Online voting System Using Blockchain

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Abstract: **Online voting system is the election process to be conducted on the online platform without the use of traditional ballots paper and EVM. The system is to ensure that votes being cast by voter cannot be rigged or unduly compromised in any shape or form. We are using blockchain technology for our voting system because it offers decentralized nodes for voting and end to end verification. Blockchain technology provides a high-level authentication and security to voter. Basic characteristics of free and fair.**

Index Terms: **Decentralized nature, Online voting, Ethereum, Blockchain Technology for voting.**

INTRODUCTION

An election is a way people can choose their candidate or their preferences in a representative democracy or other form of government. voting is a fundamental process of democratic country it can be for elective a leader or representative for their future.it is a chance for citizens of our country to have a say in the people who represent them or an issue that impact them voting a participating in election is one of the responsibility of citizen. Online voting system which is used nowadays provide some characteristic different from the traditional voting technique, and also it provides improved features of voting system over traditional voting system such as accuracy, convenience, flexibility, privacy, verifiability and mobility. In the traditional voting system we used different methods for voting like EVM based system in which we use a machine to handle the process of voting, paper ballot based system in which voter are provided a paper ballot[piece of paper] which consist of name of candidate this paper are provided at the polling station, head count method etc. but traditional voting systems suffers from various drawbacks such as , consumes large volume of paper work, time consuming, no direct role for the higher officials, damage of machines due to lack of attention, mass update doesn't allows users to update and edit many item simultaneously etc. These drawbacks can overcome by Online Voting System. At the end of any political term, millions of voters are called upon to cast their votes for their next political representatives. Unfortunately, many eligible voters will not be able to reach a polling station during the election. Online voting system will helpful for the voters who will not be able to cast their votes at the polling station so with the help of online voting system any voter will be able to cast his vote according to his comfort. citizens could be able to vote from anywhere, and at any time This is a voting system by which any voter can use his/her voting rights from anywhere in the country. Voter can cast their votes from anywhere in the country without visiting to voting booths, in highly secured way. That makes voting a fearless of violence and that increases the percentage of voting. We are using blockchain technology in online voting system to make it secure, transparent and immutable. Blockchain based voting system can increased confidentiality and accountability while securing data, automating procedures, and reducing frauds , waste of votes.

BLOCKCHAIN

Blockchain technology is a distributed network of interconnected nodes. A copy of distributed ledger is assigned to each node, each of which contains a complete history of all the transactions that have been processed by the network. Each transaction processed generated a hash. The hash created depends not only on the current transaction but also on the hash of the previous transaction. Thus any small change on the data will impact the hash of the transaction. If a transaction is approved by a majority of nodes it is written to the block. This allows the users to remain autonomous while using the system. A basic analysis of Blockchain suggests that it provides the potential of making the voting process more secure and reliable.
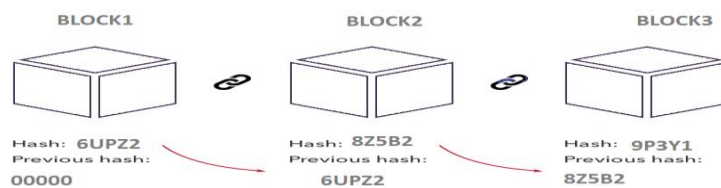
In blockchain information is structured in the form of blocks , each block is made up of three things data, hash and previous hash. First any data or information that you store in the block, second each block has its fingerprint known as hash, this ais the way uniquely identify the block among other blocks. Every block has its own key, and third each of the blocks stores the unique identity of its previous block and this is how the blocks are linked with each other in blockchain.

If you want to change the data in any block, if you try to temper with data of the block then the hash of the block will be change and if the hash change the hash of the next block will also change and eventually the entire blockchain will be destroy. For this reason it is next to impossible to temper with the data in a blockchain.

STEPs

These three main phases are as follows:
- o Voter Registration
- o Election Announcement and Candidate Registration
- o Voting and Results

Voter Registration
- o Voter have to register first for casting votes. Voter will first fill their information for the further voting process .
- o Application: For a new Voter Id , candidate fill out applications.
- o Verification: Admin will verify the voter .

Steps for Voter registration:
- o Id -Password and email
- o Voter Name - Name of Voter
- o Region Code - voter's home address.
- o Voting Phase – election that to be conducted.
- o Voting Status – vote casted or not by voter.
- o Validation Status - It marks the verification by authority.

