E-Vote System Using Blockchain and Artificial Intelligence

Prof. Vivek Pandey[1] Aman Tiwari[2] Sahil Sayyad[3] Akshita Jadhav[4]

[1,2,3,4]Department of Computer Engineering

[1,2,3,4]Alamuri Ratnamala Institute of Engineering and Technology (of Mumbai University) Shahapur, Thane, India

Abstract: In the recent time there has been increase in digital technology which many people are adapting to their daily lives. But there are still some process or events which uses traditional methods or unconventional digital methods. One such event is the Election event. While there are countries which are still using traditional voting system there are also countries which have adapted to digital voting/electoral system. But there has been rise in trust issues against the recent technologies used in electoral system. General elections use the centralized system in which one person or organisation manages whole database and system. Thus, making it possible to tamper with the result of the election according to their way. Thus, to deal with this issue our paper proposes using blockchain technology in the election system which uses a decentralized system in which database is owned and manages by the people who are using it. This can help in nullifying the tampering of votes done by using the centralized system.

INTRODUCTION:

There are still many countries which are still using conventional voting system. This system is still incompetent and causes multiple issues like the process is very lengthy, cost is much higher and other things like invalid votes can be made and so on. The problems occur because the election system is managed by a central system.

The votes casted by the voters can be easily changed or altered by the central manager raising any suspicion. This makes centralized system not safe for voting process. Blockchain is one of the technologies which can help in reducing the effects of centralized system. Blockchain technology is itself used in many cryptocurrencies like Bitcoin, Ethereum and Doge coin for transaction and safe database system. Blockchain is a method for maintaining a database for recording transaction that are connected to each other and is unique and immutable.

OVERVIEW:

Modern democracies are built upon traditional ballot or electronic voting (e-voting). From the past few years the EVM machines used for elections are highly criticizes due to irregular reports in the result of election. There have been many questions regarding the design and internal architecture of these devices and how it might be susceptible to attacks.This paper has shown different ways in which EVM's can be tampered. Online-voting is pushed as a potential solution to attract the young citizens and the nonresident of the country. For a robust online election scheme, a number of functional and security requirements are to be met such as transparency, accuracy, auditability, data privacy, etc. In the following paper we have tried to cover all the functionalities we can add to an E-voting system which will be safe from illegal attempts and also follow a way of voting that everyone will place trust on.

OBJECTIVE:

The objectives for developing the project are as follows: To improve the existing online voting system using Blockchain technology. To reduce the workload of setting up an election booth and conducting elections in physical form. Non Resident Indians living outside can also cast their votes as it is totally online. We are supposed to learn the concept of Blockchain and how it can be utilized to work on different sectors.

WHAT IS BLOCKCHAIN:

A bloclchain is mainly a digital ledger of transaction that can be copied and distributed accross the entire network of computer network that is connected to the blockchain system. Every block in the chain contains several transactions, and as soon as a new transaction occur a record to that transaction is added to every participants system/ledger.The decentralized database managed by multiple participants is known as Distributed Ledger Technology (DLT).In a blockchain system the databses is distributed across the whole network. As a distributed database bloclhain stores data in digital format in the form of blocks. The most common application of blockchain is being used in cryptocurrencies such as Bitcoin and Ethereum for maintaing a secure record of transactions. The main feature of Blockchain is that it guarantees complete security and database integrity and generates trust without the need of any third party.

A major difference between blockchain and general database is how the data is stored. A blockchain generally

collects information in clusters known as blocks, that holds the given information.These blocks have a certain storage capacties and when completed the are linked to the previously completed blocks forming a chain of information/data called Blockchain. All the new information which is presented is added to a new block and the block is connected to the former block and the chain will continue. In a typical database the data is generally stored into rows and table format, whereas blockchain stores data in the block of block which are chained together. This is data is immutable and very safe when implemented in decentralized system. When a data is stored in block it is the stored in it forever no on can change that if we want to store new data we have to create a new block.

