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BLOCKCHAIN BASED E-VOTING SYSTEM

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Abstract - *Blockchain is one of the best technology which provides new opportunities to develop new digital services. distributed electronic system is evaluated by this technology. We are going to use this blockchain technology to design a new electronic voting system that could be used in local or national elections. Blockchain is a solution to all security related digital issues, because it holds a decentralized system. decentralization refers to transfer of control and decision-making from centralized entity like organization to distributed network. Blockchain based e-voting system improves security of the election process and reduces the cost of it.*

Key Words*: *e-voting, blockchain, security, mongo dB, deployed contract address, decentralized, distributer ledger.

1. INTRODUCTION

Blockchain technology[7] is used to complete human needs relate with the digital security. Increasing use of blockchain technology has brought new challenge in the process of democracy [8]. As many people don't trust today in their government. election process require more security in the democracy in that particular case blockchain plays a vital role. Election have great power in determining in the fate of nation or organization in the every democracy , national security is the main matter of the election security. Electronic voting system with the goals of minimizing cost of having a election and increasing the security conditions of the election in the beginning of democratically electing candidates, voting system has been on pen and paper. Replacing traditional pen and paper method with the new election system is difficult to fraud and having election process traceable and verifiable. In an electronic voting machines are imperfect to this election process because anyone can access physically to this machine and thereby affecting all votes cast on the aforementioned machine.

Traditional process can take 10-15 working days to count the vote depending on the speed of sending the sound to the higher level also the frequent problem in election issue of data manipulation security [9], and transparency.

System which helps us to vote when we are not physically available or not present in our home, state or we are in travelling abroad. Now a days we are strongly prefer to live online platform ordering food to shopping, to booking caps and even in finding our life partner. So why we cant cast our votes online and select our representative in few minutes. Solution for these online e-voting system [2]. Through many online voting solutions have been proposed in the past but they are not used in reality. There are number of challenges that search e-voting system faces.

From the development of these technology using these can overcome and beforementioned problems. Security is the biggest concern for an e-voting system. blockchain technology is the one of the best solution that can be used to reduce the problem occurs in voting. Blockchain has been used in bitcoin transaction database system.[1].

Blockchain consist of several blocks and they are linked to each other in sequence. All the blocks in blockchain are related to each other because block contain hash value of next block and next block contain the hash value of that of next. The attempt to change the information will be more difficult to change information of the block it requires hash value of next block and next block depends on another block and so on. These process maintains security in the database of the election.[2]

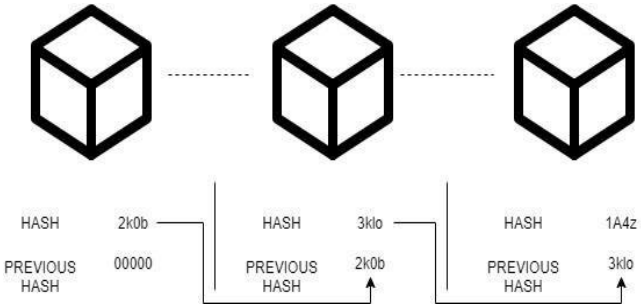

Fig.1 Blockchain illustration

Characteristics of blockchain technology can be defined as follows.[10]

1) **Decentralized technology:** network of blockchain technology is decentralized means it has a unique organization its not depends on government authority or a single person a group of nodes/peoples maintain the network.

2) **Enhance security:** as its network is decentralized no one can just simply change any characteristics of the network for their benefit also it uses encryption [3] which helps in another layer of security for the system.

3) **Transparency:** in every step of election process, it

should be in transparent way. Blockchain provides this transparency. [4]

4) **Distributed ledger:** to store and access data blockchain use distributed ledger technology(DLT). [5]

2. LITERATURE SURVEY

1. A report Kashif Mehboob Khan, Muhammad Mubashir Khan proposed to find out which leverages benefits of blockchain such as cryptographic foundations and transparency to achieve an effective solution to e-voting.[11]

2. A report by Andrew Barnes, Christopher Brake and Thomas Perry proposed to know these blockchains are held completely separately to remove any threat to link votes for certain parties back to individual voters while maintaining the ability to track who has voted and how many votes are actually present.[12]

