

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE GWALIOR, 474005 M.P.

BLOCKCHAIN BASED VOTING SYSTEM



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Undertaking

We hereby declare that the work presented in this project entitled “**Blockchain based Voting system**” submitted to the Department of Engineering Mathematics and Computing, Madhav Institute of Technology and Science Gwalior, for the partial fulfilment of the requirements of the Bachelor of Technology degree in Engineering Mathematics and Computing. We further declare that this work has not been the basis for the award of any other degree, diploma or any other title elsewhere.

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Certificate

This to certify that dissertation entitled “” which is being submitted by Priyanka Deshmukh (0901MC201047), Madhav Narayan Yadav (0901MC201034), Priyansh Jain(0901MC201048), Pushpendra Patel(0901MC201049), Shivali Shukla (0901MC201059),for the award of degree of **Bachelor of Technology** degree in Engineering Mathematics and Computing, MITS Gwalior is a record of benefited work carried out by them under my supervision. This dissertation has reached the standard fulfilling the requirements of the regulations relating to the degree.

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TABLE OF CONTENTS

Title	Page No.
1. ABSTRACT	iii
2. INTRODUCTION	1
3. LITERATURE SURVEY	4
4. WORK DONE	6
5. DATA ANALYSIS AND RESULT	9
6. SUMMARY AND CONCLUSION	17
7. LITERATURE CITED	18

List of Figure

Figure No.	Title	Page No.
Figure 3.1	User flow diagram	7
Figure 3.2	Admin flow diagram	8
Figure 3.3	Research Methodology	8
Figure 4.1	Homepage	10
Figure 4.2	Admin Login	10
Figure 4.3	Admin Dashboard	11
Figure 4.4	Add Candidate Page	11
Figure 4.5	Create Election Page	12
Figure 4.6	Candidate details	13
Figure 4.7	Election Details	13
Figure 4.8	User Sign Up	14
Figure 4.9	User Sign In	14
Figure 4.10	User Dashboard	15
Figure 4.11	Voter Registration Form	15
Figure 4.12	Vote Casting Page	16

CHAPTER-1

INTRODUCTION

India is a democratic country and has a democratic country. As now all Indian citizen become a part of the growing digital India with a digital ID that is Aadhaar card. Voting schemes have evolved from counting hands in early days to systems that include paper, punch card and electronic voting machine.

EXISTING SYSTEM

The Existing System of Election is running manually. The Voter has to Visit to Booths to Vote a Candidate so there is wastage of Time. Due to this many people don't go out to cast their vote which is one of the most important and Worrying factor. In democracy Each and every vote is important. This Traditional system can be replaced by a new online system which will limit the voting frauds and make the voting as well as counting more efficient and transparent.

Proposed System:

The current voting system requires some improvement in it because of the issues mentioned above. This can be achieved by replacing the existing system by the new system which will limit the voting frauds and make the voting as well as counting more efficient.

- Online Election System would have user registration, user login and admin login.
- This Online Voting System will manage the Voter's information by which voter can login and use his voting rights.
- At the time of registration voter will be asked for this: Full name, age, Aadhaar card no, mobile no. email id and after being verified will be given the access.
- At the time of requesting vote, voter will be asked to enter his Aadhaar id. Then voter will be authenticated, and he can give vote from one of the candidate from the list .Voters can vote for a Candidate only once per Election.

- The software system allows the user to login in to their profiles and upload all their details including their previous milestone onto the system. The admin can check each Candidate details.
- The software system also allows Voters to view a list of Candidates in their area. The admin has overall rights over the system and can moderate and delete any details not pertaining to Election Rules.

BLOCKCHAIN

Blockchain can help to implement a system that is immutable, transparent, and efficient and cannot be hacked into. The inability to change or delete information from blocks makes the blockchain the most effective technology for voting systems. Blockchain technology is supported by a distributed network consisting of variety of interconnected nodes. Each of these nodes have their own copy of the distributed ledger (information) that contains the total history of all transactions the network has processed. There is no centralized system that controls the network. If the majority of the nodes agree, then they accept a transaction. This network permits users to stay anonymous. A basic analysis of the blockchain technology (including sensible contracts) suggests that it is an appropriate basis for e-voting and furthermore, it might have the potential to form e-voting a lot of acceptable and reliable.

Blockchain technology makes e-voting cheaper, easier, and much more secure to implement. It is a considerably new paradigm that can help to form decentralized systems, which assure the data integrity, availability, and fault tolerance. This technology aims to revolutionize the systems. The blockchain systems are formed as decentralized networked systems of computers, which are used for validating and recording the pure online transactions. They also constitute ledgers, where digital data is tied to each other, called the blockchain. The records on the blockchain are essentially immutable.

Benefits of E-voting system over the current system:

1. Increasing the level of participation

The Internet voting system tends to **maximize user participation**, by allowing them to **vote from anywhere** and **from any device** that has an internet connection.

2. Security

By considering the importance of the e-voting system is implemented using “Blockchain”.

3. Efficiency

The **reduction** in organizational and implementation **costs** significantly increases the efficiency of election management compared to traditional paper voting, for example.

4. Precision

The electronic vote eliminates errors in manual count, which brings with it an **accurate and quick publication of results**, with receipt of vote for each vote cast.

Proposed Plan of Work:

For our proposed plan of work we are considering two modules that are to be completed in three phases. Two modules are as follows:

1. Front-end for the application
2. Back-end using Solidity to implement Blockchain.

Each of these module will be considered as one phase and the remaining one phase will cover the connection and testing of these modules.

- Phase 1: In this phase we will cover the front-end module, in which we will build the interactive user-interface for the admin as well as the user. In parallel the research work related to the implementation of Blockchain in decentralized application will be done.

- Phase 2: In this phase we will cover the back-end module, we will implement the Blockchain using Ethereum framework and convert the system into a decentralized application.

- Phase 3: The connection of two different module along with the testing of the platform will be completed in this phase.

