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E-Voting System Using Blockchain

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Abstract: ***The introduction of online voting has revolutionized the electoral process, providing a secure and convenient way for people to cast their votes without having to be physically present at polling stations. However, traditional online voting systems are still susceptible to security and integrity issues, such as hacking and tampering. Blockchain technology provides a solution to these problems by offering a decentralized and immutable ledger that can ensure the security and transparency of online voting. In this paper, we propose an online voting system using blockchain technology, which is designed to provide a secure and transparent voting process.***

Keywords: Block Chain, Electronic Voting System, E – Voting

I. INTRODUCTION

The electoral process is one of the most important aspects of democracy, and the integrity and security of the process are critical to maintaining the trust of citizens in the democratic system. Online voting has emerged as a popular alternative to traditional voting methods, providing a convenient way for voters to cast their ballots without having to be physically present at polling stations. However, online voting systems are still vulnerable to security and integrity issues, such as hacking, tampering, and voter fraud.

Blockchain technology has gained significant attention in recent years due to its ability to provide a secure and transparent ledger that is resistant to hacking and tampering. Blockchain technology works by creating a decentralized and immutable ledger, which can be used to securely store and transfer information. This technology has been successfully applied to various domains, including finance, healthcare, and supply chain management. In this paper, we propose an online voting system using blockchain technology, which is designed to provide a secure and transparent voting process.

Due to its adaptability, simplicity, and affordability when compared to general elections, the electronic vote is frequently utilised in many elections. Despite this, the risk of excessive authority and manipulated information limits the basic fairness, privacy, secrecy, anonymity, and transparency within the voting process.

II. LITERATURE REVIEW

Several online voting systems using blockchain technology have been proposed in the literature. Some of these systems include the Follow My Vote system, the Agora system, and the Horizon State system. These systems use blockchain technology to provide a secure and transparent voting process.

The Follow My Vote system uses blockchain technology to create a secure and transparent ledger of votes. This system uses a permissioned blockchain, which ensures that only authorized nodes can participate in the voting process.

The Agora system is a decentralized online voting system that uses blockchain technology to ensure the integrity and transparency of the voting process. The Horizon State system is another online voting system that uses blockchain technology to provide a secure and transparent voting process

III. PROPOSED SYSTEM

Our proposed online voting system using blockchain technology is designed to provide a secure and transparent voting process. The system consists of four main components: the voter registration module, the voting module, the vote counting module, and the blockchain module.

The voter registration module is responsible for registering voters and ensuring that only authorized voters can participate in the voting process. The voting module allows voters to cast their votes securely and anonymously. The vote counting module is responsible for counting the votes and generating result. The blockchain module is responsible for storing the votes securely and immutably.

The system uses a permissioned blockchain, which ensures that only authorized nodes can participate in the voting process. The blockchain is maintained by a network of nodes, which are responsible for validating and verifying the transactions. Each vote is encrypted using a public key, which ensures that the vote remains anonymous. The blockchain ledger stores the encrypted votes, which can be accessed by authorized nodes for vote counting and verification.

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IV. SCOPE OF PROJECT

The scope of an online voting system using blockchain technology is vast and includes various aspects of the electoral process. Some of the significant areas that the proposed system can cover are:

1) *Security:* The proposed system can provide a secure voting process by using encryption and immutability provided by blockchain technology. It can prevent hacking, tampering, and voter fraud, ensuring the integrity of the voting process.
2) *Transparency:* The proposed system can provide a transparent voting process by using a decentralized and immutable ledger provided by blockchain technology. It can allow authorized nodes to access the ledger and verify the votes, ensuring the transparency of the voting process.
3) *Convenience:* The proposed system can provide a convenient voting process by allowing voters to cast their votes from anywhere, using any device with internet access. It can eliminate the need for voters to be physically present at polling stations, saving time and resources.
4) *Cost-Effective:* The proposed system can be cost-effective by eliminating the need for physical ballot papers, printing, and storage, reducing the cost of the voting process.
5) *Accessibility:* The proposed system can provide accessibility to the voting process to people with disabilities, who may have difficulties accessing traditional polling stations. It can allow them to cast their votes from the comfort of their homes using assistive technology.
6) *Scalability:* The proposed system can be scalable, allowing it to accommodate a large number of voters, making it suitable for elections of various sizes, from local to national.

