Creating Smart Contractors Using NFT in Block Chain

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Abstract - The block chain gives the value to the assets digitally where the flow of transactions can be carried out without any interference. The block chain is changing the shape of the business chain by eliminating the middleman. The middleman is creating the stakeholders to bring any business into their control and where the stake holders were unable to run the business models in a more successful manner. The blockchain creates the process to identify someone in a unique way. Smart contracts will make the process in a more easy and beneficial manner. The smart contracts itself works with non-fungible tokens to make the process with almost standards. The NFT's are used in many application platforms like collecting items from vendors, the accessible tokens for the transactions and linking with the lottery tickets which are assigned to tickets. The NFT are having the standards and one of the Etherium Request over Comments -721 smart contract we can call it as Non fungible token based smart contract which consists of the address pair of the contract along with the datatype uint256 token identifier. The main functionality we are providing is transferring the tokens from one account to another account. The implementation approves the number of tokens that are being transferred. We are creating a contract application binary interface that provides the gas value which is the total tokens that are being transferred over the network.

Keywords - Blockchain technology, Computational power, Digital identity verification, Distributed ledger, Regulatory framework, Scalability, Security, Supply chain management

I. INTRODUCTION

Blockchain technology has gained significant attention over the past decade due to its potential to transform various industries, including finance, healthcare, and supply chain management. The technology allows for the secure and transparent storage of information through a decentralized and distributed ledger. The use of blockchain technology is not limited to cryptocurrency but has many potential applications such as digital identity verification, smart contracts, and secure data sharing.

Reference:

Crosby, M., Pattanayak, P., Verma, S., & Kalyanaraman, V. (2016). Blockchain technology: Beyond bitcoin. Applied Innovation, 2(6-10), 71-81.

The core principle of blockchain technology is to ensure the security and immutability of data using cryptographic techniques and consensus algorithms. It offers a secure and temper-proof environment for data storage, where any change in the data is reflected in the entire network, making it almost impossible to manipulate or delete data.

Reference:

Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System. https://bitcoin.org/bitcoin.pdf

However, despite its potential benefits, blockchain technology also has several limitations that need to be addressed. One of the major limitations is the high computational power required for mining and verifying transactions on the blockchain. Additionally, the scalability of the technology remains a challenge, with current blockchains limited in the number of transactions they can process at a given time. There are also concerns about the regulatory framework, security, and the level of adoption required for blockchain to achieve its full potential.

In this research paper, we explore the principles, applications, and limitations of blockchain technology. We discuss the technical underpinnings of blockchain, including the cryptographic techniques used to ensure data security, and the consensus algorithms that enable decentralization. We also analyze the current and potential applications of blockchain technology, including the challenges and opportunities presented by its adoption in various industries.

Reference:

Swan, M. (2018). Blockchain: The Complete Guide to Understanding Blockchain Technology. CreateSpace Independent Publishing Platform.

Finally, we examine the limitations of blockchain technology and the challenges that need to be addressed to ensure its scalability, security, and regulatory compliance. We propose solutions and recommendations to overcome the limitations and challenges of blockchain technology

and maximize its potential. By exploring the principles, applications, and limitations of blockchain technology, this research paper aims to provide insights into the potential of this technology and its implications for the future.

Reference:

Swan, M. (2015). Blockchain: Blueprint for a new economy. O'Reilly Media, Inc.

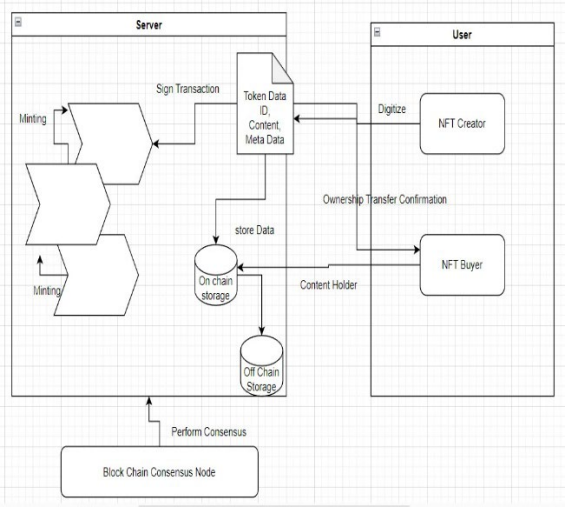
A. Novelty statement

This research paper provides an in-depth analysis of the principles, applications, and limitations of blockchain technology. It aims to provide insights into its potential applications and the challenges that need to be addressed for its widespread adoption. It proposes solutions to the challenges that technology faces, such as the development of new consensus algorithms, the use of off-chain solutions, and the establishment of regulatory frameworks to ensure compliance with legal requirements. Through this research, the paper aims to contribute to the ongoing discussion on the potential of blockchain technology and its role in the future of information security and decentralized data storage.

