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E-Voting Using Public Blockchain

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Abstract: ***Since then, there have been some ways of voting. Around the world, paper ballots are the most common voting format. Only in the past ten years have electronic voting schemes gained popularity, and they remain unaddressed. E-voting systems have issues with security, reliability, openness, functionality and dependability. Estonia is the innovator in this area and might be regarded as the cutting edge. However, there aren't many alternatives that use blockchain. All of the aforementioned issues can be solved with blockchain, which also offers benefits like immutability and decentralization. The primary issues with blockchain-based technology used for electronic voting are their narrow focus or the lack of testing and comparability. We introduce an electronic voting system built on the blockchain that may be applied to any type of voting. Blockchain uses it to the fullest extent possible and has the capacity to manage all processes. After the voting process has begun, the platform behaves as though it is completely independent and decentralized, with no potential for interference. Although the data are completely transparent, homomorphic encryption protects the voters' identities. The main innovation of our solution is the fully decentralized management of the e-voting platform through blockchain, transparency of the entire process, and privacy and security of the voters thanks to homomorphic encryption.***

Keywords: ***e-voting system, blockchain, face recognition, security, voter.***

I. INTRODUCTION

The development of e-voting technologies is still in its infancy. We chose this topic not only because it is new, but also because there aren't many solutions available to issues with e-voting. These days, e-Government development is gaining popularity. But if essential government functions like elections don't go electronic, such a system is impractical. "One of the major public sectors that blockchain technology can revolutionize is e-voting." [1]E-voting also brings with it new problems that need to be solved. One of them is election security, which must be at least as secure as the traditional voting methods using ballots. Because of this, we have chosen to have secure elections where voters won't have to worry about fraud or other electoral irregularities. Blockchain is frequently cited as an example of safe technology being employed in an online context in recent years. Blockchain is used by our electronic voting system to oversee all election procedures. Its key benefit is that no trust in the centralized entity that established the elections is required. The outcome of the election under our system cannot be impacted by this authority. [2]The lack of system transparency, which undermines voter confidence, is another difficulty with electronic voting. Blockchain offers a completely transparent solution to this issue, enabling everyone to view the methods used to store data and manage it. When it comes to security, this technology is superior to the traditional e-voting platform without blockchain in every manner.

Voting is a way for a group, gathering, or electorates to decide something together or voice their opinion Voting typically happens after election campaigns, discussions, and debates. Voters are those who cast ballots for their preferred candidates, while candidates are those who are running for office Typically, the voter has the option to select any other candidates he or she prefers in addition to those on the list. [2]

Following the introduction and broad use of bitcoin the very first cryptocurrency in everyday life, blockchain technology has gained popularity in the software industry today. Due to its high level of system transparency, blockchain technology quickly gained popularity after it was first introduced to the internet and became an active area of research and study for its potential applications in a variety of other fields. Blockchain technology derives from the fundamental architectural framework of the cryptocurrency bitcoin. For instance, since bitcoin has a distributed structure for its wallets. [3]

II. LITERATURE SURVEY

Modern digital technology has improved the lives of several people. Contrary to the election system, it makes extensive use of ordinary paper. Elections using the traditional system are still widely used, endangering the aspects of security and transparency (offline). Because it adopts a decentralised structure and the full database is held by multiple users, block chain technology is one of the answers. A ground-breaking decentralised consensus technique is introduced by Bit Coin.

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However, the public block chain deployment scenarios of the developing consortium block chain cannot be supported by the Bit coin-derived consensus processes. [1]We suggest Proof of Vote as a new consensus algorithm (POV). The internal control mechanism within the consortium as well as the former both ensure the separation of voting rights and executive rights, enhancing the independence of the position of the board member. Regarding the latter, our study demonstrates that POV can ensure the security of the transaction under the condition that at least Nc/2+1 commissioners are functioning efficiently. Without a question, the blockchain, a ground-breaking idea that serves as the technology that powers the well-known crypto currency bitcoin and its offspring, is ushering in a new age for the Internet and online services. In this study, we used the Ethereum wallets and the Solidity programming language to create and test an example e-voting application as a smart contract for the Ethereum network.[4]. There has previously been some noteworthy research in this area, which has been referenced to in order to get a comprehensive understanding of the subject and grasp a few crucial ideas for this study. To get a general understanding of how the author attempted to use Ethereum as a blockchain network to tackle a comparable problem, many other sources that have been included below can be used to grasp different topics by looking through earlier research in the same field. The benefits and limitations of generic voting systems, blockchain security, blockchain structure, several existing blockchain networks, and many other subjects were understood through consulting various related publications. It also provided us with an introduction to a number of consensus algorithms, including proof of work and proof of existence. This evaluation aided in the development of our own research and helped shed light on related issues. [5]