V. METHODOLOGY

Creating a Voting System with Blockchain Technology:

1) *System Design*
a) Identify the roles: Voter, Candidate, and Administrator.
b) Define voting regulations: Eligibility requirements, voting period, and number of votes permitted.

2) *Blockchain Creation*
a) Create a blockchain to store voting data securely and transparently.
b) Each block in the blockchain should contain candidate names, voter IDs, and timestamp.
c) Implement a proof-of-work algorithm to prevent data tampering.

3) *User Interface Design*
a) Develop a user interface accessible on devices with an internet connection.
b) Ensure the user interface is user-friendly, inclusive, and secure.
c) Implement authentication mechanisms to verify voter identities.
d) Consider using digital signatures, biometric identification, or other techniques for identity verification.

4) *Voting Process*
a) Provide voters with a voting interface (e.g., desktop, mobile, or web application).
b) Enable voters to cast their ballots securely and effectively through the user interface.
c) Implement mechanisms to confirm voters' identities and prevent fraud.

5) *Blockchain Network*
a) Store voting data on a blockchain network to ensure security and immutability.
b) Choose between a public or private blockchain network based on the voting system's needs.
c) Utilize smart contracts to automate and make the voting process transparent.
d) Implement a consensus process to ensure the validity and accuracy of vote data.
e) Select a suitable consensus mechanism for the blockchain network.

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6) Smart Contract Development

Develop smart contracts that will govern the voting process. These contracts should handle tasks such as ballot creation, vote casting, tallying, and result declaration. Ensure that the smart contracts are secure and accurately reflect the rules of the election.

By following these steps, a voting system utilizing blockchain technology can be designed and implemented. It provides transparency, security, and integrity to the voting process while ensuring eligibility and authenticating voters' identities.