3. A report by Haibo Yi Published Synchronized model of voting records based on DLT is designed to avoid forgery of votes. Which is proposed to meets the essential requirements of e-voting process. All votes in the blockchain is cryptographically linked block by block. The block with a higher value of signature is selected over others when they have the same timestamp.[13]

4. A report by Frorik P, Hjalmarsson, Gunnlaugur K proposed to building a secure electronic voting system that offers the fairness and privacy of current voting schemes, while providing the transparency and flexibility also system that utilizes smart contracts to enable secured cost efficient election while guaranteeing voters privacy. System aims to evaluate the application of blockchain as service to implement distributed electronic voting system. it elicitates the requirements of building electronic voting system and identifies the legal and technological limitations of using blockchain as a service for realizing such systems.[5]

5. A report by Abhishek Kaudare [4], Milan Hazra, Anurag Shelar, Manoj Sabnis proposed a present robust blockchain- based election mechanism that will be reliable, flexible and transperent according to present needs. Also it implemented a system that utilizes hyper-ledger to conduct secure elections while guaranteeing users privacy.

3. PROBLEM DEFINATION

How might we make system so efficient so all the connected people can do their best and communicate well in less time.

3.1 PROPOSED SYSTEM

The aim of proposed system is to provide security to the digital voting system using blockchain technology.

First step of our design is the process verifying a voter is essential in establishing security within the system. Making sure that someone's identity isn't being misused for fraudulent purposes is important, especially when voting is considered because every vote matters. To allow users to register to vote our proposed service utilizes recognition devices like face recognition to cross check whether the user is present in the database or not /whether he is eligible to vote or not. After that unique hash address is given to voter using which he can cast a vote.

In the beginning, deploy script creates a unique deployed contract address of blockchain where we can add blocks of data.
There are two main modules in this system. one is admin and another is voter. Admin will add election and election candidates. Voter will register first with required biometrics and sign in using legal biometrics. Admin will verify the voter. In proposed system face detection is used for verification. After verification voter will cast the vote.

Process for this e-voting system is as follows

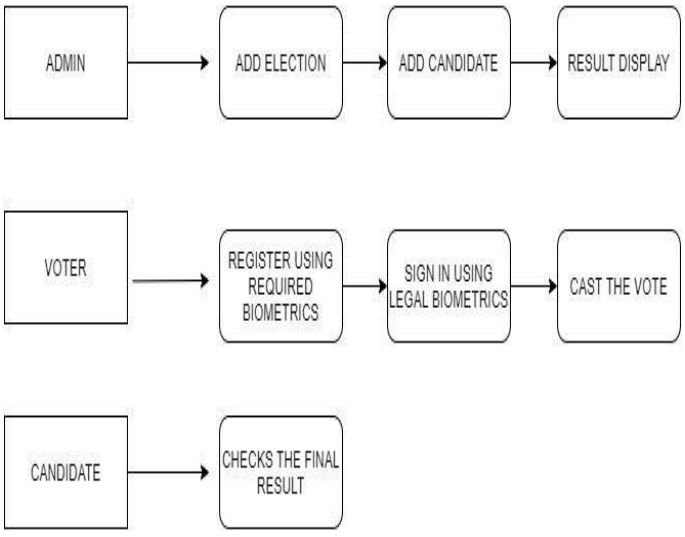

Fig -2: E-voting system

Above process is of four phases-

- Authentication phase : The user has to log in to the voting system using his credentials. At the time of log in user capture his live photo which will used during voting. System will check all information entered and match with valid voter, the user will get authorized using face detection

system to cast a vote.

- Casting vote phase : Voter has to cast a single vote as per his/her choice.
- Adding block : After casting vote a block is created, and block information will add into the blockchain.

