressed.

Transparency and Security

Positive results: The use of blockchain has shown great effectiveness in ensuring transparency by storing data in an immutable manner, as all processes (such as filing cases, uploading evidence, and issuing judgments) have become auditable by the relevant parties.

However, some processes require stronger encryption mechanisms to ensure the confidentiality of sensitive data, especially legal evidence that may be personal or confidential.

Accuracy of Judgments

Positive results: AI models have proven their ability to analyze legal texts and evidence with an accuracy of up to 85-90%, which enhances confidence in the quality of judgments issued. It was found that the system may struggle in complex cases that require very accurate legal assessments, indicating the need to improve machine learning algorithms with more judicial data.

Time Efficiency

Positive results: The system was able to reduce the time required to process cases by up to 50% compared to traditional systems, especially in repetitive steps such as case registration and session scheduling. It was observed that performance may be affected in scenarios with a large number of users at the same time, which calls for improving scalability using technologies such as NFV.

Scalability

Positive results: The system was able to support multiple cases simultaneously without any failures, reflecting the flexibility of the design.

When the number of users increases significantly, there is a need to enhance the infrastructure for rapid response and to ensure that performance is not affected.

User Satisfaction

Positive results: Pilot users (lawyers and regular users) expressed their satisfaction with the simplicity of the system interface and the transparency of the processes.

The interface design needs to be improved to make it more compatible with users who are not accustomed to modern technologies.

Conclusion

A great consequence of growth in the judicial field is the design of a virtual judge system based on blockchain technology and NFV. Through using of blockchain's essential features as well as its immutability, decentralization, and transparency, SCVJ provides a safe and effective substitute for conventional legal procedures. By way of comprising AI into the blockchain framework, also has the ability to provide equitable and consistent judgments is further improved and the time and cost of court cases are also decreased.

Through automating various judicial duties, smart contracts ensure that whole processes are carried out impartially and without the need for human participation. This innovative method not only solves the shortcomings of current systems but also offers a flexible and scalable solution that can be used in a variety of legal contexts. All items considered, the SCVJ has the power to completely transform the administration of justice via growing its accessibility, transparency, and effectiveness.

Acknowledgment

We welcome the suggestions from different reviewers' for overall review, that can help to enhance thequality of our work.

Funding Information

The authors have not received any financial support or funding to report.

Author's Contributions

Hayder Abdulsattar Nahi and Rusul Abdulkarrem Salman: Conceptualization, methodology, software.

Noor Hasssan Fadhil: Formal analysis, investigation, resources, data curation.

Moatasem Mohammed Saeed: Writing-original draft preparation, writing-review and edited, visualization.

Ethics

The authors emphasize that the work in this publication is original and unpublished. There are of course not ethical troubles because the paper has been examine and licensed via all authors.

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