- Blockchain Hash Function-
  A hash function accepts any input value and converts it into a fixed length. The fixed length can change according to the hash function being used in the data section. The fixed bit length can vary (like 32-bit or 64-bit or 128-bit or 256-bit) depending on the hash function which is being used. The fixed-length output is called a hash. This hash is the result of cryptographic hash algorithm. We can understand it from the given figure.
- Img1

- SHA-256
- The Blockchain in bitcoin uses SHA-256 hashing algorithm, which was developed by National security agency in the United states of America.
- How does the hashing process works?
- If we type any character in the data section, we will observe its corresponding cryptographic hash in the hash section.
- For example: We have type in data section: This is

  a great tutorial.
- It will generate the corresponding Hash:
- 759831720aa978c890b11f62ae49d2417f600f26aaa51b3291a8d21a4216582a

WHAT IS ARTIFICIAL INTELLIGENCE:

Artificial intelligence is the process or ability of making a computer, machines to form task that are usually done by humans because that needs human intelligence. Notable application of AI include NLP, face recognition, voice recognition, expert system and many others. Artificial Intelligence (AI) is the branch of computer sciences that focuses the development of intelligence machines, thinking and performing human brain like functions. For eg, Speech recognition, problem, solving, face recognition etc.

WHAT IS JWT?

JWT is an abbreviation for JSON Web Tokens (JWT) which was introduced to establish a secure communication between any two parties Although it was made for maintaining secure communication , JWT is mainly used for the process of authentication and authorization.

A sample JWT token looks like this:

eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJzdWIiOiIxMjM0NTY3ODkwIiwibmFtZSI6IkpvaG4gRG9lIiwiaWF0IjoxNTE2MjM5MDIyfyf

Which is constructed as

```
HMACSHA256(
 base64UrlEncode(header) + "." +
 base64UrlEncode(payload),
 your - 256 - bit - secret
)
```

The first part is base64 encoded header, which looks like this when decoded{

```
 "alg": "HS256",
 "typ": "JWT"
}
```

RELATED WORK:

¬ A Blockchain Voting System Based on the feedback Mechanism and Wilson score A blockchain voting system based on the feedback mechanism and Wilson score is proposed to solve the problem of the malicious votes behaviour. In the beginning we get correct rate of supporting and the ranking of the given candidates using Wilson score method. After that different many numbers of feedback coefficient are calculated as per the obtained parameters.

. ¬ Blockchain Voting: A systematic literature Building an electronic voting system that satisfies the legal requirements of legislators has been a challenge for a long time.

Distributed ledger is one of the most fascinating technology which has been gaining advancement in recent years. Blockchain offers a wide never ending range of possibilities in this field. The purpose of this paper is to evaluated the application of blockchain in the field if distributed ledger technology.

¬ Blockchain Based E-voting system Face recognition In this paper a new authentication technique in online voting system using facial recognition of the voter is used. Currently in India two types of voting system is been practised. That is Ballot paper voting and EVM machines, but both methods have its own limitation and problems. Online voting is still not been implemented in India

EXISTING SYSTEM:

BALLOT

It will usually be in a polling station although in some countries, notably Ireland, Italy and Russia, there may also be ballot boxes that are taken to people's homes for the peoples who were not able to travel to polling booth due to some issued. When very large ballot papers are used, there may be a feeder mechanism to assist in the deposit of the paper into the box. 3.1.1

History

In the times of Roman republic voters would initially gave their votes orally and it is being noted at official tablet, but afterwards in the Republic, the secret ballot was introduced, and the voters casted their votes in a paper and it is stored in a sealed ballot box

1.By using paper ballot for voting there is no scope for any technology or automation to involve.. Electronic voting machines are preferred because it reduces the manual work only with the on click of button the votes is recorded

2. After the election it takes a lot of time to count he votes casted and post the results. By using a EVM the counting of votes can be done within the shortest span of time.