CHAPTER -2

LITERATURE SURVEY

Currently increasing digital technology helped many people lives. In contrast to the electoral system, there are many conventional uses of paper in its implementation. The aspect of security and transparency is a threat from still widespread election with the conventional system .Block chain technology is one of solutions, because it embraces a decentralized system and the entire database are owned by many users.

There is no doubt that the revolutionary concept of the blockchain, which is the underlying technology behind the famous crypto currency Bit coin and its successors, is triggering the start of a new era in the Internet and the online services. In this work, we have implemented and tested a sample e-voting application as a smart contract for the Ethereum network using the Ethereum wallets and the Solidity language.

Block chain was first introduced by Satoshi Nakamoto (a pseudonym), who proposed a peer to-peer payment system that allows cash transactions through the Internet without relying on trust or the need for a financial institution. Block chain is secure by design, and an example of a system with a high byzantine failure tolerance.

E-voting is a potential solution to the lack of interest in voting amongst the young tech savvy population. For e-voting to become more open, transparent, and independently auditable, a potential solution would be base it on block chain technology. Block chain technology has a lot of promise; however, in its current state it might not reach its full potential.

Electronic voting has been used in varying forms since 1970s with fundamental benefits over paper based systems such as increased efficiency and reduced errors. With the extraordinary growth in the use of block chain technologies, a number of initiatives have been made to explore the feasibility of using block chain to aid an effective solution to e-voting. It presented one such effort which leverages benefits of block chain such as cryptographic foundations and transparency to achieve an effective solution to e-voting. The proposed approach has been implemented with Multichain and in-depth evaluation of approach highlights its effectiveness with respect to achieving fundamental requirements for an e-voting scheme.

Recent major technical challenges relating to e-voting systems embrace, however not restricted to secure digital identity management. Any potential citizen ought to be registered to the electoral system before the elections. Their data ought to be in a very

digitally processable format. Besides, their identity data ought to be unbroken personal in any involving information. Ancient E-voting system could face following problems:

- Anonymous vote-casting.
- Individualized ballot processes.
- Ballot casting verifiability by (and only by) the voter.
- High initial setup costs.
- Increasing security problems.
- Lack of transparency and trust.
- Voting delays or inefficiencies related to remote/absentee voting

To mitigate these threats, software mechanisms which promise the following should be deployed:

1. Prevention of evidence deletion.
2. Transparency with privacy.

Using a Blockchain, the most important requirements are satisfied:

- Authentication: Only registered voters will be allowed to vote.
- Anonymity: The system prevents any interaction between the votes casted by the voters and their identities.
- Accuracy: Votes once cast are permanently recorded and cannot be modified or changed under any circumstances.
- Verifiability: The system will be verifiable such that the number of votes is accounted for

As technology advances, many countries have now opted for electronic voting systems. Any voting system must follow principles of transparency and impartiality in order to achieve fairness; the electronic voting process must also be protected against cyber-attacks or denial-of-service attacks (DDOS) because such attacks may affect the processing time in voting procedures and even hinder the fairness in voting. This study establishes a network security mechanism for voting systems based on blockchain technology. The blockchain mechanism employs a distributed architecture that can prevent system shutdown resulting from malicious cyber-attacks; additionally, any user in the blockchain can authenticate data integrity, which satisfies requirements of transparency and impartiality in voting systems.

CHAPTER-3

WORK DONE

Proposed Plan of Work:

For our proposed plan of work we are considering two modules that are to be completed in three phases. Two modules are as follows:

1. Front-end for the application
2. Back-end using Solidity to implement Blockchain.

Each of these module will be considered as one phase and the remaining one phase will cover the connection and testing of these modules.

- Phase 1: In this phase we will cover the front-end module, in which we will build the interactive user-interface for the admin as well as the user. In parallel the research work related to the implementation of Blockchain in decentralized application will be done.

- Phase 2: In this phase we will cover the back-end module, we will implement the Blockchain using Ethereum framework and convert the system into a decentralized application.

- Phase 3: The connection of two different module along with the testing of the platform will be completed in this phase.

Division of Phase One:

- We have considered 2 main modules which are as follows:
 - A. Admin- The admin module is divided into 5 components-
 1. Dashboard-It will contain various charts to display information such as number of parties, number of voters etc.
 2. Add Candidate - In this feature of admin, he can add candidates who are standing in the election. After candidate is added it will be displayed on the user side.

3. Create Election- This feature of admin will allow him to create election.
A user can cast his vote only after the election is created by admin. A user can cast vote between the start date and end date.
4. Election Details- In this section admin can update election details such as start date, end date etc.
5. Candidate Details- In candidate details all the candidates added by admin will be displayed. Admin can update the candidate details if incase a wrong entry is done.

B. User- The user module is divided into 4 components

1. Dashboard- The user dashboard contains information about parties and their candidates. A user can see all the information about candidate.
2. Voter Register- In this section first user will have to register himself only then he will be able to cast his vote.
3. Voting Area- After user is registered, then only he will be directed to this page and then he can cast his vote.
4. Results- In this component the user will be able to see the results of the election.

