A WEB BASED ONLINE VOTING SYSTEM BASED ON BLOCKCHAIN

Abstract *— . –This is Electronic voting system based on blockchain technology. This will help Voters to vote secretly and more confidently. In this research paper we wrote all the problems and errors we faced to develop this project. .*

Keywords *— Smart Contract, Blockchain, Ethereum, Electronic voting, Metamask.*

I. INTRODUCTION

Digital technology helps people to make their lives even more easier and convenient. Whole world believes on digital technology, not believes but actually dependent on digital technology. But the electoral system, is still using Ballot Papers. The centralised elections are managed by organisations, the issue is that they have total control over the database and system. With the innovation in Information Technology the need for better, easier, and secure electronic voting is important as traditional procedure cannot satisfy the demands for rising population. Some of human body characteristics like fingerprints, face reading, DNA, etc. are used for authentication purpose. These are helping to keep data secure, as every person has unique thumb impression & at the same time helps with accuracy. Reduces time.

So, their are much higher chances of hacking. This is the biggest problem faced by electoral system. Blockchain is such a useful arrangement that it has decentralised framework. Blockchain is used by Bitcoin and Ethereum cryptocurrency as a decentralised system. Implementation of blockchain in e-voting system will reduce the risk of fraud, it will be the system on which people will trust. Following review of literature gives brief idea about the challenges faced by electoral system, some solutions to tackle the problems, opinions of authors and technology used for solving the problems.

II. LITERATURE REVIEW

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III. METHODOLOGY/EXPERIMENTAL

A. Synthesis/Algorithm/Design/Method

We were group of five members, as project is much complicated we decide to split our team for different
tasks. Basically first splitting was in technical and non-technical. Two students was in technical domain and three were in non-technical domain. One student was studied solidity and another was web3.js. Me and other two were in theoretical domain and research paper work. First of all, We decide to made a website for voting because users can vote on website more easily and user doesn't

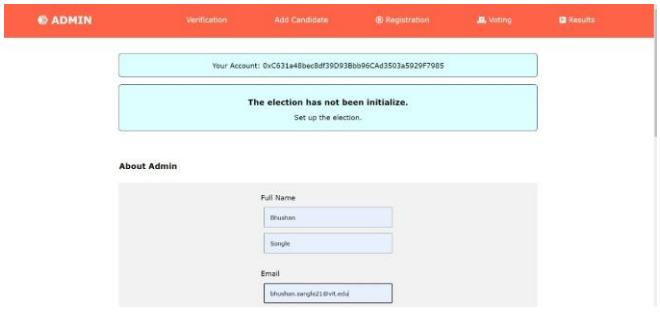
need to learn blockchain. Blockchain Later, we decide to split our work in four teams one was doing blockchain , one was in frontend part of website, one in backend and two was in paperwork. Most difficult part was solidity, blockchain and backend part of website. Because in backend, we want to put several functions like First name ,Middle name, surname and mobile no., genlocal address and email as general query. For special query we want to ask Aadhaar card no., PAN card no. And addition with this we want to give user a special 10-digit unique-Id, for extra security.