Election Announcement and Candidate Registration
- o This phase has following steps:
- o Election Announce
- o Voters Notification
- o Candidate Registration
- o Candidate Verification
- o Election Model Fields:
- o Id - Election Id
- o Election name

Candidate Model Fields:
- o Id - Candidate password and email id.
- o Candidate Name - Name of Candidate

- o Candidate address
- o Total Votes - Votes casted in the name of candidate
- o Validation Status - It marks the verification by authorities

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. When we use traditional voting system we can not get the guarantee of our vote by ourself. It is guaranteed by the election commission that our vote would be counted but in the online voting system using blockchain technology will be get us the guarantee our vote ourselves. In online voting system we will be able to verify ourselves whether our vote is countable because no one be able to change our vote.

PROPOSED SYSTEM

- • 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, 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 id and password 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.

SYSTEM ANALYSIS AND DESIGN

Requirement and specification-

This is the most important section of the project. This section described the detail workflow of the project and necessary theoretical background.

Tools and technologies

 Tools and techniques used in the project are described in the section of the thesis.

Truffle: Truffle is a development environment utilizing the EVM as a basis. The slogan of Truffle is Smart Contracts Made Sweeter indicating that the environment specializes in Smart contract development. Truffle is a world-class development environment, testing framework and asset pipeline for blockchains using the Ethereum Virtual Machine. Truffle provides the compiler for smart contracts. We need it to convert the Solidity code into machine-readable code that can be deployed on Ganache blockchain.

Ethereum: for developing e-voting system we used Ethereum – a popular for framework for creating distributed blockchain system Ethereum supports smart contracts.

Smart contracts Smart contracts are self -executing contracts which contains the turms and conditions of agreement between peers.They are simply program stored on a blockchain that run when the pre determined condition are met.They typically are used to automate the execution of an agreement so that all participants

can be immediately certain of the outcome without any intermediately involvement or time loss.Smart contracts eradicate the need for a third party giving your full control of agreement .

Ganache -Since working with the main Ethereum network cost actual money for transaction we are using a local ROC ganache Ganache is a local test network for rapid Ethereum and distributed application development. It can be used across the entire development cycle enabling us to develop , deploy and test our application in a safe and deterministic environment. Ganache is a private Ethereum blockchain environment that allows to you emulate the Ethereum blockchain so that you can interact with smart contracts in your own private blockchain

Vs code: It is a Microsoft software which provides tools for developing quick code.Visual Studio Code is a streamlined code editor with support for development operations like debugging, task running, and version control.

Node JS: Node. JS is an open-source, cross-platform JavaScript runtime environment and library for running web applications outside the client's browse. Node.js is a very powerful JavaScript-based platform built on Google Chrome's JavaScript V8 Engine. It is used to develop I/O intensive web applications like video streaming sites, single-page applications, and other web applications. Node.js is open source, completely free, and used by thousands of developers around the world.

Mysql-MySQL is a relational database management system (RDBMS) developed by Oracle that is based on structured query language (SQL). A database is a structured collection of data.. it's widely used in relation to managing and organising data in databases.

Solidity- Solidity is an advanced programming language used for implementing Ethereum-based smart contracts. It's an object-oriented language that targets the Ethereum virtual machine (EVM). This language is statically-typed and supports complex programming features such as inheritance and user-defined data types.

Javascript- Javascript is the most popular programming language in the world and that makes it a programmer's great choice. Once you learnt Javascript, it helps you developing great front-end as well as back-end softwares using different Javascript based frameworks like jQuery, Node.JS etc. You can develop your website with a console like look and feel and give your users the best Graphical User Experience.

Typescript- TypeScript is a language for application-scale JavaScript. TypeScript adds optional types to JavaScript that support tools for large-scale JavaScript applications for any browser, for any host, on any OS. TypeScript compiles to readable, standards-based JavaScript.