Phase One Flow Diagram

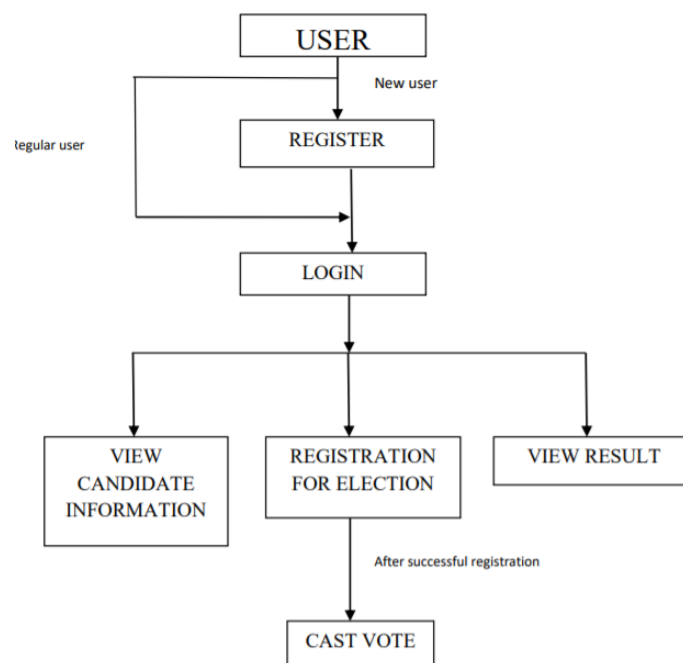


Fig.3.1 User flow diagram

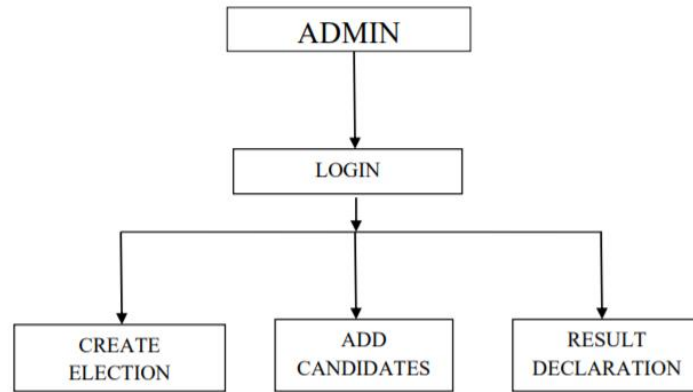


Fig.3.1 Admin flow diagram

Research Methodology of Phase Two

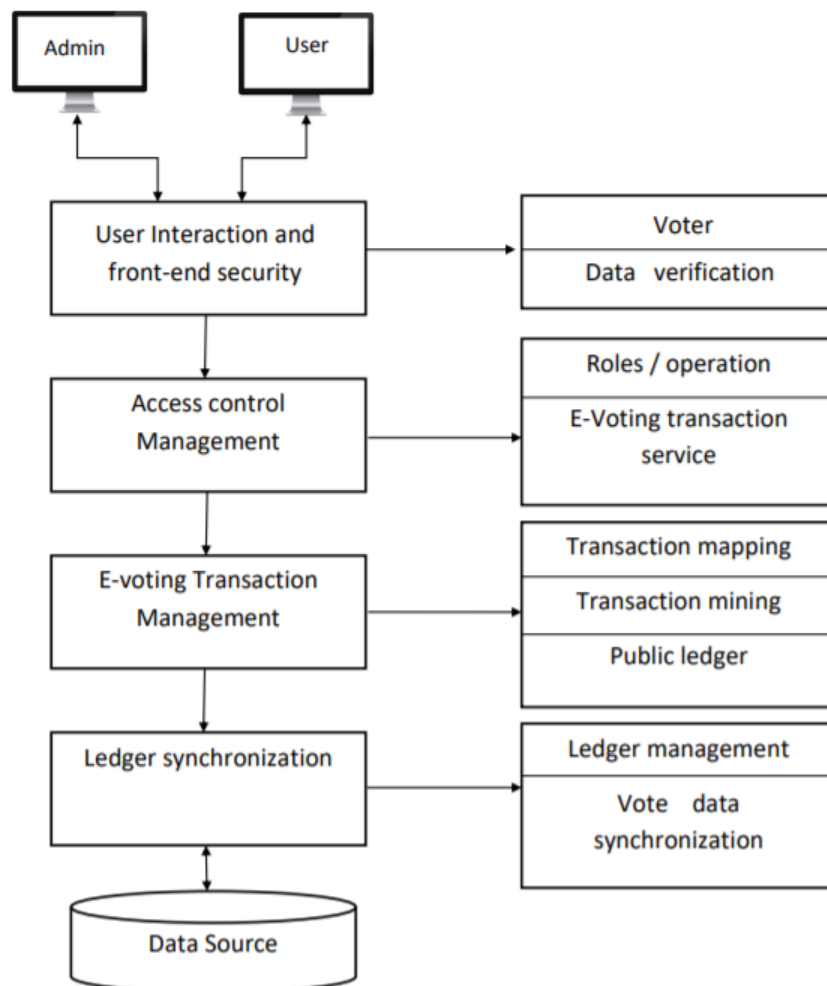


Fig.3.3 Research methodology

CHAPTER-4

DATA ANALYSIS AND RESULT

The existing system for voting in India is the EVM (Electronic Voting Machine) based system. Prior to this system there were paper ballots and manual counting. The paper ballots method was widely criticized because of fraudulent voting and booth capturing, where party loyalists captured booths and stuffed them with pre-filled fake ballots.

Replacing the existing system with a new election system is critical to limit fraud and having the voting process traceable and verifiable. As we can see the internet has brought a revolution in each and every domain possible, by trying to shift the existing system towards the online platform to make the proceedings fast and user convenient.

We know that the existing system is reliable but that does not mean that we should not take a step ahead towards the betterment of the existing system. Online voting system using blockchain can be that step.

A blockchain is a distributed, immutable, incontrovertible, public ledger. This new technology works through four main features:

- The ledger exists in many different locations: No single point of failure in the maintenance of the distributed ledger.
- There is distributed control over who can append new transactions to the ledger.
- Any proposed “new block” to the ledger must reference the previous version of the ledger, creating an immutable chain from where the blockchain gets its name, and thus preventing tampering with the integrity of previous entries.

We have tried to build a user interface of the decentralized application that will make the voting process more convenient. The UI portion can be assumed as 30% of the total work that is to be completed. The major portion in this system is related to the blockchain technology which will be responsible for the reliable voting process.