For user awareness we want to do verification of OTP via both SMS and email, so user can confirm his login authentication. By this verification user can get first information about his login and logout details , like what we know when someone put incorrect password in debit/credit card. We were tried for biometric verification too. But in face detection we were finding some error for storing and recognising users face. In many case face detection is done but we were failed to find proper code for storing data , because if we close the program or close the laptop then for next time login code doesn't recognise the user. Also same problem in thumb verification too. So for the time we drop the biometric verification process. The main problem is to connect blockchain to website. When we try to build backend database, we stuck in many problems. First I try to do backend with XAMPP. The languages which I have chosen were PHP, MySQL and Django. I refer many you tube videos for that. Initially I watched PHP and MySQL tutorial on CodeWithHarry YouTube channel. It was nearly 3 hour, I watched video and I download XAMPP file from google. In many case XAMPP file stored in C drive, in my case it is stored in c drive. But for a reason I didn't continue the video. But then, after some days I restarted the video and mistakenly I download XAMPP file, which were stored in different drive. And then problem started…In every video of any YouTube channel every coder teach in a way that XAMPP is stored in C drive, but I didn't even know that whenever I opened XAMPP control panel , it was which panel, whether it was in C drive or in any other drive. But after doing some google searches that problem solved , from that I go to C drive and then open XAMPP panel. But when I started coding on Visual Studio Code (IDE), the local host were not opening. Basically, I saved a file as login system in VS code in XAMPP file of C drive. When the YouTuber started typing localhost/loginsystem in search bar there were showing output of backend but I hadn't. So then I referred a new video in that, they also stored file in XAMPP but in http folder. So again I tried, but output was not showed. Then I searched this solution on google, there were I found a new concept for storing data in local pc. In smart contract, when we declare variable we have to execute with different type, there were confusion in variable declaration. When we want to connect the website to block. For voting we required fake Ethereum for voting and sending gas. So for that we download Metamask as chrome Extension for creating account. Next we download Ganache from google to get Ethereum. In Ganache we copy the private key and paste in the Metamask. Before that we created an account as localhost in metamask, we set the password for account and in that account, we paste the private key taken from Ganache. We name the currency as "ETH", you can name it as your own wish. After that we take 100-100 Ethereum in two accounts. For voting we were required two commands *npm install -g truffle* and *npm install -g ganache-cli* in command prompt, but they were showing some errors, like Your Visuaul Studio is in old version. The funny part is we confuse between visual studio code and Visual studio.Then we install Microsoft Visual studio, but there was no need for that. We search for "npm install -g truffle" to be install but the error was occurred. So we tried it also in Node.js but there were error. So after sometime we found an old command for npm install -g truffle and then it run without any error. After that we open metamask but it was not opening. Because ganache is closed. Then we realise that if we want to open metamask we need to open Ganache first. Then it was opened.

IV. RESULTS AND DISCUSSIONS

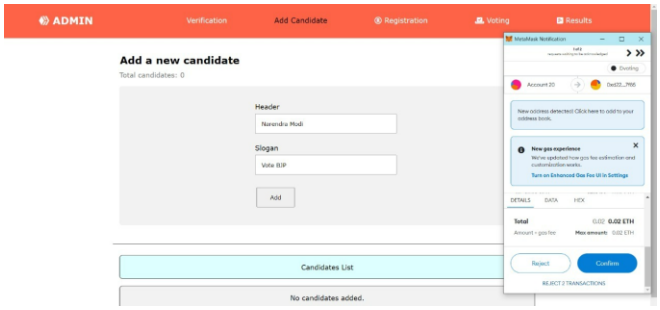
First of all we made website using HTML and CSS. We took help from bootstrap for different design for frontend. We made 6-7 pages for website. The first page is Home page. In this page there were

some government guidelines which was taken from Constitution of India. Options like Election dates, name of local candidates, a mock voting system. In the mock evoting system we wanted to give voter a mock test voting for user, so that voter can know our voting system and user can know and solve his problem. We use ETH for gas value for voting.

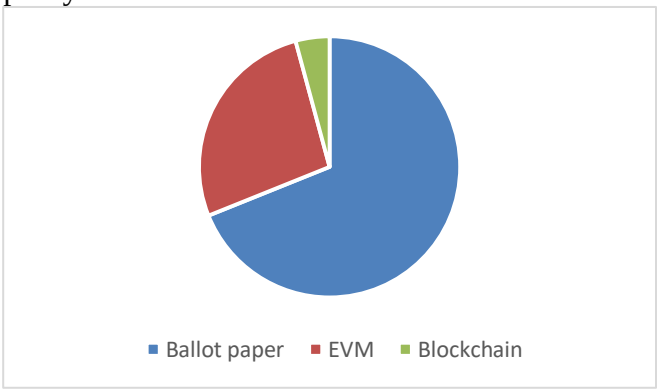


This is homepage of our website. In this we give users information of election, name of candidate etc.

This is a general information, like information about right to vote. Rules and regulation for voting, etc.



