Empowering Democracy: A Robust and Secure Online Election System

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ABSTRACT

Every democracy and organization's hallmark are the voting system. The absentee ballot which India has been using have proved to be defective and even ineffective since they require a large manpower, taking longer processing time for the publication of results. Accordingly, to eliminate such flaws from the system, these amendments are implemented in the systems that could circumvent these considerable disadvantages. Physical presence as a criterion is also eliminated by the new method, hence decreasing overall complexity. The country has been undergoing significant changes since 2014 especially the use of online voting to control and manage elections. The system may help to achieve a better performance and enhance the overall voter numbers. On the one hand, it has a positive side in terms of protecting privacy and providing authentic information. The primary points describing security include minimization emerges as everyone's motive. In our research paper, we conducted an analysis of this system that involves three stages of authentication for guaranteeing the reliability and validity are utilized in the entire voting procedure. A process begins with voter card verification, then comes the second and third level- Aadhar verification and face verification respectively.

Keyword-*OVS, Face Verification, Implementation, and Authentication, Electronic Voting Machine.*

I INTRODUCTION

The foremost form of voting was using paper ballots. India ultimately developed an Electronic Voting Machine (EVM)- rested voting system. India, which has the biggest republic in the world, needs a voting system that its people can trust. In view of recent claims against the current system, including identity theft, false votes, and corruption, India urgently needs a voting system that everyone trusts. The top program of this exploration is to develop a voting system that's both effective and effective using face recognition technology, Aadhaar Verification [3] and Voter ID Verification giving occasion to every existent who's good to bounce from any remote position on earth. The proposed system consists of three situations of authentication. The first position involves face verification, where the selectors are obligatory to take a print of their face which contains three ways before the face is honoured. Voting Nowadays, is hard and takes so much time, as well as conventional methods use a lot of paper. In order to undergo the process of voting, a voter has l visit polling place and has to present their identification card to voting official. A voter can thus present this identification card used in person as they stand in a polling place for authentication. Following the authentication process, one proceeds to the averrable point, marking a cross next to the preferred candidate's name. The series will begin with the line and end at the vote, which means there will be a lot of steps lasting several hours between line and vote. Of the cost of labour and paper in every polling booth would be shared partly with the relevant election commission. voting station officer is responsible for transporting the vote boxes to a central location after the voting session to announce the results. security along the route is a serious issue, as the ballot boxes might be changed during the time between the polling station and the central location.

II LITERATURE REVIEW

Blockchain-grounded-voting recording system design, National choices still Problem with the traditional system is it completely controls the website and the system, potentially dismembering the database of numerous openings. The consequence, as we endorse a typical system and the whole database is A blockchain itself has been used in a Bitcoin framework by supporting a blockchain on electronic voting systems would lead that one of the best bookkeeping records reconciliations in electronical voting moves on would be reduction of using a blockchain.

LITERATURE REVIEW TABLE

N O	TITLE	AUTHOR	DESCRIPTION

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1	Investigation of E-voting system using face recognition using convolutional neural network (CNN) (2022)	Priyanka Dahiya, T.M.Latha, G. Revathy, Names yet to be…	Stable internet connectivity and infrastructure is needed.
2	Trends in blockchain-based electronic voting systems (2021)	Michal Pawlak, Aneta Poniszewska-Maranda.	Does not produce enough privacy.
3	Towards the intelligent agents for blockchain e-voting system (2018)	Michał Pawlaka, AnetaPoniszewska-Maranda, Natalia Kryvinska.	High investment in terms of time, resources, etc.
4	Online voting system for India based on AADHAAR ID (2013)	G.N. Pandey, Himanshu Agarwal.	Lack of transparency.
5	Electronic Voting based on Virtual ID of Aadhar using Blockchain Technology (2020)	R. T M and R. Sumathi	Lack of privacy.
6	Electronic Voting system for efficient Students (2019)	Moses Thiga, Oguk, Charles.	Does not produce privacy.
7	Secure and Hassle Free EVM through deep learning face recognition (2019)	Ishani Mondal, Sombuddha Chatterjee.	Lack of transparency.
8	IoT based evoting system (2017)	Swati Gawhale, Vishal Mulik, Pooja Patil.	Stable internet connectivity is required.

TABLE 1 Literature Review of Online Voting System.

Web- grounded Open- Audit Voting After Times of Research on the open web auditing They presented Helios, the first web- grounded, open- source check on the voting system. And its Protocol Helios are intimately accessible moment anyone can produce and run an election, and any interested bystander can probe the whole process. Helios is ideal for online software communities, original clubs, pupil

government, and other areas where honest, non-public choices are needed but enforcement isn't a serious matter. It works by Cracking and plodding the Audits Covered by Ben Adida in the Research.