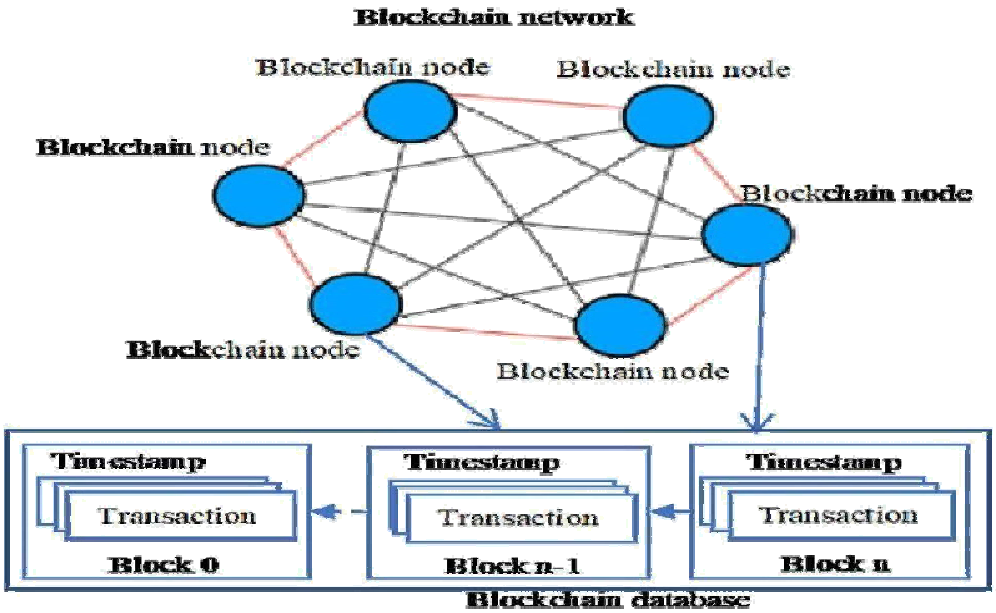


Figure 1 : Architecture Of Block Chain Enabled E – Voting

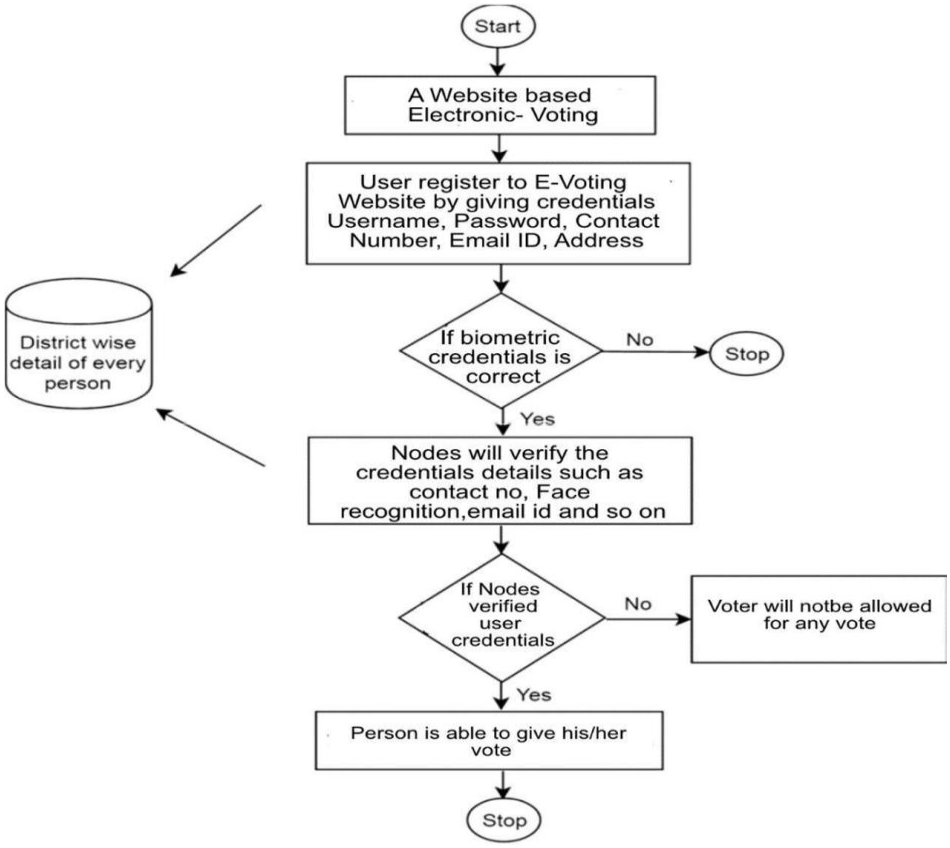


Figure 2 : Flowchart of proposed Block Chain Enabled E –voting

VI. RESULT

In a voting system implemented using blockchain, the results of the election are stored on the blockchain and can be accessed and verified by all participants.

As voters cast their votes, each vote is recorded as a transaction on the blockchain. The votes are stored in a secure and immutable manner, ensuring that they cannot be altered or tampered with. Smart contracts on the blockchain can be programmed to tally the votes based on predefined rules and algorithms. Once the voting period is over, the smart contracts execute the vote tallying process. The votes are counted and aggregated to determine the outcome of the election.

One of the key benefits of using blockchain for voting systems is the transparency it provides. All transactions, including the votes and result calculations, are recorded on the blockchain and can be accessed by anyone. This transparency allows for independent verification and auditing of the results, increasing trust in the system.