III. EXISTING SYSTEM

Since then, there have been some ways of voting. Over the world, paper ballots are the most common voting format. Only in the past ten year shave electronic voting schemes gained popularity, and they remain unsolved.E-voting systems have issues mostly with functionality, security, legitimacy,and openness. Estonia is the innovator in this area and might be regarded as the cutting edge. Nevertheless, there aren't many alternatives that use blockchain. All of the aforementioned issues can be solved with blockchain,which also offers benefits like immutability and decentralisation. The primary issues with blockchain-based technology used for electronic voting are their narrow focus or the lack of testing and comparability.This existing system has security issues which is major disadvantage

IV. PROPOSED SYSTEM

The proposed e-voting system based on the public blockchain takes into account all voting requirements, including security, credibility, transparency, reliability, and functionality. As a result, it is intended for use in any election, including student elections, presidential, legislative, and local elections. The system allows for more rounds of voting and, ideally, employs a public blockchain. Other types of blockchain can be used in place of the public blockchain, but the stored data (votes) must be easily verified by any user. Any observer who is interested in the electronic voting system is represented by the user. (The user represents any observer who is interested in the electronic voting system.) [1]

An admin module and a user module are the two primary modules in our suggested system. The vote publisher role, which is the major role in the admin module, is responsible for managing the election data and voting results. The voter who casts his vote is one of the key roles included in the user module. In addition to these two roles, there is a third main role called "key authority" whose responsibility it is to generate and distribute keys to voters and vote publishers. These three roles can stand in for a group, a business, or a user. Due to the possibility of both roles being held by the same entity or individual, the functions of vote publisher and key authority can be combined into one. Depending on a vote configuration, the voter participates in the elections. The vote publisher configures the votes, and this is done as part of the smart contract. Before publishing the smart contract, the vote publisher must be aware of all cypher keys. A strong collaboration between the vote publisher and the key authority is necessary. To a voter and a vote publisher, the key authority generates and provides all cypher keys. The distribution channel needs to be protected and shouldn't be open to outside interference.

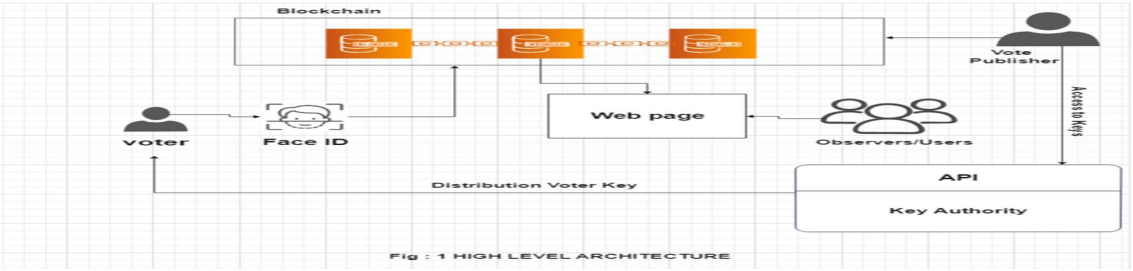


Fig. 1 System Architecture

It depicts the architecture of the electronic voting system. The roles, components, and interconnections between them are depicted. The architecture includes the following components: blockchain (required), faceID (required), results interface (required), and key authority API (optional). A smart contract is a specialised component that is part of the blockchain and is responsible for vote processing and evaluation. The smart contract's programming language is determined by the type of blockchain.
The key authority API is a supplementary module that can be included in the key authority organisation. This API allows the voter and vote publisher to obtain a public key for homomorphic encryption as well as a key to access the votes. These keys can be distributed manually or automatically. This is why the component is only optional and not required in the architecture.