In the Categorify ballot, each seeker has an arbitrary Letter Paired with the Position. It's a voting system that offers independent verification without changing name marks on optic checkup ballots. It complies with unencrypted paper inspection records. It's recorded by David Chaum and Aleks Essex, Richard Carback, and Jeremy Clark in the exploration Process.

Online voting mechanism is operational only for the period of operation of the electoral process. Of course, the users need a stable internet and a webcam to use it with its full potential. Authentication is done by webcam and, thereafter, matching the face of a user with the facial images that were loaded into system database. The facial recognition technology that is cited in the proposed method will provide an opportunity to develop a safe internet voting system, as the problems of traditional and current approaches are eliminated [5]. The system we would like to present offers an array of important benefits that include verifiability, accuracy, and convenience. As opposed to the conventional approach that mainly depends on election officers, paper ballots or electronic voting machines, this system requires an internet connection and facial scanners for voters in other parts of the world to safely cast their votes from [6] any location. This system provides the surest and most reliable venue for individuals to exercise their right to vote without fear. It uses strong security mechanisms aimed at maintaining the viability and integrity of each voter's choice, storing their elections in extremely secure digital format. This system provides the ultimate secrecy and assures that no intrusion or leakage of votes takes place in any way [7]. The online voting process includes different important steps which are highly essential for providing a flawless and safe voting experience. These stages can be broadly classified into two facets: The view of the voters and that of the administrator, Indian Election Commission. To have a better understanding of these stages, we should take a closer look into them [8][9]

III TECHNICAL RESEARCH

The technical research can be regarded as a main process presented by various components of E-voting system technological composition, including programming language, user interface, fingerprint algorithms and fingerprint classes etc. Finger mark technology has been the latest compromise for some researchers and developers since numerous algorithms designed by them for matching of identifying have been variedly worked out on how to enhance its effective implementation in modern society. There are some significant factors to consider for achieve the realization and target result of E-voting

application. The implementation can be met by fingerprint features.

IV PROBLEM STATEMENT

Our online voting system will make all voting processes simple since we will use authentication in this system, which will help every end stoner during the voting process. Our voting system will reduce the cost of the entire voting process. Our voting medium will give an accurate and timely bean result. Our voting medium will make it easier for us to keep track of who has suggested.

In the traditional OVM grounded voting system, we've faced several problems similar as,

1. Important man work is needed for security and verification purposes, which isn't wholly dependable and always leads to several miscalculations.

2.Tampering of votes and machines and change in issues.

3.Results in traditional voting are delayed or take further time as the votes are counted manually.

4.The bean conducted in pastoral areas lacks several coffers.
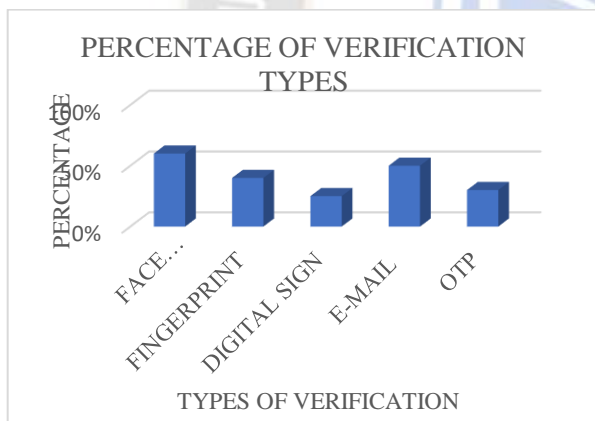
Figure 1 Percentage Composition of Verification Types

This composition reflects the distribution of verification methods within the overall authentication process in an online system.

V OBJECTIVE DEFINITION

Finally, having studied the plethora of literature materials we can say that the problem and perspective how to address it is now outlined. We can elaborate a system model by use of biometric point along with used camera bias. The two modules can be used for name authentication since this is what OVS stands for, the implication can register its value by the requirement of having identification name proofs. On the other hand, both also voted for it, If the case of name is valid only if match with

pre-stored information about registered point database. Nevertheless, there will be a video announcement shown on the television allowing that same person to be either transferred for interrogation of simply not allowed with casting his vote in case when they do not.

VI PROCEDURE

1. First, the person will enter his/ her Voter ID, and their Aadhaar ID.

2. After vindicating their ID attestations, the stoner will be diverted to the Dashboard from where the stoner can choose options of his/ her interest.