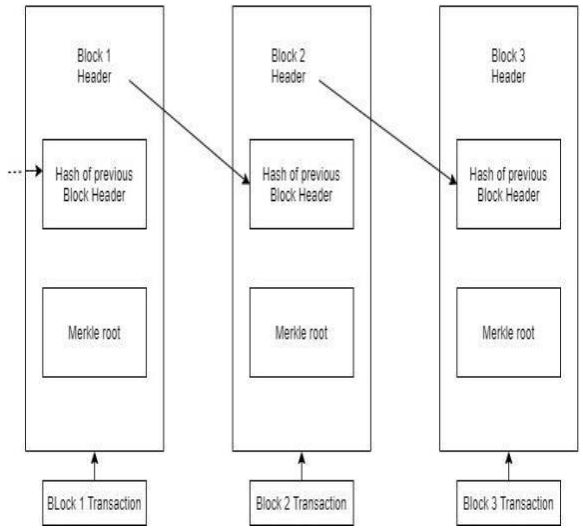

Fig.3 block of vote

After every transaction block created by its new hash value and linked with hash value of previous block

- Displaying result : After the election period is over result will then made available to the voters on dashboard by the admin.
- Face Detection System : In this proposed system azure face service is used. Which provides AI algorithms that detect, recognize, and analyze human faces.

i. Face Detection :

It detects a face along with smile, emotion, facial hair, pose.

ii. Face Verification :

Check the detected image and registered legal image is same or not with facial attributes.

4. DESIGN AND IMPLEMENTATION

Technology

The project mainly based on web based technology. There are two broad section, Front end and another one is Back end. Backend is coded with mongoDB and above. Here we used structured database MySQL. Front end is developed with HTML, CSS, JavaScript, Microsoft azure face detection system.

HTML is a markup language and here it used for frontend structure, the appropriate tag is also important on SEO aspect, version 5 are used here. CSS it's stand for Cascading Style Sheet. It's used here for styling the front end, In styling here comes Layout, User Interface (UI), Colors and Orders of front end module. It's very important role to make user-friendly design. JavaScript also know as ES6 after 2015 release, It's used here for gives web pages interactive elements that engage a user. Used jQuery for same it's well known library of JavaScript, it's easy to implement.

Microsoft azure face detection system helps user to capture proper image as per ICAO compliance standards. Manual image capture may ignore various checks such as titled head, person looking sideways, up or down, mouth open, eyes closed , expression on face, person not looking in front camera.

5. RESULT AND ANALYSIS

After successful implementation of project, few graphical screenshot we taken to give a clear idea about the project. The following screenshots represents few aspects of projects.

Fig. 4 represents home page of our project. eligible voters can start registering or if they have already registered they can cast their vote.

Fig.4 Home Page

Fig.5 is the registration page where voter can register with legal credentials. Also registered credentials are used to sign in for to cast the vote.

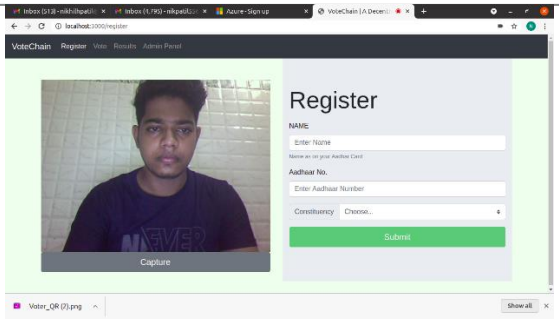

Fig.5 Registration page

Fig.6 represents the admin page where admin can control all the actions taken from the users.

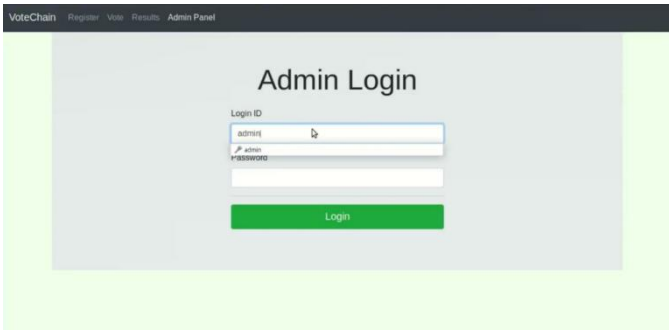

Fig. 6 Admin page

6. CONCLUSION

The proposed system introduced a blockchain-based electronic voting system that utilizes smart contracts to enable secure and cost-efficient election while guaranteeing voters privacy. System shows that the blockchain technology offers a new possibility to overcome the limitations and adoptions barriers of electronic voting systems which ensures the election security and integrity and lays the ground for transparency. the idea of adapting digital voting systems to make the public electoral process cheaper, easier and faster.

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