A. Blockchain

The voting process and data storage architecture are all represented by the blockchain component. The blockchain can be built using either a public blockchain like Ethereum or a private blockchain like Hyperledger. The benefit of the public blockchain is that it offers all users access to information about transactions and blocks, giving it more confidence than the private blockchain. This assurance is made sin the context of a common user who wants to see all the information but is not technologically sophisticated. The private blockchain can offer the same level of assurance, but a company must demonstrate it with data. The type of blockchain that should be employed is not constrained by the proposed design. The platform chosen is at the discretion of the organisation in charge of organising elections.

B. Face id

This component gives users access to the blockchain so they can conduct voting. Face ID, often referred to as virtual cryptography, is taken into account in the architecture as a means of gaining access to the blockchain network. It is an encryption method that conceals data in pictures. It offers data security and secrecy.

C. Result Interface

This component represents a result interface. The interface must be able to access the blockchain and provide users and observers with information. Vote results are included in the data, and users should be able to view transactions on the blockchain since it should be transparent about all transactions. For ease of understanding the findings are presented graphically, with only the final results being revealed. As a result of the homomorphic encryption being used, live results are not accessible. [1]

V. IMPLEMENTATION & RESULTS

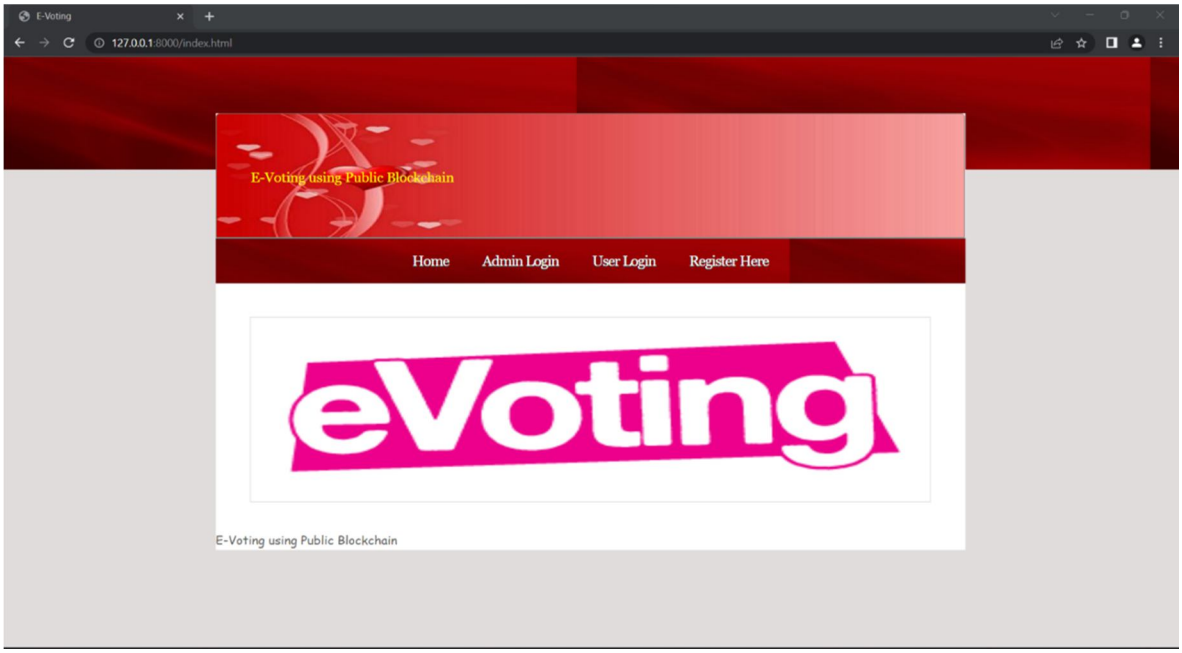


Fig. 2 This screen displays E-voting interface to interact with the admin and user. In this we have Admin Login module, User Login module and Register Here Module.