3. Still, also he'll be directed to a window where he'll be asked to choose a political party, if a stoner elects to cast a vote.

4.In the Mine block, first, the seeker details will get vindicated, and also after vindicating, a unique hash value will be generated, which will be used latterly to identify a block in the blockchain.

5.Still, they will see their profile on the operation, If the seeker selects the profile option.

6. In the results option, campaigners can see the number of votes entered by all the parties.
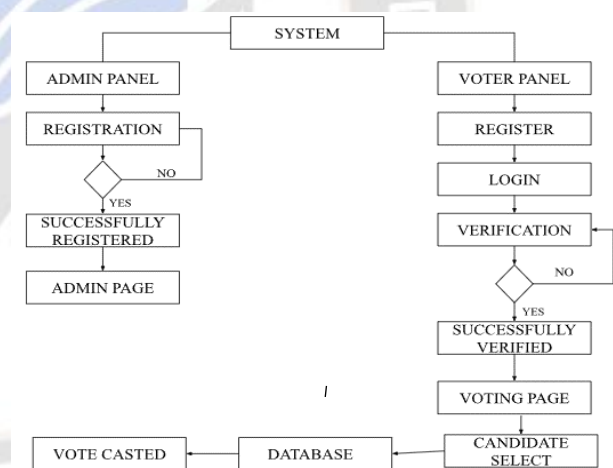
Figure 2 Block Diagram for E-Voting

This figure outlines the sequential steps in the online voting process.

VII METHODOLOGY

In order to cast the votes, make the vote count transparent, and show the vote aggregate in real time, My Vote will work blockchain technology. We can work with blockchain technology by using reliability to make smart contracts and tools like Ganache, MetaMask, and Truffle for testing purpose.

The name must first register on the My Vote voting system. After successfully registering, the stoner

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can login by just inputting their Aadhar number and Voter ID. After successful verification of ID's, the stoner's information will be incontinently recaptured. The voting information will be kept on the blockchain and the stoner will admit an acknowledgment for successfully advancing if the name is eligible to bounce. The system will display the campaigners list and can only bounce for one seeker.
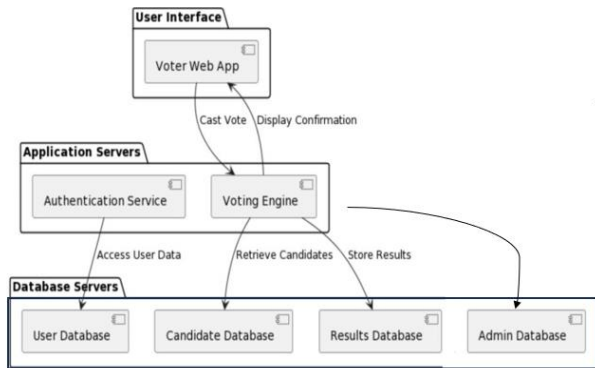
Figure 3 structure of E-voting

The Structure indicates the user interface as a web voter app, application servers for accessing the user data and database servers for storing etc.

VIII MODULES

The voting process within the modules comprises multiple phases that participants must undergo to cast their vote.

    a)   Register
    b)   Login
    c)   Face recognition
    d)   Face proctoring
    e)   Vote casting
    f)   Result display

a) Register

Before Voter ID can be registered on My Vote Point, the introductory information of stoner will be submitted such as Name, Address, Mobile Number, Date of Birth and Aadhar number. If the Aadhar number has previously been recorded in the database, the system will notify; sends message to stoner that this is a formerly registered [3]. moreover, the gate will inform the stoner if on the date did, he de determine that his age accent is lower than 18 years of age. In the case that everything went well however it will be possible to enable successful enrolment and would also encrypt the Aadhar number with SHA- 256 encryption for security.

b) Login

Based on this logic then, the voting process undergoes login requirements therefore is mandatory for all the druggies logged in to register a vote. The Aadhar number of the stoner will be realized with regard to the login gambit, and SHA- 256 Encryption will cipher this enumeration vi

international exchange While doing a check whether or not the stoner was against that in times past; If the stoner was previously registered then their OTP will be delivered to their mobile number that is verified with BTC Turkey. A deflect will sends the enemy to the opponent voter.

c) Face Recognition

Finally, the enroller will enter in all of their introduction information for registration, so the system will detour them to face prisoner runner where the stoner's image will be captured and also then catenate base64 string and preserved with fresh intelligence that is introduced by stoner for a database entry. The face detects to overcome the threat by fake choosers.

d) Face Proctoring

The system will be compatible with any type of faces to visualize with the camera and mobile set of the user. If the camera detects more than one face, then the system will alert to stoner as well and translate back to the home runner and stop their voting program.