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Result
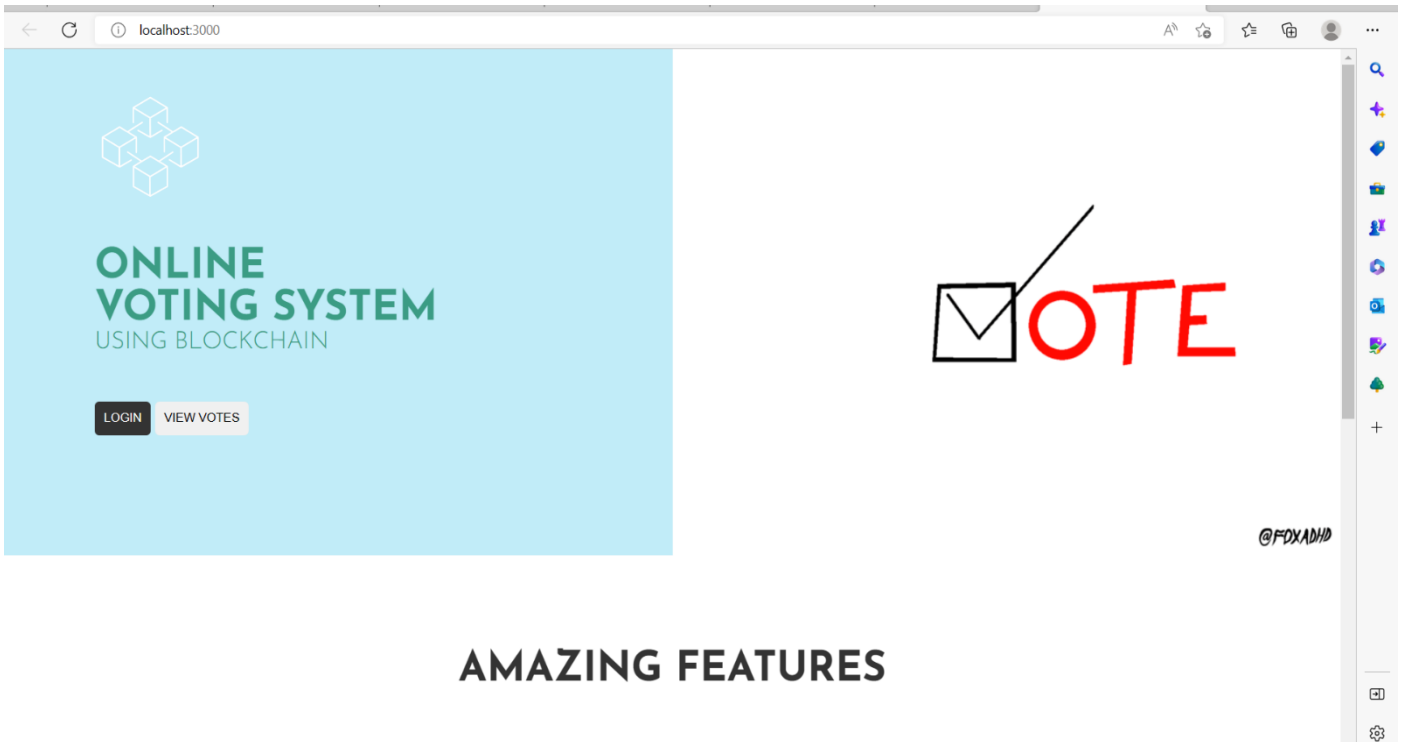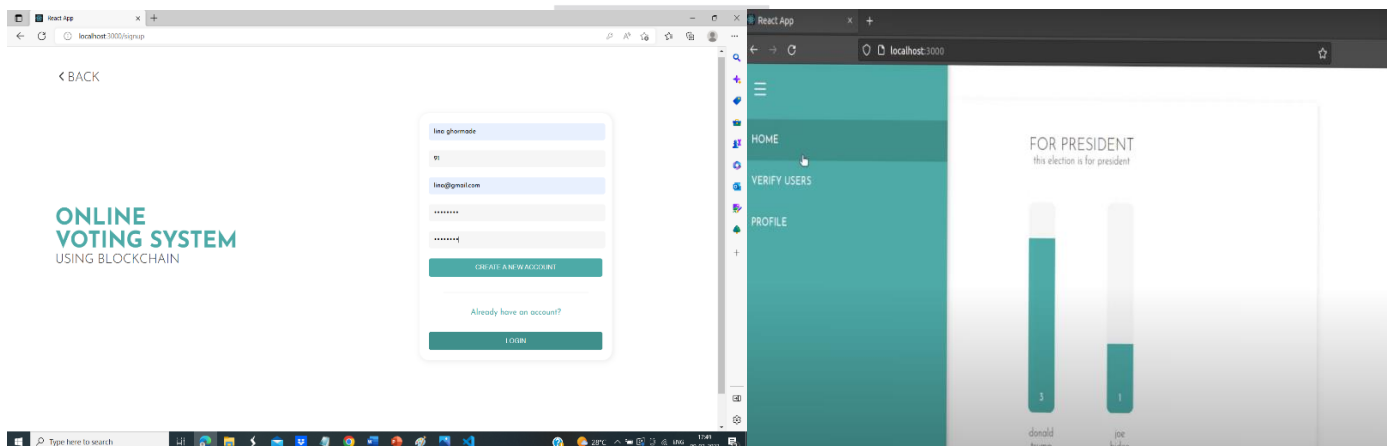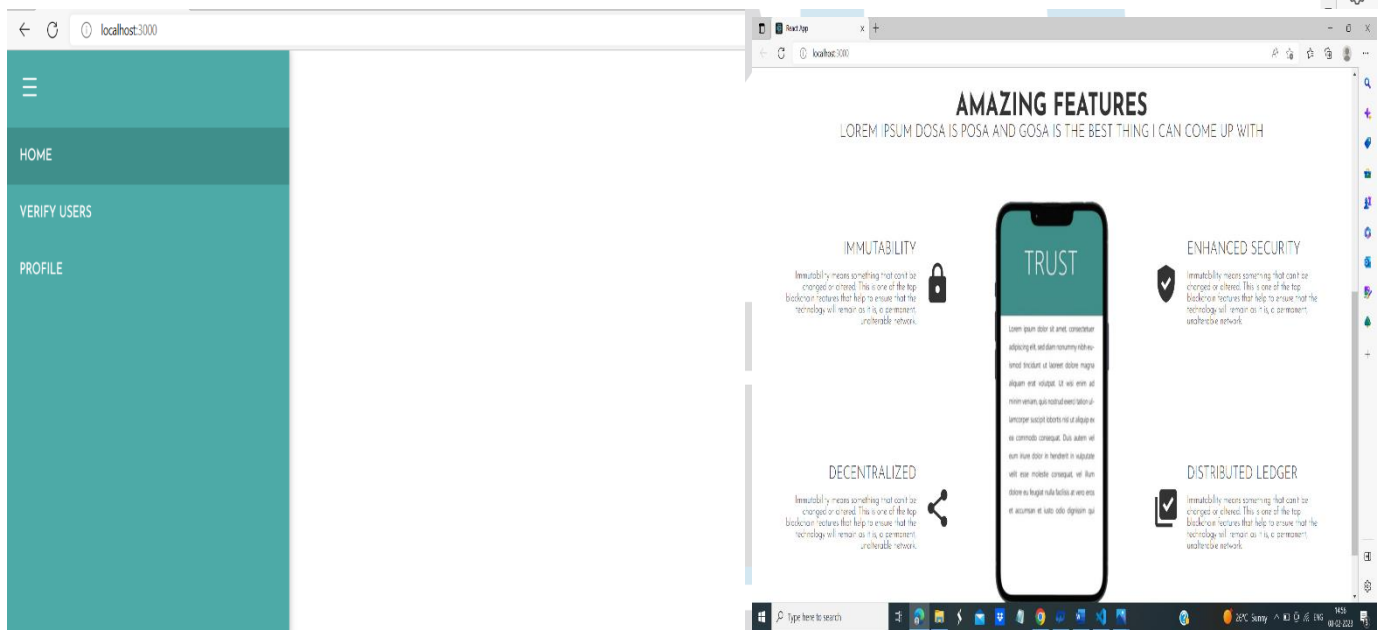
CONCLUSION-

Every Citizen desires to have a Transparent and Direct Form of Democracy which is clear cut obtained from this E- Voting.System using Blockchain. Faith of People on the Voting System is Increased therefore, many People Come Forward for Voting, thereby Increasing the Percentage of the People Voted. The Pen and the Paper Election is Eradicated thereby creating Accuracy in the Voting System. Everybody Prefers Time and Cost Efficient Systems so this E-Voting System using Blockchain is apt for Transparent Democracy. Ethereum Private Blockchain allows hundreds and hundreds of Transactions in a Second. Utilization of the Smart Contracts lower the Load on the Blockchain. we have proposed and implemented a blockchain-based online voting system to conduct secure elections while guaranteeing users. Security and Convenience is the key that makes the user comfortable and also eliminates the barrier between the voter and voting system in any case where voting takes place It is a decentralized system hashing and encryption concept for providing the security . Once any voters completed her/his vote, the block will be created which will be immutable. After completion of the blockchain no one will do any modification into the block. our model ensures that one voter gives only one vote, no one will allow to give two votes.

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