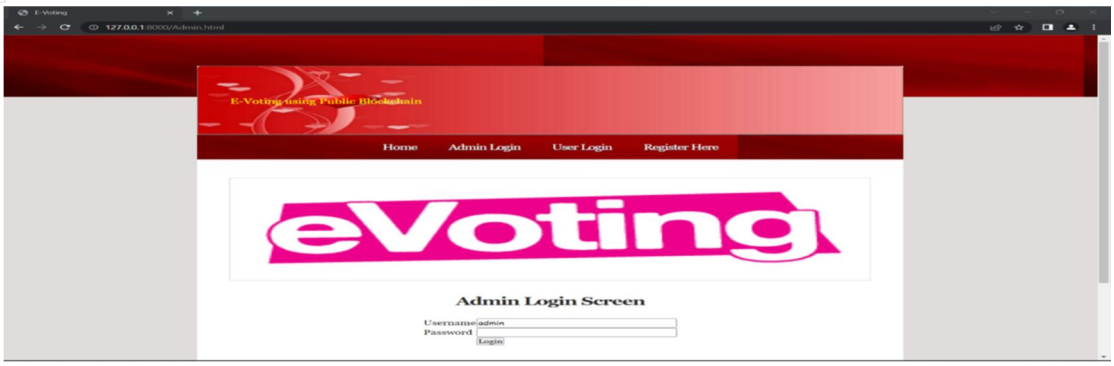


Fig. 3 In this screen admin should enter the user name and password to login into the module to election task.



Fig. 4 In this screen admin can access to party details, votes etc.



Fig. 5 In this screen admin add the party candidate details like Candidate Name, Party Name, Area Name, Party Image.

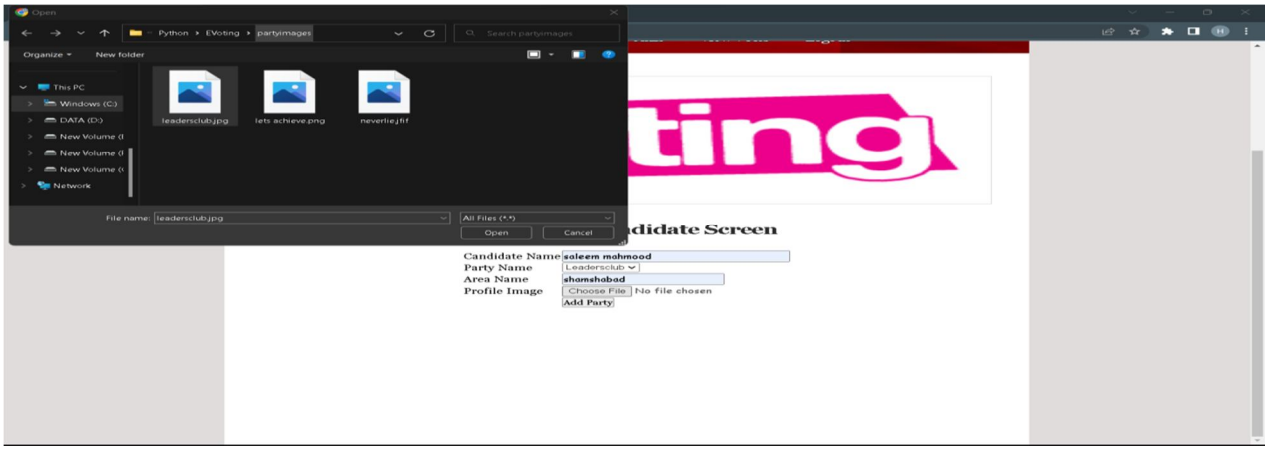


Fig. 6 Below screen displays adding of party details and candidate details.



Fig. 7 In this screen admin can see every party candidate and their details like Candidate Name, Party Name, Area Name and Party symbol.



Fig. 8 In this screen user should register by using details like User Name, Password, Contact Number, Email ID, Address.