UI of Website

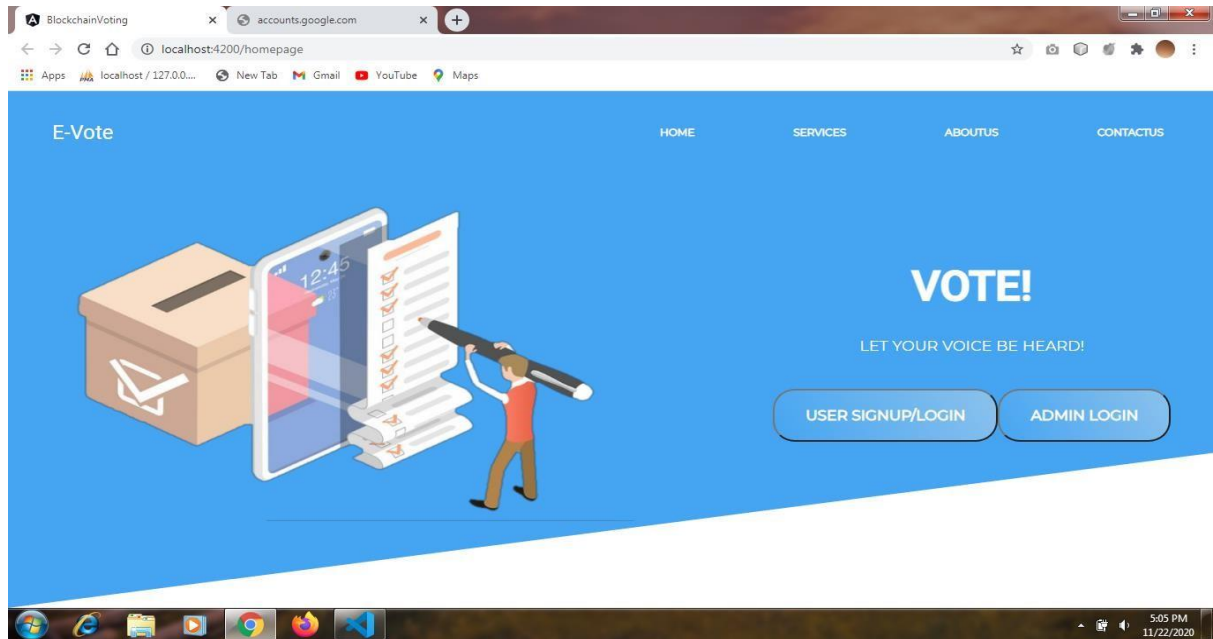


Fig.4.1 Homepage

- The homepage consists of 2 options –
 1. First option is for admin login
 2. Second option is for user signup/login

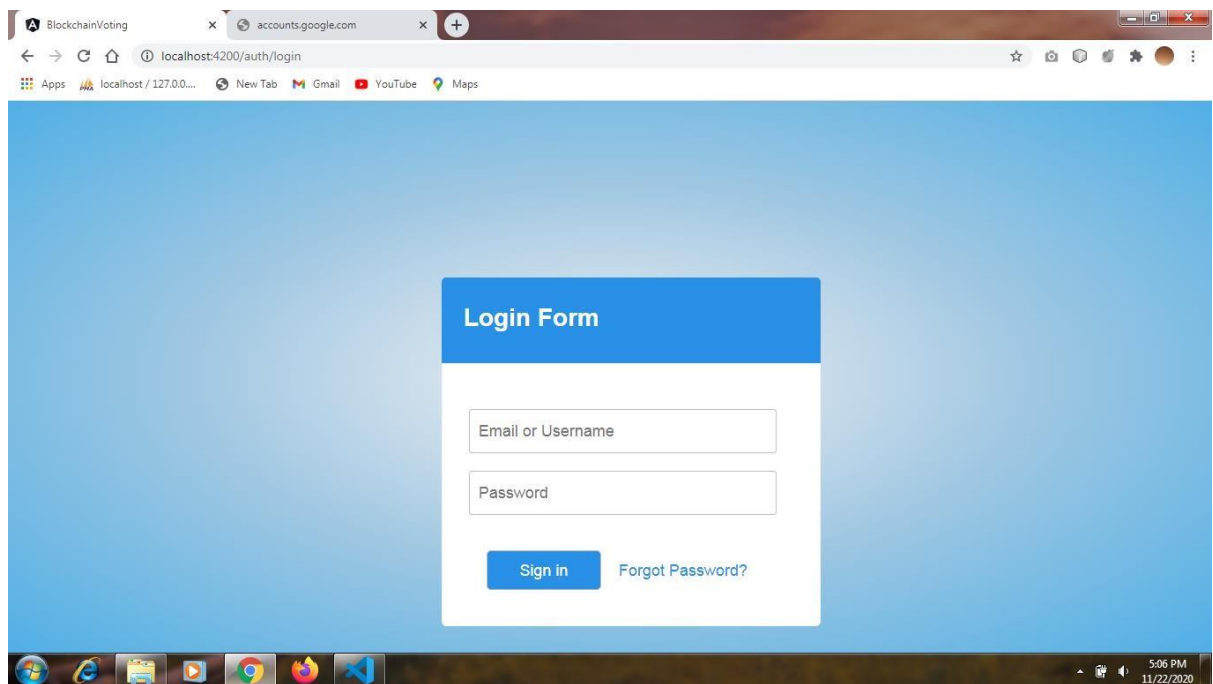


Fig.4.2 Admin Login

- This is the login page for admin.