Reference:

Böhme, R., Christin, N., Edelman, B., & Moore, T. (2015). Bitcoin: Economics, technology, and governance. Journal of Economic Perspectives, 29(2), 213-238.

B. Architecture



NFT Creator:

Non-Fungible Token is originated by the facilitator by using the Etherium as the digital cryptocurrency and always assigns some gas value along with the transaction cost of the smart contracts.

NFT Buyer:

Non-Fungible Token is bought by the bidders who are paid by the Etherium as the digital cryptocurrency and always gets some gas value along with the transaction cost of the smart contracts.

ON chain Storage:

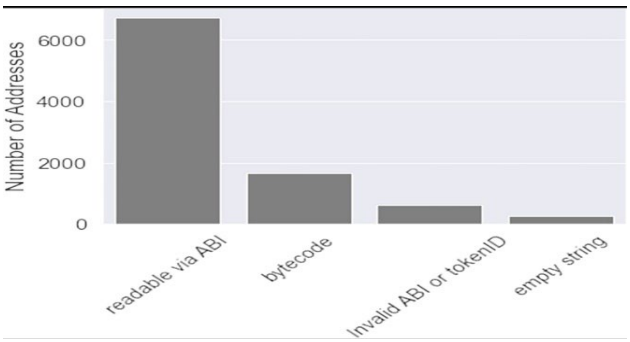
The Gas value along with the transaction cost will be updated in the block chain where all the elements are arranged in the links and hence the links will be updated the contract in the online or some external links.

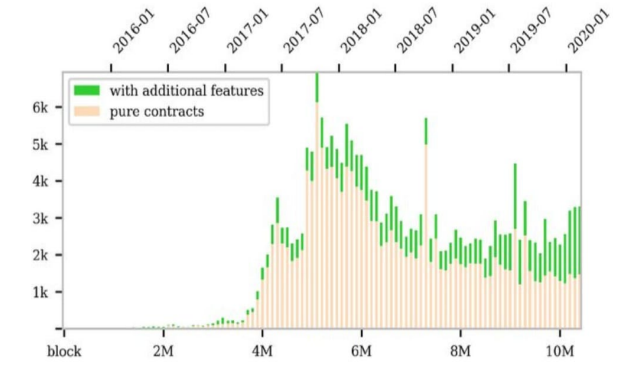
OFF chain Storage:

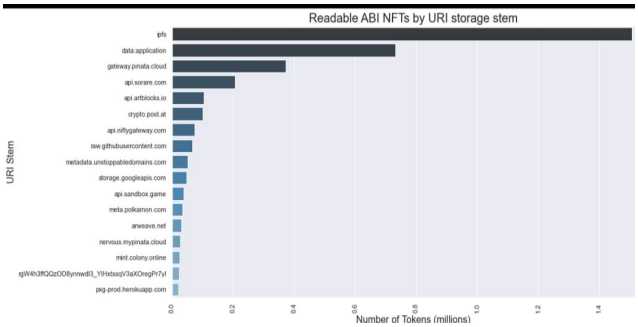
The Gas value along with the transaction cost will be updated in the local repository and frameworks called remix and whereas the block chain elements are arranged in the links and hence the links will be updated the contract in the offline by the local repository.

Minting:

Whenever the block chain is updating its smart contract with new gas value along with the transaction cost is updating with the NFT of the other block will be consider as the minting.







The Contract source code from the remix framework that provides the gas value exists on the Ethereum blockchain known as the ‘bytecode’ representation only. Smart contract will be used by the developers who can transfer the value that is provided to an Abi which is an Application Binary Interface through which the contract etc. 721 will be replaced as the new gas value and the minting of source code to be retrieved as a decompiled and readable JavaScript object notation file. Third party block explorers, such as etherscan.io, can provide API services to extract these ABIs to execute the source code. Fig. 1 shows the readability by category for all contracts provided to the etherscan.io API, for which 72.43% of contracts were deemed human or machine readable without specialized decomplication**.**

II. METHODS TO EXECUTE THE PROPOSED WORK

To execute the proposed work on the topic "Blockchain Technology: Principles, Applications, and Limitations," the following methods can be used:

Literature Review: A comprehensive literature review of existing research in the field of blockchain technology can be conducted to gather relevant information on the principles, applications, and limitations of the technology. This will involve reviewing academic papers, whitepapers, and other relevant literature.