EVM Electronic Voting Machine

Electronic voting machine is also known to be called as EVM it is the use of electronic means to take care of all the problems arising due to paper The EVM mainly consist of two units one is control unit and other is ballot unit. The polling officer is in charge of taking care of control unit of EVM. The ballot unit is placed in the designated location within a compartment for voters to cast their votes. The polling officers authorizes the voters identity after this process. With EVM being introduced in the place of ballot paper the polling officer will start the ballot by pressing a button and elections are started. The voters will be provided with a list of candidates and symbols and vote button right next to it. The voters can press the button and voted for their preferred candidate

HISTORY The Indian electronic voting machine (EVM) were developed in 1989 by Election Commission of India in collaboration with Bharat Electronics Limited and Electronics Corporation of India Limited. The EVMs were used first time in the year 1982 in the election by North Paravur Assembly Constituency in Kerala for a very few number of polling booths.

DISADVANTAGES:

1 There have been some incident in which a fake person casts vote for other person and increase the fake vote counts.

2. Although traditional ballot voting is lengthy process and involves a lot of physical hard work people still trusts this process because the advanced technology is always vulnerable to hacker attacks.

3.Typical EVM based machine use centralized database which can lead to a single person manipulating whole database.

4. While the voting system is electronical people still have to go to polling booths to vote. This may pose problems for physically challenged peoples.

5. Evm machines are always prone to technical issues such as having put up wrong chip having dead batteries or some
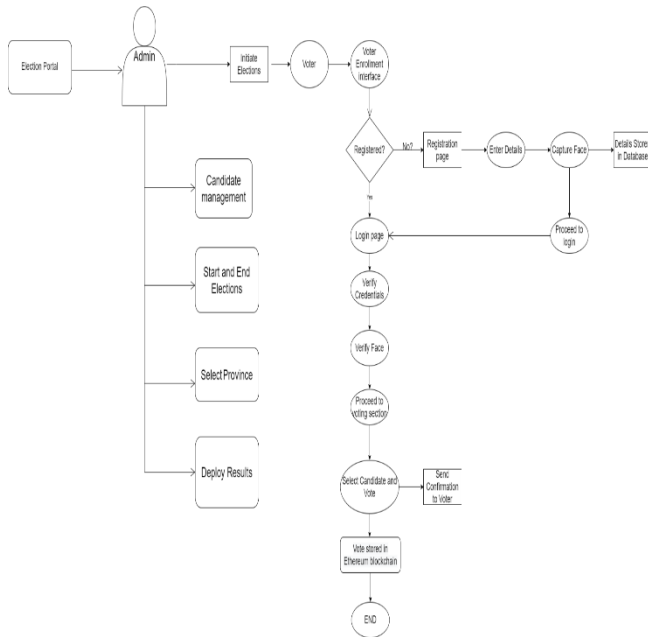
wiring issues.

6. EVM machines always have to be protected against physical damages and also from weather related problems like snow and rain, also water spilling damages too.

NEED OF NEW SYSTEM / PROPOSED SYSTEM:

Several countries have been working integrating Blockchain and AI to make a voting system to improve the election system. This paper talks about the risks of being involved in traditional and EVM voting system and how to improve them and move on to a newer and better technology. We have proposed to enhance and make the voting process so much safer that it was in the times when paper ballot and EVM machines were used. Our proposed system give us the following advantages over the existing:

• Users' can vote from anywhere in the world until he possess a citizenship of the country.

• The votes are stored in Blockchain database which makes it safe from malicious activities.

• Due to electronic voting people don't have to stand I a queue for a very long time which saves a lot of time for other activities. The EVM voting system runs the election The process includes registration , login. Voting and other steps. In a voting system using blockchain technology the initiator of system writes a smart contract and publishes it to the front end of the voting site. Then the users who have registered for the voting process can login and will have access to the candidate list provided by the person who made the smart contract and showed it on front end. The user can vote for their desired candidate for the list provided and the votes will be casted.