After admin is logged in he is directed to the dashboard

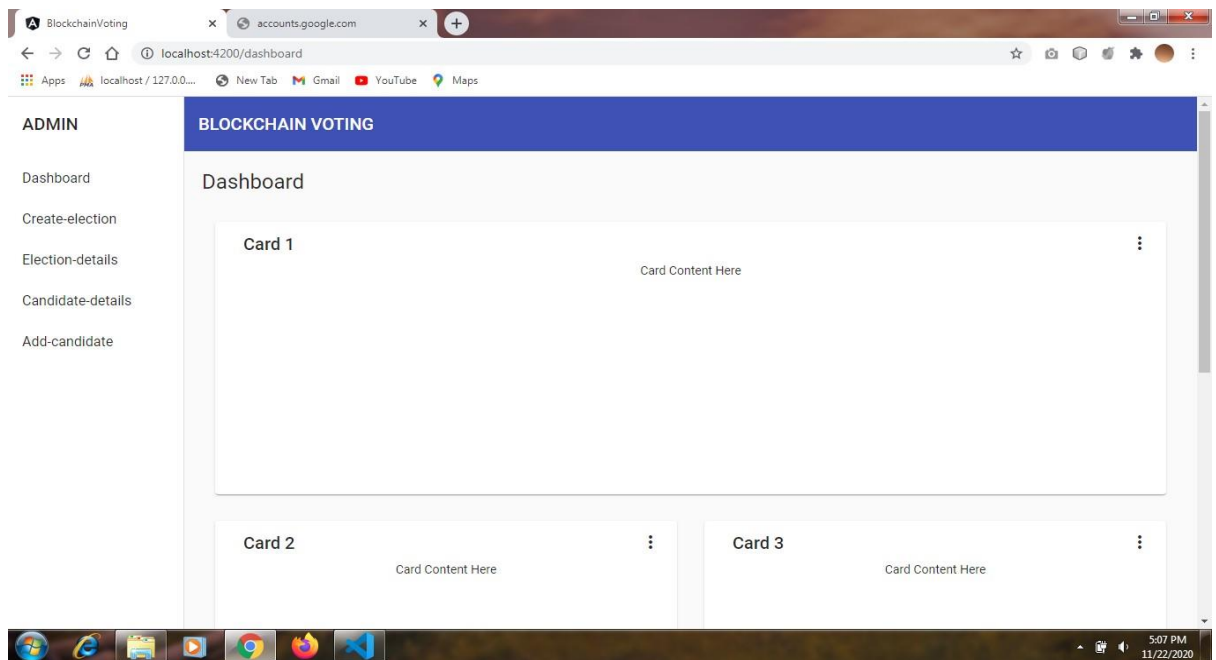


Fig.4.3 Admin Dashboard

- The dashboard will contain various charts to display information such as number of parties, number of voters etc.

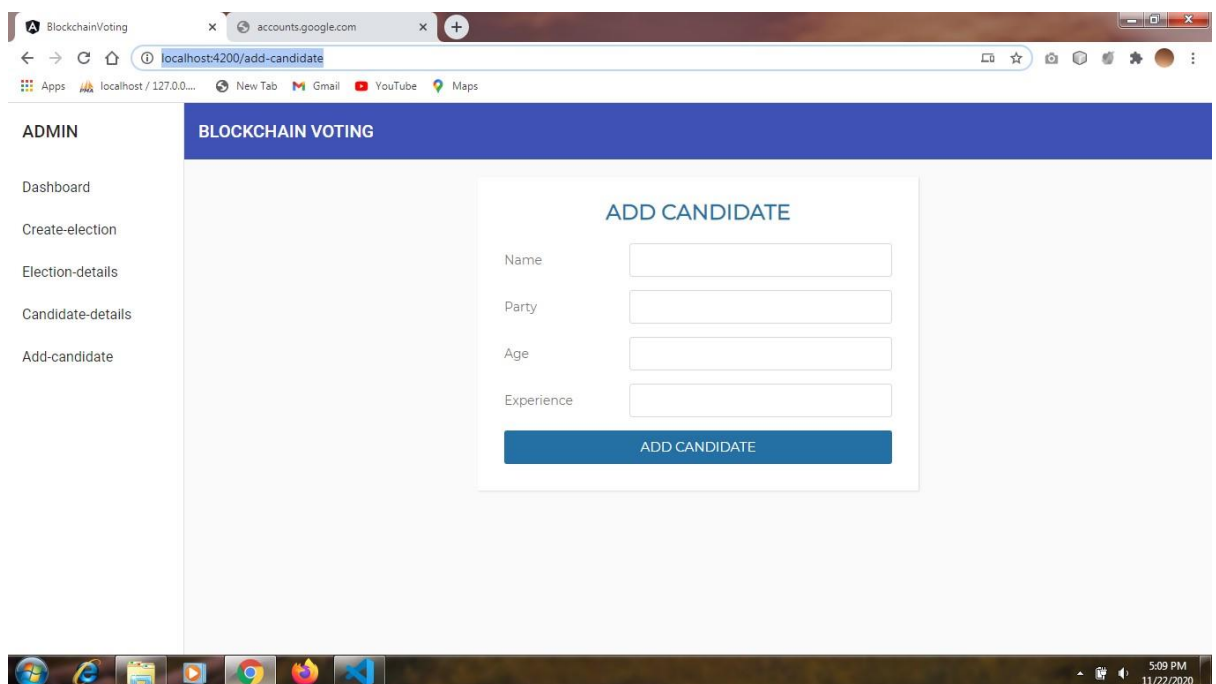


Fig.4.4 Add Candidate Page

- In this feature of admin, he can add candidates who are standing in the election.
- After candidate is added it will be displayed on the user side.

The screenshot shows a web browser window with the address bar displaying 'localhost:4200/create-election'. The page has a blue header with the text 'BLOCKCHAIN VOTING'. On the left, there is a sidebar menu under the heading 'ADMIN' with the following items: 'Dashboard', 'Create-election' (which is highlighted), 'Election-details', 'Candidate-details', and 'Add-candidate'. The main content area is titled 'CREATE ELECTION' and contains a form with the following fields: 'Type', 'Organiser', 'Start Date', 'End Date', 'Start Time', and 'End Time'. Each field is represented by a text input box. Below these fields is a blue button labeled 'Create'. The browser's taskbar at the bottom shows various application icons and the system clock indicating 5:07 PM on 11/22/2020.

Fig.4.5 Create Election Page

- This feature of admin will allow him to create election.
- A user can cast his vote only after the election is created by admin.
- A user can cast vote between the start date and end date.