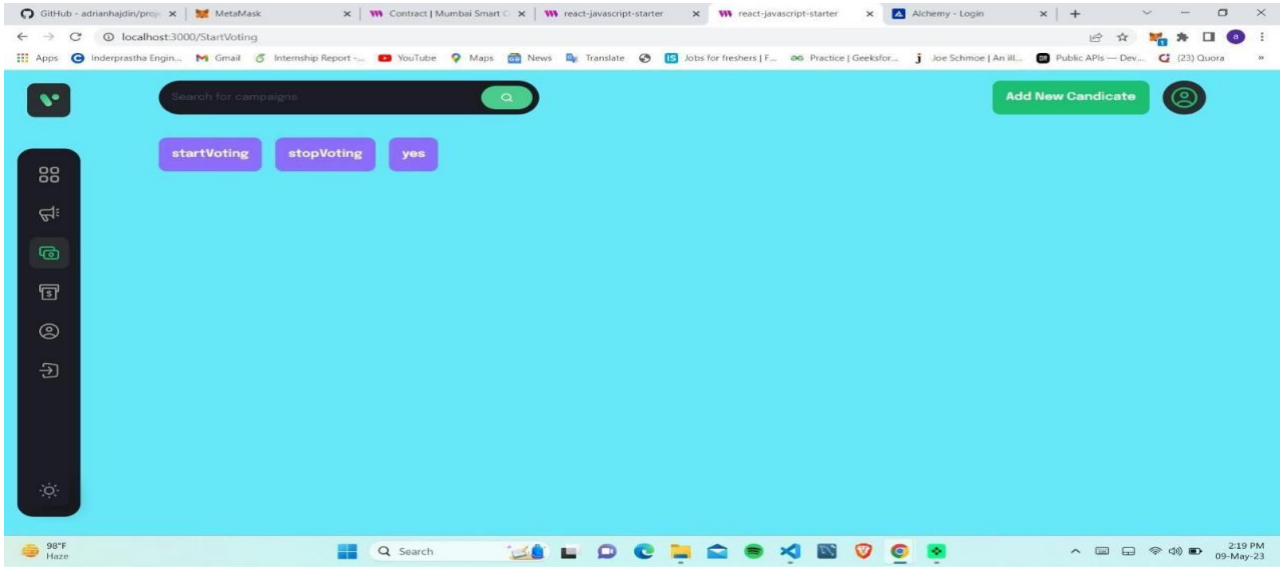


Figure 3: Home Page

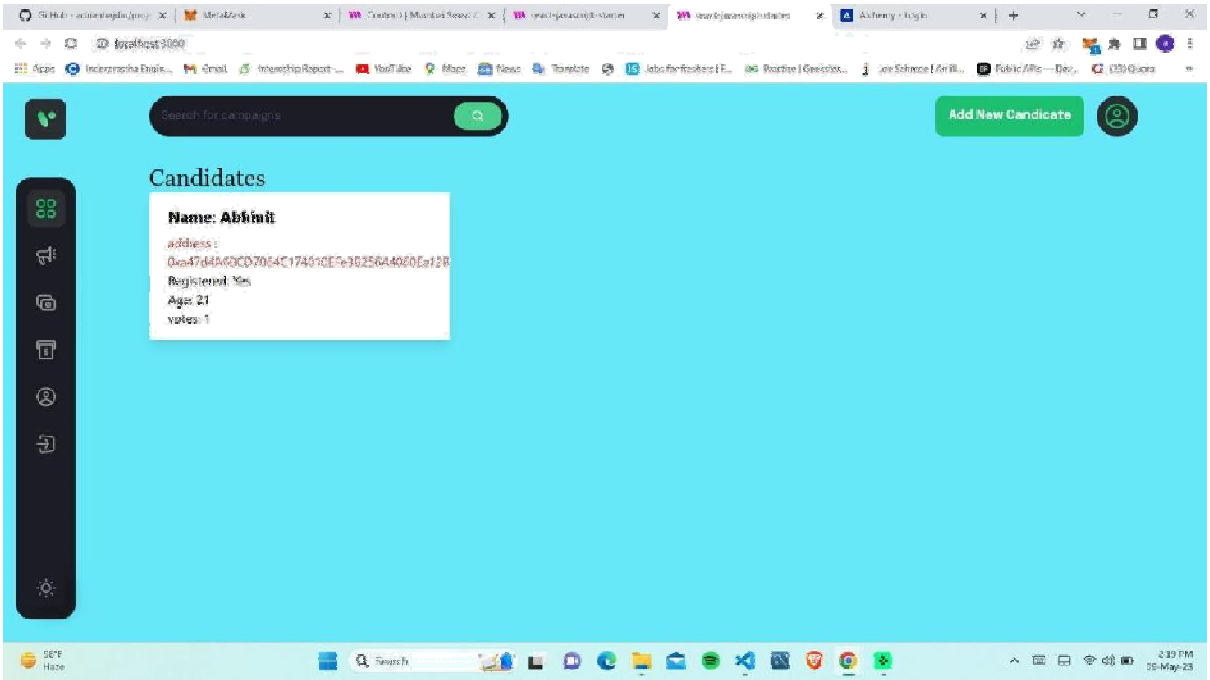


Figure 4: User Registration Page

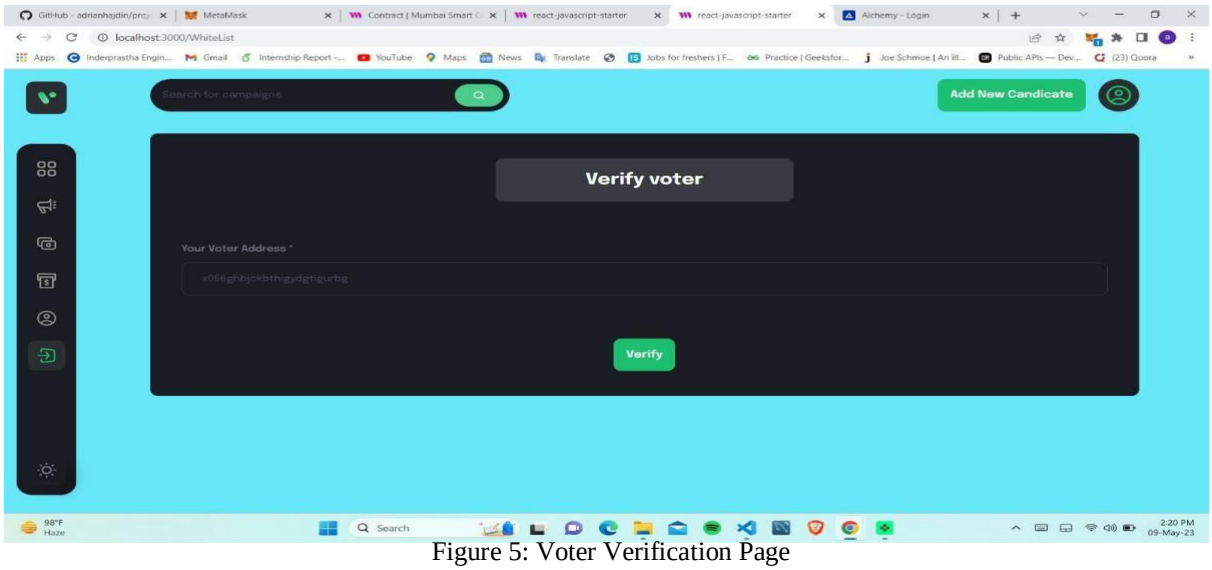


Figure 5: Voter Verification Page

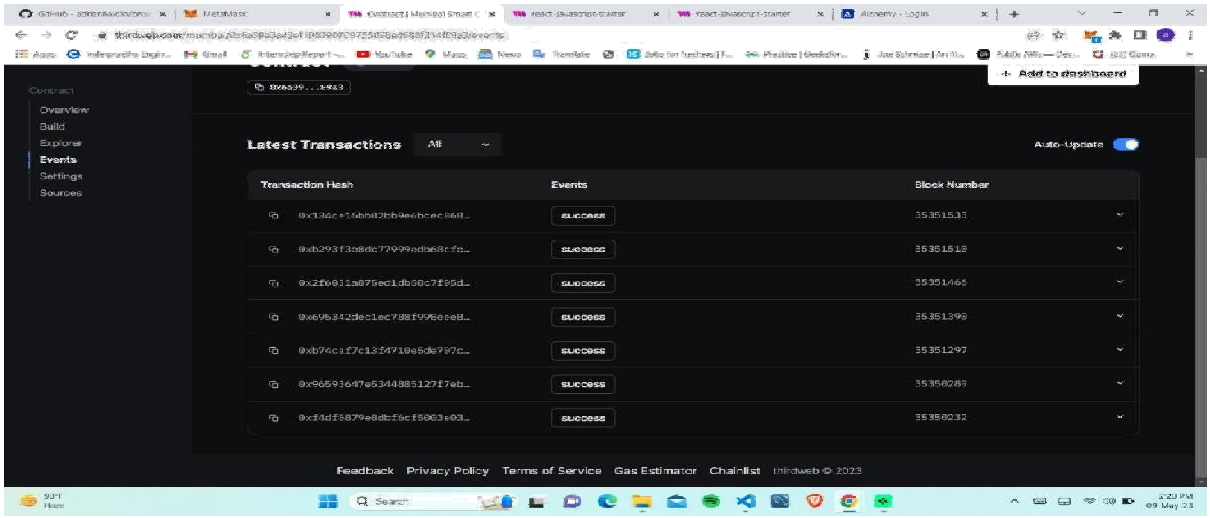


Figure 6: Voting Transaction Page

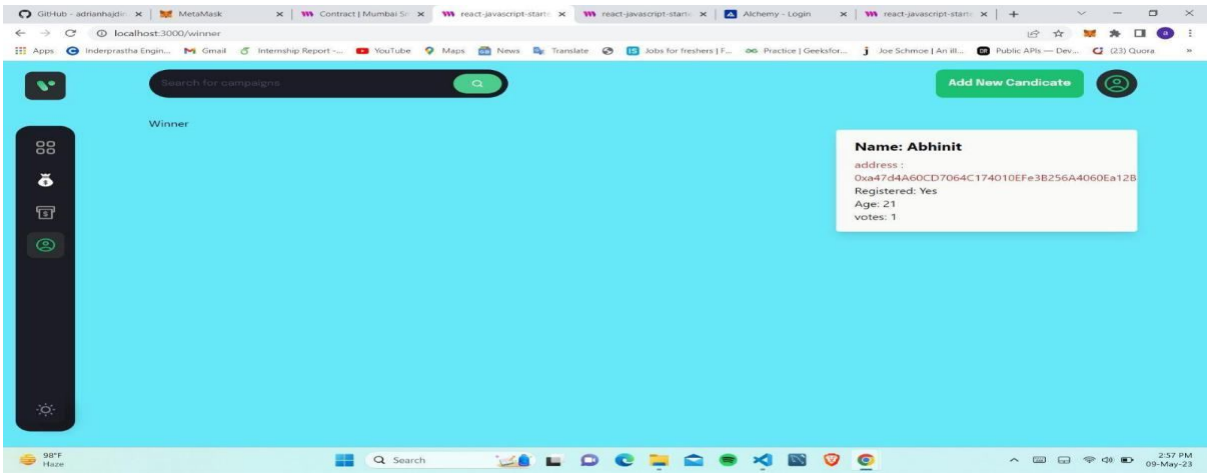


Figure 7: Result Page

VII. CONCLUSION

In this paper, we proposed an online voting system using blockchain technology, which is designed to provide a secure and transparent voting process. The proposed system uses a permissioned blockchain, which ensures that only authorized nodes can participate in the voting process. The system consists of four main components: the voter registration module, the voting module, the vote counting module, and the blockchain module. The system ensures the security and integrity of the voting process by using encryption and immutability provided by blockchain technology. The proposed system can be a significant step towards a more secure and transparent electoral process.