Hardware Requirements :

• System type: 64-bit Operating System, x64-bassed processor.

• Installed memory (RAM):8.00 GB (7.43 GB Usable)

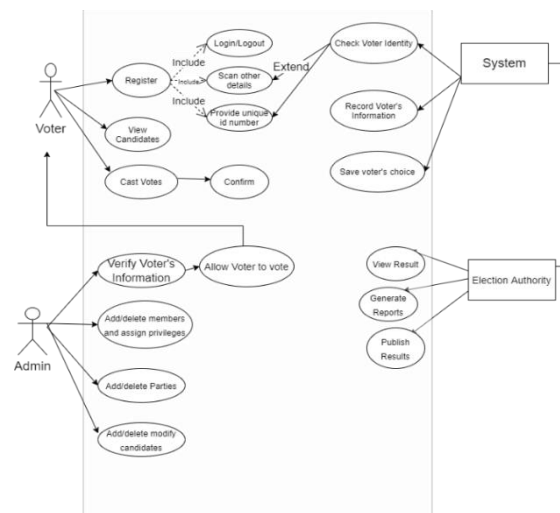• Size of Hard disk: 1

Software Requirements:

Tools Used-

¬ Visual Studio Code

¬ Remix Ethereum Ide Programming Language Used: - 1. Html/CSS 2. JavaScript 3. Solidity 4. Django
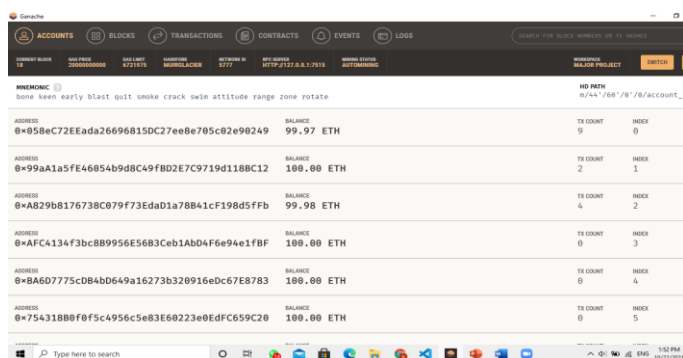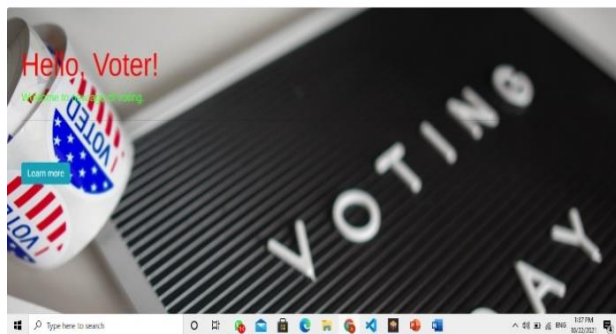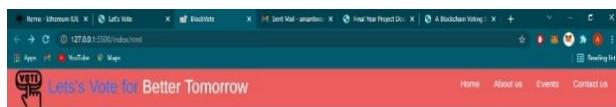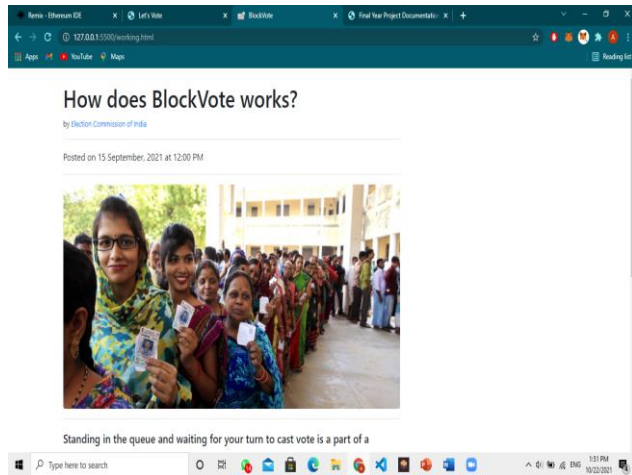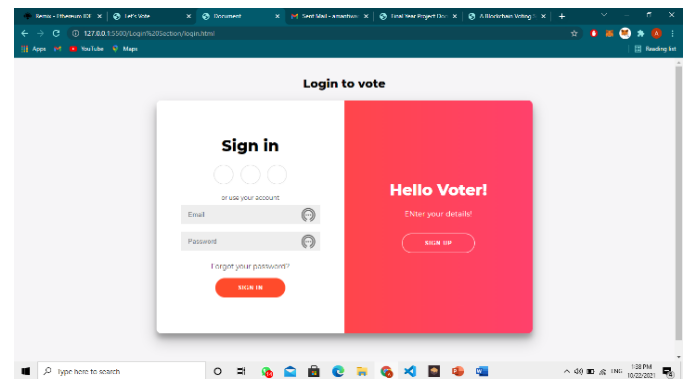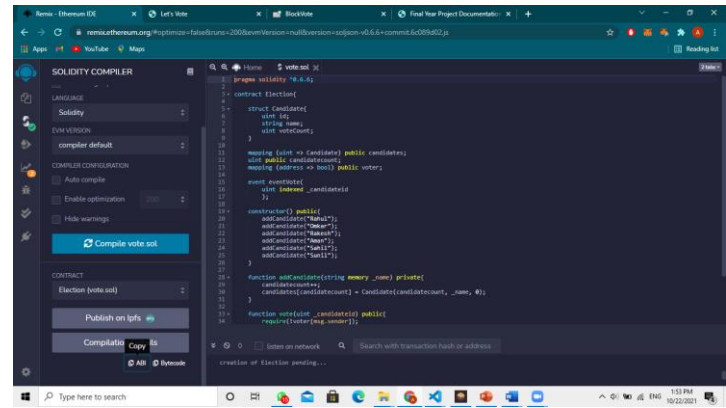
SYSTEM DESIGN:

SYSTEM IMPLEMENTATION: -

• Client: Someone who is eligible for the overall voting process is a client. The user can have access to overall voting process.

• Presentation Layer: Presentation layer is responsible for presentation of the data to the user the interface or the system is displayed to the user.

• Resource manager: Resource manager is responsible for maintaining all the data and resource required for carrying out a smooth electoral process.

• This resource manager here is the Local Blockchain server maintained by Ganache

• Application logic: The application logic figures out what the system actually does. It takes care of applying the correct logic to carry out the voting process at the user as well as admin section.
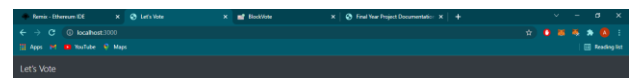
RESULTS:

USER INTERFACE DESIGN:

ENTHEREUM IDE:

MAIN USER/VOTER SIDE PAGE:

CONCLUSION AND RESULTS:

Democracy relies on credible elections, and citizens need to trust the election system for strong democracy. However, traditional paper-based elections do not provide credibility. In modern society, the idea of adopting a digital voting system to make the general voting process cheaper, faster and easier is fascinating.

Making the election process cheaper and faster normalizes it in the eyes of voters, removes the barriers of power between voters and elected officials, and puts some pressure on elected officials. It also opens the door to a more direct form of democracy and allows voters to express

their will on individual bills and proposals. The project has evolved into a blockchain-based electronic voting system that leverages smart contracts to enable safe and cost-effective elections while preserving the privacy of voters. Provides an overview of system architecture, design, and system security analysis. The next build of this application suggested creating separate client themes for different roles. B. One for the Election Commission and the other for candidates registered with a particular political party using the existing voting client design. Also, the current version does not have authentication because you do not have access to the current Aadhar or Voter SDK to integrate with your application. All voters will also be required to vote to maximize turnout in this election on Election Day, the next stage of construction.

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