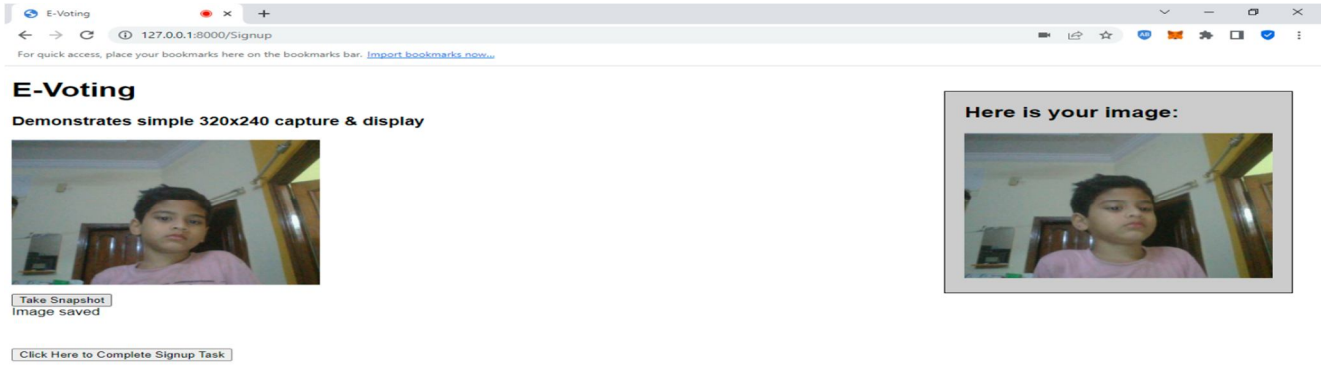


Fig. 9 Taking the snapshot of user while registering.

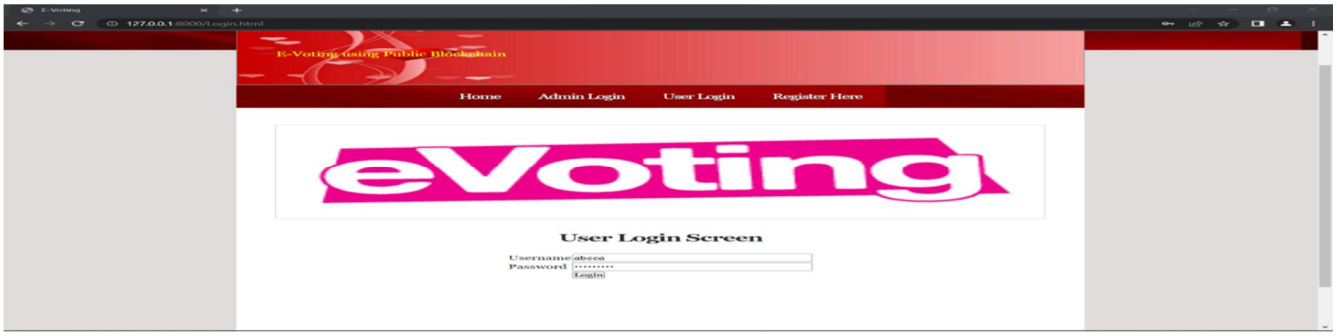


Fig. 10 In this module user should login by using registered username and password.

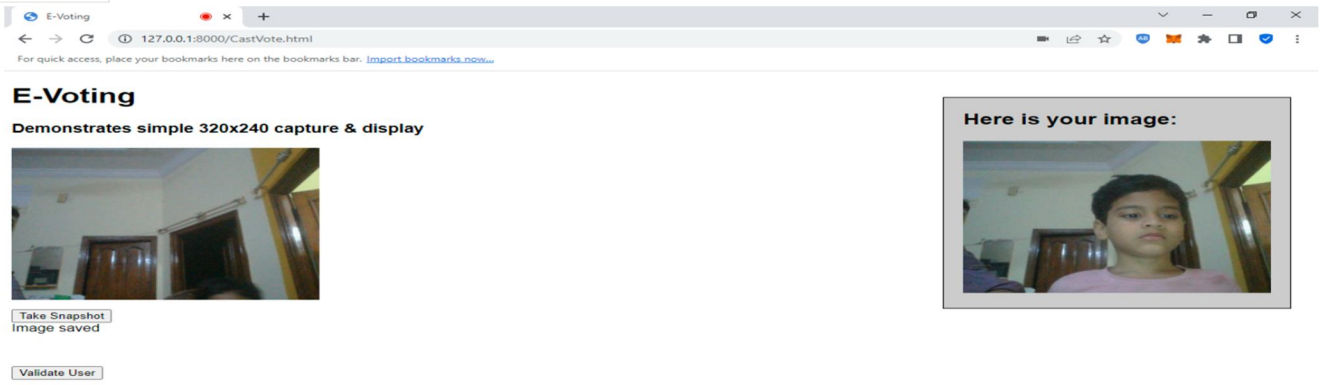


Fig. 11 In this screen registered user is validated and redirected to the voting module to caste vote.



Fig. 12 In this screen we can see that user vote has been stored in block chain.