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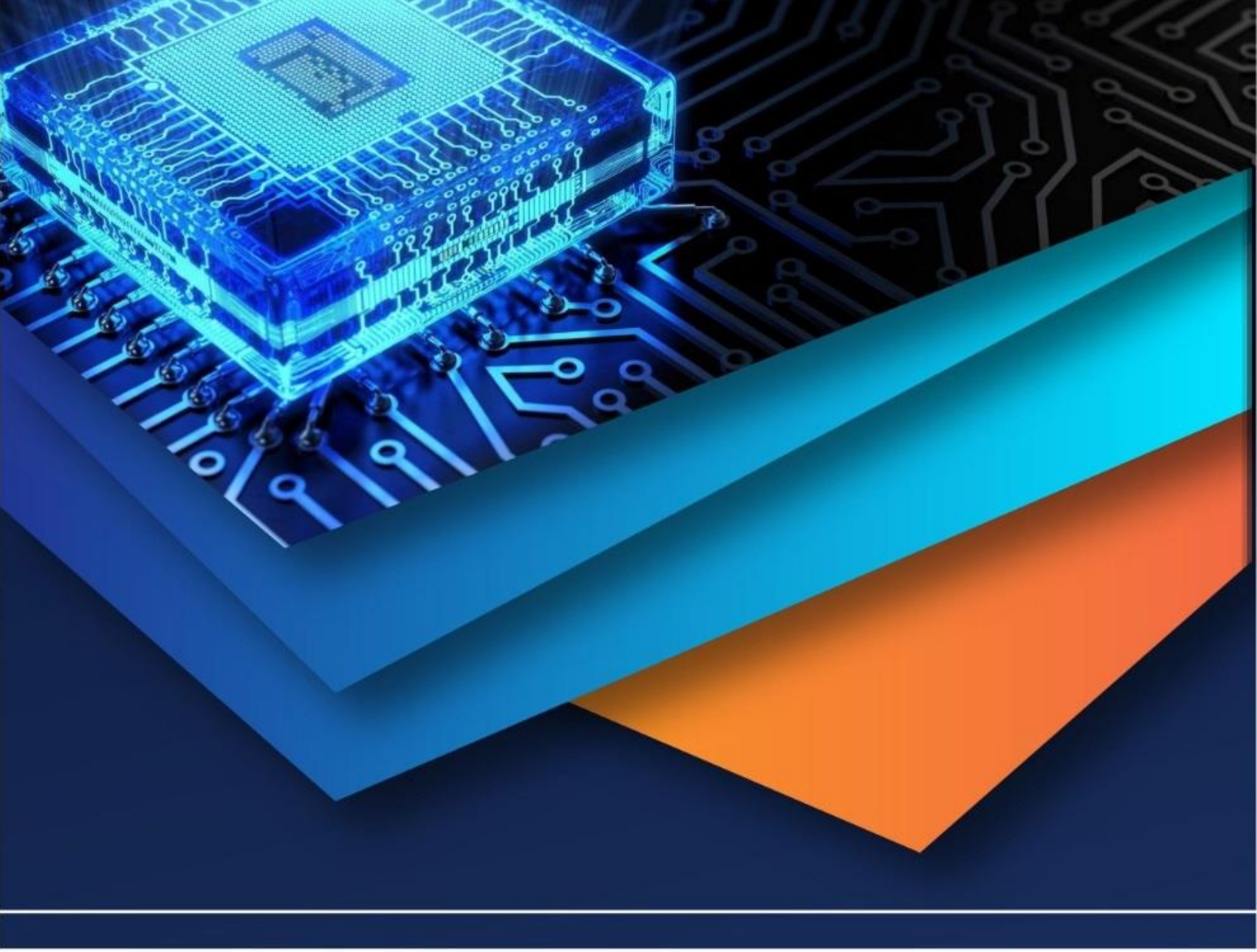
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