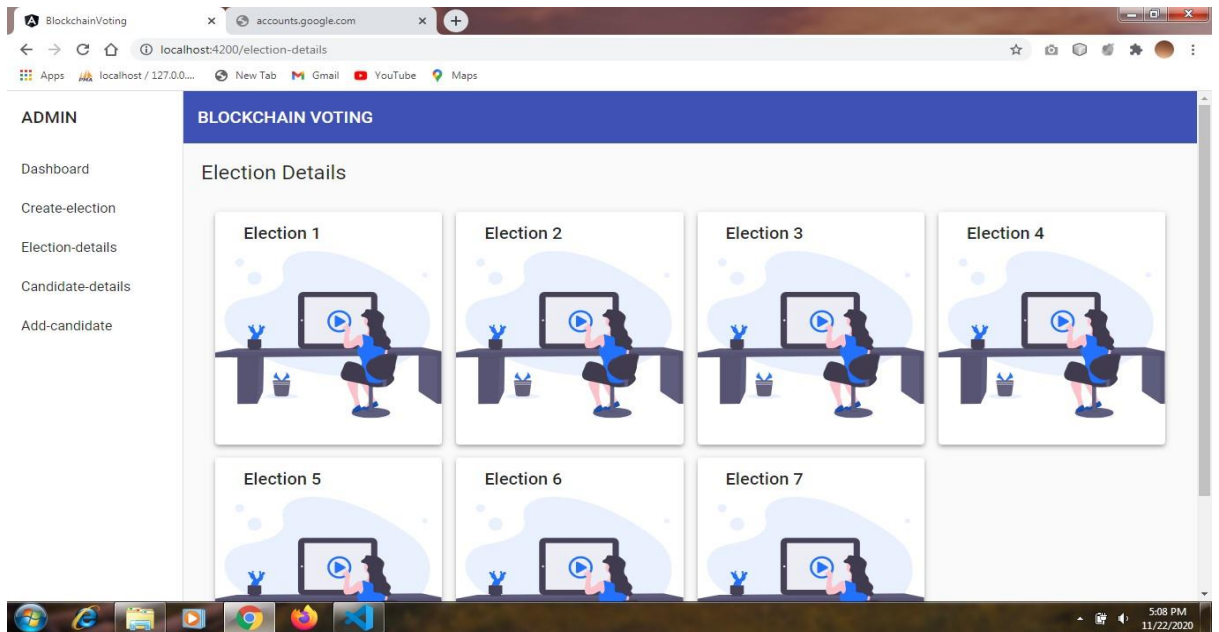


Fig.4.6 Candidate Details

In candidate details all the candidates added by admin will be displayed. Admin can update the candidate details if incase a wrong entry is done.

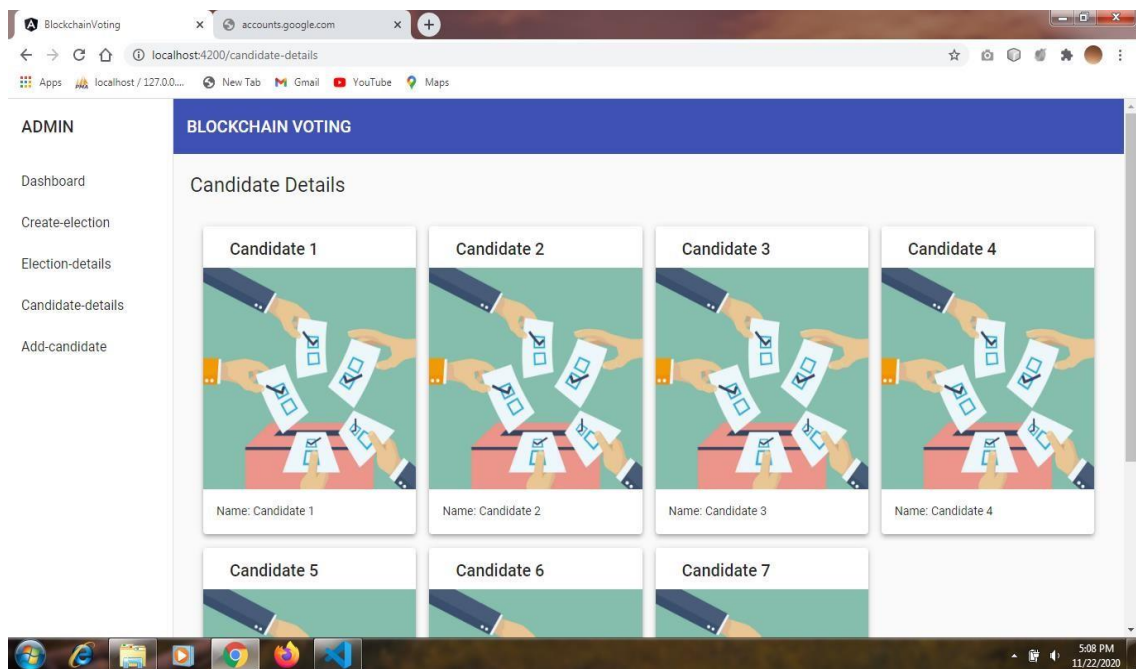


Fig.4.7 Election details

- In this section admin can update election details such as start date, end date etc.