e) Vote Casting

If the login proves successful, then the Stoner will move to the voting runner where an option for voting a nominated seek from a drop-down box with all campaigners are displayed be it running or withdrawing and this would take place after completing filling of form. Starts from the drugs emanating point where the hurdlers can pick out the traveller they would prefer to leap and click Vote button to vote. Once the vote has been expressed productively, the destination will be vanquished and impaired and it would have a tendency to break min withdrawn.

f) Display Result

The current numbers of votes will be indicated as a real-time update. As a result, the transparency will always remain and user can check that is his vote counted.
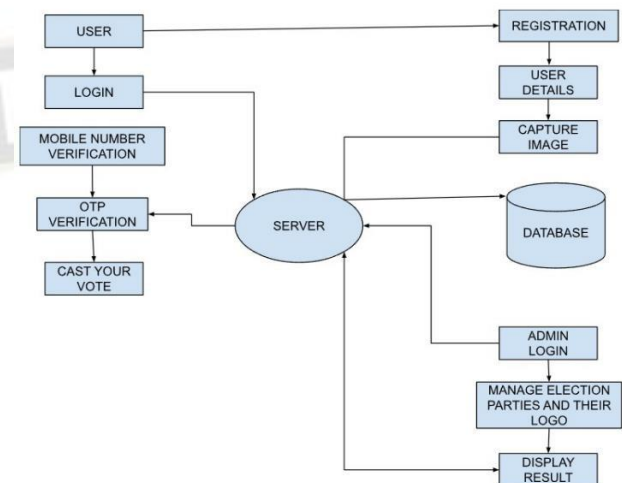
Figure 4 System Architecture

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In the system architecture, block diagrams are created to show the main parts of the E-voting system which also give a conceptual overview of the main software components that is used in designing the application. This section also includes the flow chart to show the flow of integrated system and also gives an overview on application interface design and layout.

IX TECHNOLOGIES USED

Front End: - HTML5, CSS3, JavaScript

Back End: - PHP 8, JavaScript (ES12)

Database: - MySQL 8, phpMyAdmin 5.1.1

Server: - XAMPP 8.0.12

Technology: - Hash Graph

X RESULT ANALYSIS

The integration of face recognition technology adds an [4] extra layer of security, reducing the risk of identity theft and fraud. Convenience is enhanced as voters can participate from any location with internet access, and accessibility is improved for individuals with physical disabilities. The system's efficiency is evident in streamlined processes and reduced resource requirements. However, challenges include privacy concerns related to biometric data, technological limitations requiring continuous advancements, the need for extensive voter education, and potential cybersecurity risks. Addressing these challenges through robust security measures, privacy policies, and ongoing improvements is crucial for ensuring the success and integrity of online voting systems with face recognition verification in the future.
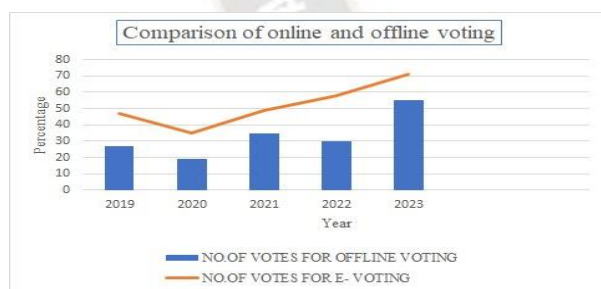
Figure 5 Comparison of online and offline voting

The above figure illustrates the comparison for online and offline voting with year and percentage since 2019.

XI CONCLUSION

There will be a real time update which would reflect the sum of the votes placed by citizens. as a result, the transparency will be preserved and even Stoner would verify so that their vote is registered. Our online voting system is an IT sector that gives opportunity to cast their vote from anywhere under the guidance of individual bias in any decimal places. This system could be implemented in any corner of the world and might provide correct guidance, discipline, and independence to people's rights and responsibilities. It is a very efficient process which saves time and generates output in equal measures. In the recent past, many literatures concerning online voting have been formed. Online voting has been a hot topic in the contemporary times yet efforts are being put leaving no stone unturned to make the system more reliable and secure. The use of unsecured networks and breaches that affect can be reported in recent time.

XII FUTURE SCOPE

As such, they can be managed on cloud making them securely and efficiently. We have devised the vlogging system working, only for one booth and that should be made available to all the polling booths throughout India. As this website provides better way of election between voter and political parties: Therefore, we assume that this the project is of a vast expanse and is cardinal essential to provide a tight system of voting through online.

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