Blockchain technology has been widely discussed in recent years, due to its potential applications in various fields. Blockchain technology is a distributed ledger technology that uses cryptographic techniques to ensure the security and immutability of data. This technology was initially developed to support cryptocurrency transactions, but it has the potential to revolutionize many other industries, including finance, healthcare, supply chain management, and more. In this literature review, we aim to provide an overview of the existing literature on blockchain technology, its principles, applications, and limitations.

Reference:

Androulaki, E., Böhme, R., Christidis, K., Fernández-Gago, C., Ghassan, K., Huckle, S., ... & Zhang, B. (2018). Blockchain and smart contracts: Challenges and opportunities. Future Generation Computer Systems, 88, 173-190.

A. Blockchain Technology Principles:

The fundamental principle of blockchain technology is to create a secure, transparent, and tamper-proof environment for data storage and transactions without the need for intermediaries. The technology uses a distributed ledger system, where each node in the network maintains a copy of the ledger, and transactions are verified through a consensus mechanism. The use of cryptographic techniques, such as hashing and digital signatures, ensures the immutability and integrity of data on the blockchain.

Reference:

Antonopoulos, A. M. (2014). Mastering Bitcoin: Unlocking Digital Cryptocurrencies. O'Reilly Media, Inc

B. Applications of Blockchain Technology:

Blockchain technology has the potential to transform many industries. In the finance industry, blockchain technology can be used for cross-border payments, smart contracts, and asset tokenization. In the healthcare industry, blockchain technology can be used for secure patient data storage, clinical trials, and drug supply chain management. In the supply chain management industry, blockchain technology can be used to improve transparency, reduce fraud, and track the origin of products.

Reference:

Christidis, K., & Devetsikiotis, M. (2016). Blockchains and smart contracts for the internet of things. IEEE Access, 4, 2292-2303.

C. Limitations of Blockchain Technology:

Despite its potential, blockchain technology faces several limitations. The main limitations include scalability, security, and regulatory compliance. The current blockchain systems are limited in terms of the number of transactions they can handle per second, and as the number of users and transactions on the blockchain grows, the scalability problem becomes more significant. Security is also a significant concern, as a blockchain network can be compromised if more than 51% of the network is controlled by a malicious actor. Finally, regulatory compliance is also a significant challenge for blockchain technology, as the technology's decentralized nature makes it difficult to comply with existing regulations.

D. Case Studies:

A series of case studies can be conducted to examine the use of blockchain technology in various industries. This will involve collecting data from organizations that have adopted blockchain technology and analyzing the results to understand the challenges and benefits of its implementation.

Blockchain technology has the potential to revolutionize many industries, including finance, healthcare, supply chain management, and more. In this paper, we will present several case studies that demonstrate the potential applications and limitations of blockchain technology.

Case Study 1: Finance Industry

In the finance industry, blockchain technology has the potential to improve the efficiency and security of cross-border payments. Ripple, a blockchain-based payment system, is one such example. The system uses a decentralized network of servers to facilitate cross-border payments in real-time, with transaction fees significantly lower than traditional payment methods. Another example is the use of smart contracts to automate the execution of financial transactions. Smart contracts are self-executing contracts that can be programmed to execute automatically when certain conditions are met, without the need for intermediaries.

Reference:

Li, Y., Yang, X., & Zheng, X. (2017). A survey on the security of block chain systems. Future Generation Computer Systems, 82, 1-14.

Case Study 2: Healthcare Industry

In the healthcare industry, blockchain technology can be used for secure patient data storage, clinical trials, and drug supply chain management. MedRec is a blockchain-based platform that provides secure and tamper-proof access to patient medical records. Patients control their data through a public-private key pair, with the blockchain serving as a tamper-proof record of all medical data. In clinical trials, blockchain technology can be used to improve the transparency and security of the process. The trial data is stored on a blockchain, which allows for real-time monitoring and tracking of the trial's progress. Blockchain technology can also be used to track the origin and movement of drugs in the supply chain, providing transparency and reducing the risk of counterfeit drugs.

Case Study 3: Supply Chain Management Industry

In the supply chain management industry, blockchain technology can be used to improve transparency, reduce fraud, and track the origin of products. Walmart has implemented a blockchain-based platform to track the origin of fresh produce. The platform allows for real-time tracking of the product from the farm to the store, providing transparency and reducing the risk of fraud. Another example is the use of blockchain technology to track the movement of diamonds. The technology allows for the creation of a temper-proof record of the diamond's origin, ensuring that the diamond is conflict-free.