This is another page, it is basically registration page, we ask various questions like name, surname, age, date of birth, address, adhaar card number , PAN card number And we also ask unique id of voter with voter id. This information will identify voter, and give authority to vote. These information will authenticate voter so that there is no more proxy vote.



V. LIMITATIONS

1) Paper based voting : Since many years paper based voting is being used, once people drop their ballot in box they lost their right over the ballot. There are still many cases of missing ballots reported in past and it doesn't stopped till date.
2) e-voting product: Well known example is DREs. DREs are used by many countries. But this requires even more trust as voters can't verify votes on their own. e- voting system which is digital even though have threats from hackers.
3) E2E verifiable technology : Cryptography is used by Researchers to develop E2E verifiable voting system. But this system has TAs (Who are trustworthy individuals computing and cryptography experts appointed for tallying votes). Besides having above three mentioned technologies it still comes to the trust of people.
4) Bitcoins limited programming capability makes it difficult to enforce the voting protocols correct explanation. This makes us turn to Ethereum.
5) OV Network is useful in decentralized voting but not in centralized voting.
6) e- voting which is digital even though have threats from hackers.

VI. FUTURE SCOPE

Time is the most important factor in today's world which is also a measure reason which will attract people to tend toward E-Voting System. This system will really help people to save their precious time and will be easy to use. It will help NRI's and also the soldiers to cast the vote from same place where they are. It will be single step to appreciate their efforts. In the same way from one person to other it will start to benefit people. Future will be much brighter with such technology.

Information On Similar E-voting Systems :

1] Estonian Internet voting system :

In 2005, Estonia became the first nation to hold the elections over the internet. But the thing was one person can cast vote several times, but only one vote was considered. After the hacking case in 2011, Estonia implemented vote verification for each voter in 2013. A white paper on Estonia's 2017-2019 gives proof of its end to end verifiability.

Technical Security issue of the Estonian I-Voting system:

This system was unprotected from hackers and was unguarded against attackers at state level. These hackers had access to sufficient data required for hacking the system.

Centralized infrastructure :

In this type of system, all data was under one roof that is all servers were in one main data center. Decentralizing the servers obviously was more efficient and greater accessible, but definitely expensive and complex. It is easier to maintain all data in centralized place.

Attacks on the Client Side:

Under this system, the aim was to manipulate the voters personal computer. For this reason voter is unable to detect manipulation of voting machine attacks.

2] Norwegian E-Voting system :

Norwegian e-voting system is much similar to the Estonian voting system. Instead of paper based voting system software application was used at polling stations. Afterwards there were some improvements and system allowed mobility and use of any internet connected device. It was to improve voters experience to cast their votes from anywhere. Although this system made casting vote easier, convenient and increase the number of voters. However, electronic system has many threats.

In Norway, voter could obtain the poll card with the listing of all participating parties and a 4 digit code unique for individual voter. This code was sent through postal mail. After the vote was cast this was sent, containing unique code to voters mobile via server. This helped voter to confirm the vote. Enabling the voter to match received code and code of voters choice. Voters could cast many votes but for protection, only the last vote is counted.

Security problems with Norwegian e-voting system :

Vote project in 2014 faced criticism because of security concern. The main concern was the votes will be made public. Network attack was also considered as one of the threats because hackers could observe traffic easily and establish relation with voter and voting server. Centralised nature of system was the biggest point of failure as hacker needs only one server to impact entire elections

VII. CONCLUSION

Future is in developing the technology which will help people in many ways. It will make their lives more easier and soother. World really needs trustworthy and transparent electoral system. So we are putting one step forward to make this system for the welfare of people. Which will might help them in future. Particularly needed is the way to categorize the challenges caused by cultural diversity and to develop effective training programs to address them.

X . Acknowledgment

We are very thankful to our guide Kausalya Thopate mam for our guidance in this project.We learned various new things in the semester like blockchain , backend and front end and backend languages to get our desired output in this project.We learned how to make the smart contract to perform ethereum transaction for registration,adding candidates and for voting.We solve many errors,so we learned many from the errors.Kushalya Thopate Mam guide us in every situation.

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