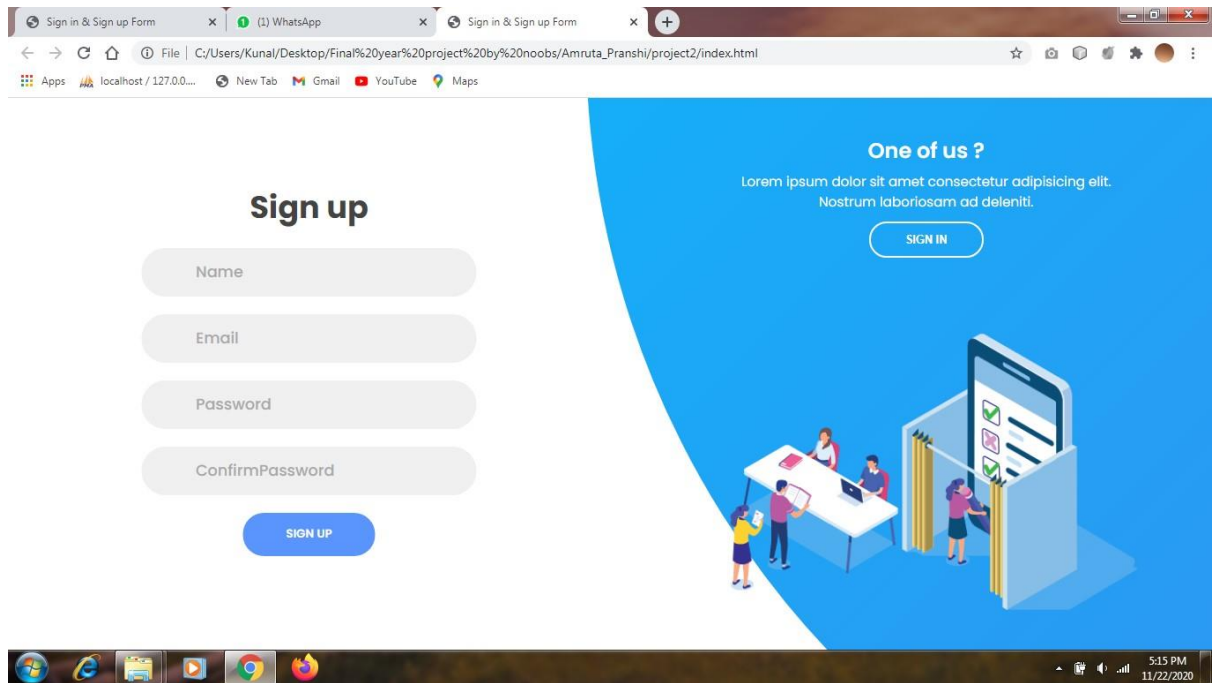


Fig.4.8 User Sign up

- User will have to sign up before login.
- This is the signup page for the user.

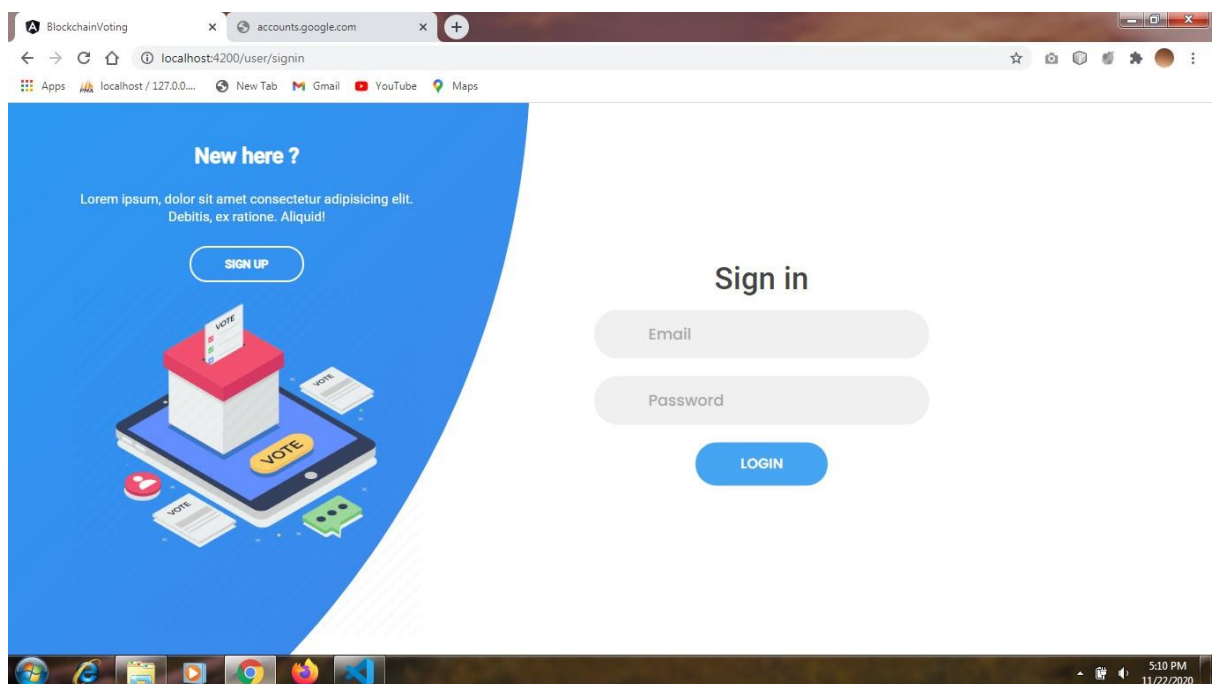


Fig.4.9 User Sign in

- If user chooses user sign in option on homepage he will be directed to this page.
- After login he will be directed to user dashboard.