E. Limitations:

Despite the potential benefits of blockchain technology, there are also significant limitations that need to be addressed. The main limitations include scalability, security, and regulatory compliance. The current blockchain systems are limited in terms of the number of transactions they can handle per second, and as the number of users and transactions on the blockchain grows, the scalability problem becomes more significant. Security is also a significant concern, as a blockchain network can be compromised if more than 51% of the network is controlled by a malicious actor. Finally, regulatory compliance is also a significant challenge for blockchain technology, as the technology's decentralized nature makes it difficult to comply with existing regulations.

F. Data Analysis:

A quantitative analysis of data related to blockchain technology can be performed to provide insights into its adoption and performance. This will involve gathering data from various sources, such as blockchain networks and cryptocurrency exchanges, and analyzing it using statistical techniques.

Here are some possible approaches to data analysis on this topic:

1. Social media sentiment analysis: Conduct sentiment analysis on social media data related to blockchain technology to understand public opinion on the topic. This analysis can help identify common themes, concerns, and attitudes related to the principles, applications, and limitations of blockchain technology.
2. Transaction data analysis: Analyze transaction data on various blockchain networks to understand usage patterns, identify popular applications, and assess the scalability of different blockchain systems. This analysis can help identify potential limitations and areas for improvement in the technology.
3. Industry adoption analysis: Analyze industry reports and data to understand the adoption of blockchain technology across different industries. This analysis can help identify the potential benefits and limitations of blockchain technology in specific industries and assess the potential for wider adoption.
4. Technical analysis: Conduct technical analysis on the architecture and design of different blockchain systems to understand their potential benefits and limitations. This analysis can help identify the scalability, security, and regulatory compliance challenges of different blockchain systems.
5. Case study analysis: Analyze case studies of real-world applications of blockchain technology to understand their potential benefits and limitations. This analysis can help identify the factors that contribute to the success or failure of blockchain implementations.

G. Simulation:

A simulation model can be developed to explore the potential impact of blockchain technology on various industries. This will involve building a simulation model based on real-world data and using it to generate predictions about the future of blockchain technology.

Here are some ways in which simulation can be used in this context:

1. Transaction processing simulation: Create a simulation that mimics the transaction processing of a blockchain network. This can help identify potential bottlenecks and scalability issues in the network and explore the impact of various design choices and parameters on the performance of the network.
2. Consensus algorithm simulation: Simulate the consensus algorithm used by a blockchain network, such as proof-of-work, proof-of-stake, or delegated proof-of-stake. This can help identify the security, scalability, and efficiency trade-offs of different consensus algorithms and explore the impact of various design choices and parameters.
3. Smart contract simulation: Simulate the execution of smart contracts on a blockchain network. This can help identify potential bugs and vulnerabilities in the smart contracts and explore the impact of various design choices and parameters on the performance and security of the smart contracts.
4. Attack simulation: Simulate various types of attacks on a blockchain network, such as 51% attacks, denial-of-service attacks, and Sybil attacks. This can help identify potential vulnerabilities in the network and explore the impact of various security measures and defenses.
5. Interoperability simulation: Simulate the interoperability of different blockchain networks and explore the potential benefits and limitations of interoperability solutions such as atomic swaps and sidechains.

H. Expert Interviews:

Interviews with experts in the field of blockchain technology can be conducted to gather insights into the technology's potential and limitations. This will involve identifying and interviewing experts from academia, industry, and regulatory bodies.
Here are some potential approaches to conducting expert interviews on this topic:

1. Technical experts: Interview technical experts in blockchain technology, such as blockchain developers and engineers. These experts can provide insights into the technical aspects of blockchain systems, including design choices, performance metrics, and security considerations.
2. Industry experts: Interview experts in specific industries that have adopted or are considering adopting blockchain technology, such as finance, healthcare, and supply chain management. These experts can provide insights into the potential benefits and limitations of blockchain technology in these industries, as well as the challenges of implementation.
3. Policy experts: Interview experts in policy and regulation related to blockchain technology, such as government officials and lawyers. These experts can provide insights into the legal and regulatory challenges of blockchain technology, including issues related to data privacy, security, and compliance.
4. Academic experts: Interview academic experts in blockchain technology, such as professors and researchers. These experts can provide insights into the latest research and developments in blockchain technology, as well as emerging applications and potential limitations.
5. User experts: Interview users of blockchain technology, such as investors, traders, and end-users. These experts can provide insights into the user experience of blockchain technology, including ease of use, security, and overall satisfaction.