TABLE I
Vote Count Analysis

Voter Count	Correct Vote Count	Accuracy
2	2	100%
5	5	100%
7	7	100%
10	10	100%

TABLE III
Face Validation Analysis

Voter Count	Correct Face ID Verification	Accuracy
2	2	100%
5	4	80%
7	5	71.43%
10	6	60%

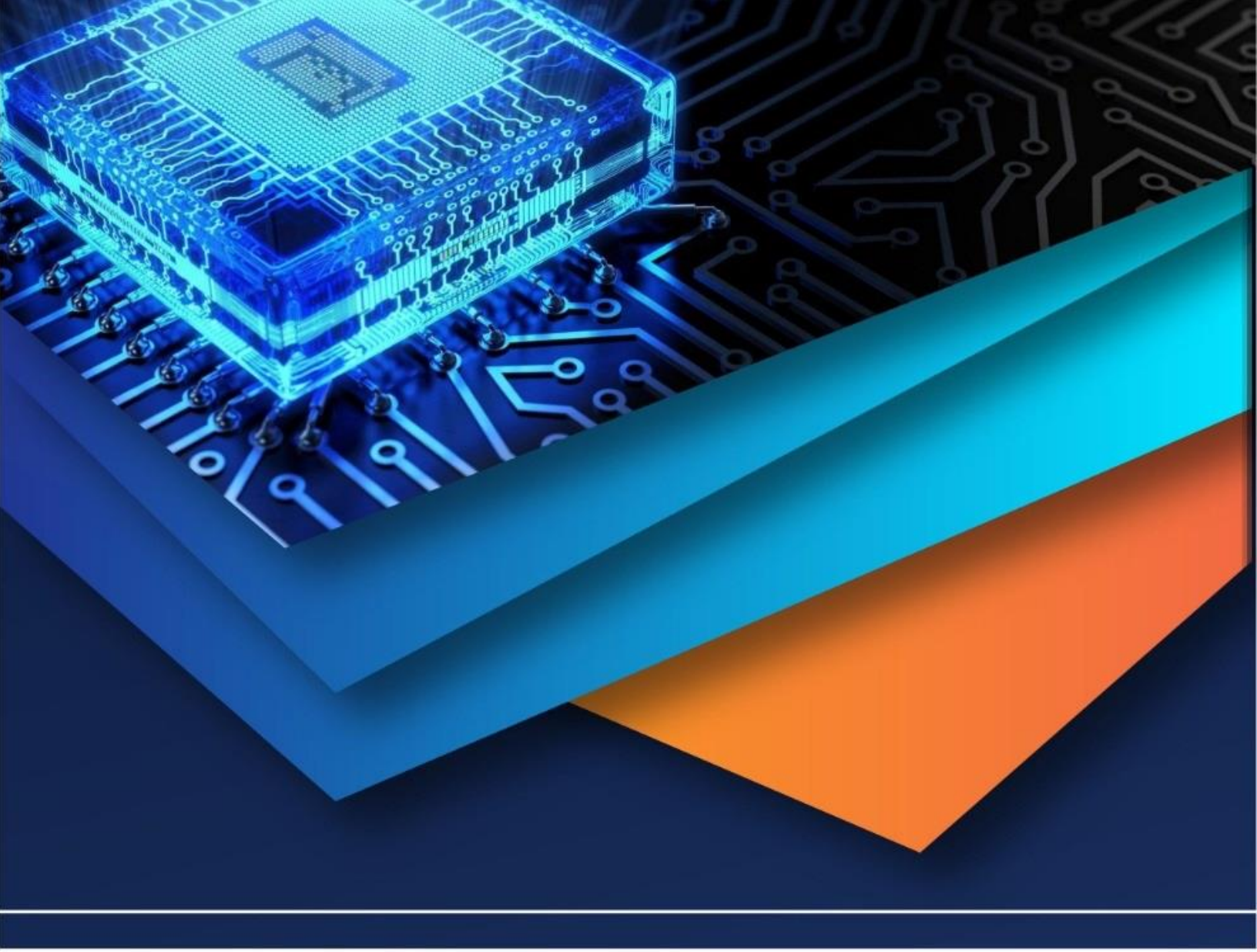
VI. CONCLUSION AND FUTURE SCOPE

We demonstrate face recognition validation for the electronic voting system, in this paper. The given algorithm validated correctly approximately 6 out of 10 times. This voting system cuts down on the amount of work, labour, and time required for elections. We can currently use this web application for school or university-level elections, polls, and so on. Increase Accuracy of Face ID verification., Voter ID integration, Aadhaar card validation, Mail otp verification. Which makes it more secure and can be used for general elections.

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