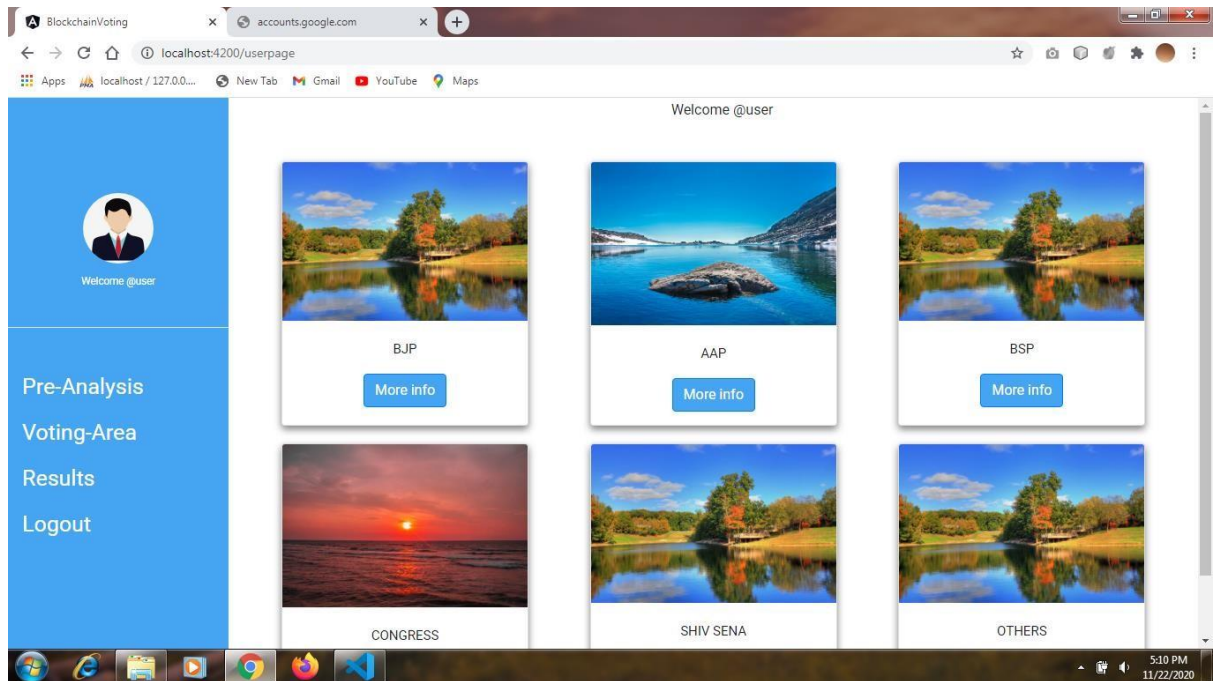


Fig.4.10 User Dashboard

- The user dashboard contains information about parties and their candidates.
- A user can see all the information about candidate.

Fig.4.11 Voter Registration form

In this section first user will have to register himself only then he will be able to cast his vote.

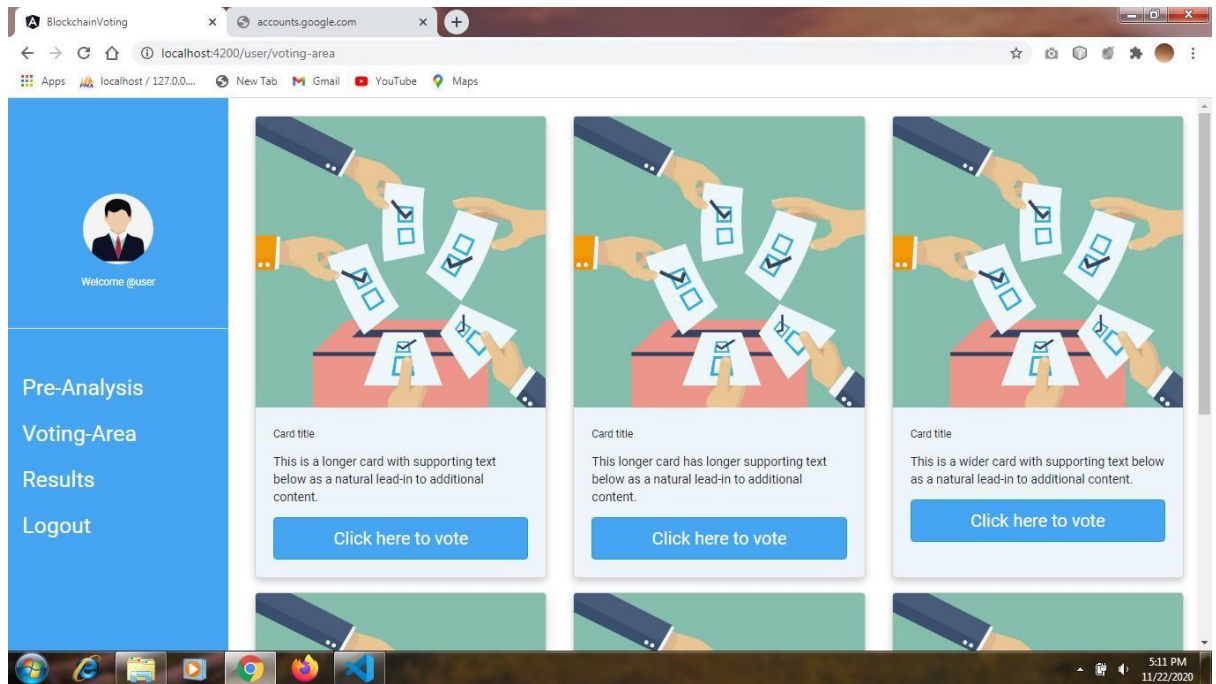


Fig.4.12 Vote Casting Page

After user is registered, then only he will be directed to this page and then he can cast his vote.

CHAPTER-5

SUMMARY AND CONCLUSION

In this project, we introduced a blockchain-based electronic voting system that utilizes smart contracts to enable secure and cost-efficient election while guaranteeing voters privacy. Blockchain technology offers a new possibility to overcome the limitations and adoption barriers of electronic voting systems which ensures the election security and integrity and lays the ground for transparency. Using an Ethereum private blockchain, it is possible to send hundreds of transactions per second onto the blockchain, utilizing every aspect of the smart contract to ease the load on the blockchain. To achieve this we have divided this overall work into three modules.

1. The front-end module
2. The back-end module
3. Connection of two different module along with the testing.

Until now we have completed our first module, in which we created the interactive user-interface for the admin as well as the user. We have also done some research work related to the implementation of Blockchain in decentralized application.

And In the future to make the voting process more secure and to correctly identify the person who is voting we can use ML and AI concepts. Using these concepts we can verify whether the person voting is the same as the person who has registered during the registration process.

CHAPTER-6

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