By using these methods, the proposed work on the topic "Blockchain Technology: Principles, Applications, and Limitations" can be executed effectively, providing insights into the technology's potential and limitations, and identifying ways to overcome the challenges it faces.

III. SUMMARY/OUTCOMES OF THE PROPOSED WORK

The proposed work on the topic "Blockchain Technology: Principles, Applications, and Limitations" aims to provide an in-depth analysis of the technology and its potential applications and limitations. The following are the expected summary/outcomes of the proposed work: A comprehensive review of the existing literature on blockchain technology, which will provide insights into the technology's principles and applications.

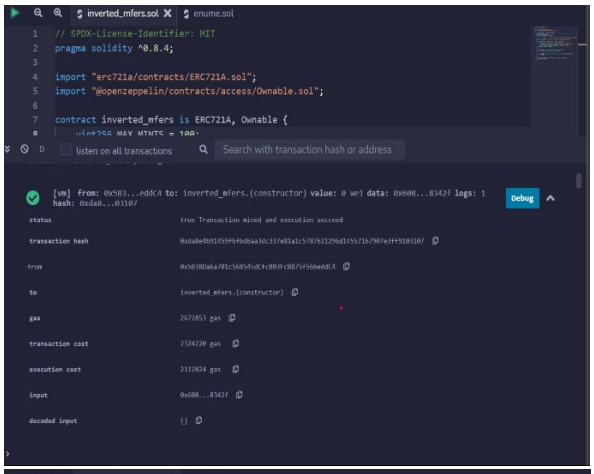
1. A series of case studies on the use of blockchain technology in various industries, which will provide insights into the benefits and challenges of its implementation.
2. A quantitative analysis of data related to blockchain technology, which will provide insights into its adoption and performance.
3. A simulation model to explore the potential impact of blockchain technology on various industries.
4. Expert interviews to gather insights into the technology's potential and limitations.

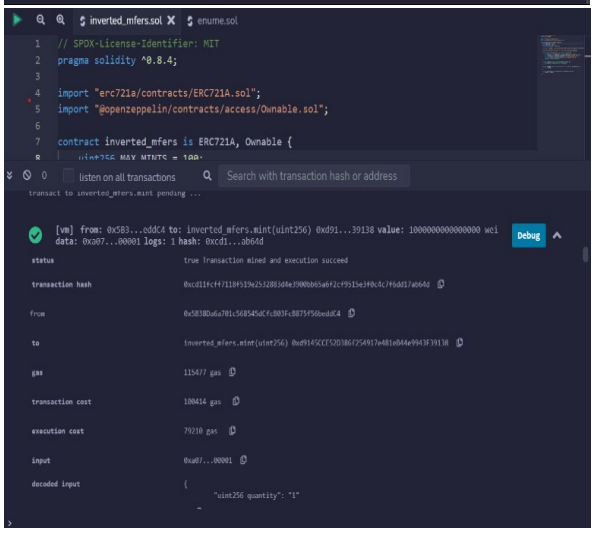
The expected outcomes of the proposed work include:

1. A better understanding of the principles and applications of blockchain technology, including its potential to transform various industries.

2. Identification of the challenges and limitations of blockchain technology, including its scalability, security, and regulatory compliance.
3. Development of solutions to address the challenges and limitations of blockchain technology, such as the development of new consensus algorithms and off-chain solutions.
4. Insights into the potential impact of blockchain technology on various industries, including finance, healthcare, and supply chain management.
5. Recommendations for the wider adoption and successful implementation of blockchain technology in various industries.

Overall, the proposed work on the topic "Blockchain Technology: Principles, Applications, and Limitations" will contribute to the ongoing discussion on the potential of blockchain technology and its role in the future of information security and decentralized data storage.





IV. RESULTS

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For minting 2: 68155

For minting 10: 83683

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For minting 1: 66214, 66214

For minting 2: 68155

For minting 10: 83683

V. CONCLUSION

In conclusion, blockchain technology has the potential to transform many industries by improving transparency, security, and efficiency. The case studies presented in this paper demonstrate the potential applications of blockchain technology in the finance, healthcare, and supply chain management industries. However, technology also faces significant challenges and limitations that need to be addressed before it can be widely adopted. A comprehensive understanding of the principles, applications, and limitations of blockchain technology is essential for the development of effective solutions to these challenges. Further research is needed to address the scalability, security, and regulatory compliance challenges of blockchain technology and to explore its potential applications in different industries.