Let's Vote Voting System

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Abstract- *Voting is an important aspect for democratic countries. Elections decide which candidate is capable and also decides the future of that country therefore elections should be as transparent as possible and should have high level of security. But the existing voting system has some flaws like false EVM's and budget issues, also there is lesser security in present voting system. Due to this, inclination of voters is decreasing towards voting and voting percentage decreases. To overcome these issues and to improve the existing voting system we are designing online voting system using android application which will give better system security and vote casting become less time consuming process and it will provide better results. Voter can cast vote in our new vote station. The app will have native 128 bit AES encryption and a server based 256-bit encryption. Android application will be compatible with almost all the android devices so that every voter should get benefit of online voting system. It has higher level of security as it has two stage authentication technique i.e. Facial recognition and One Time Password (OTP). And another layer of security, which is the block chain storage. Voter data that is his facial images and voter id will be stored on the database. Verification process is done by server itself. Facial image of voter will be fetched by android application which will be then forwarded to server for further verification, also there after One Time Password will be provided to the voter on his registered mobile number for registration purpose. Voter is allowed to cast his vote after successful verification with facial. The entire voting results will be sent to the highly secure blockchain storage. Results of election will be displayed on the admin app and will be published at the same day itself. Any individual who register from the let's vote website is able to mine the results through blockchain mining software. Thus, creating transparency in the system.*

Keywords- Facial Recognition; OTP; AES Encryption; Real-time database; Blockchain.

I. INTRODUCTION

Voting plays a very important role in any democratic country. Voting is the system where citizens choose and replace government by doing elections. Hence these elections must be accurate and transparent. When elections are happening there is need for lot of man power for completion of elections properly and with desired security. Although lot of man power is used in elections there is no guarantee that elections will be done with no fake votes. Sometimes there are chances that fake votes can be done. Also for voting voter has to go to the voting booth and stand in line for long time. Due to this the percentage of voting reduced in some amount.

Currently used voting system consumes much time and it is a very hectic process. Let's Vote App provides the facility of casting votes without visiting the booth to the voters. The facial recognition secures the system by allowing the authentic voter for voting. One-time password (OTP) provides another level of security to the system. To avoid fake voting and for providing voter an extra comfort by doing vote from remote place so that voter inspired to cast his vote and voting percentage will increase phenomenally. A new technique as Mobile based Facial Recognition can be implemented. Also to provide the best transparency and security for the casted votes a Blockchain system is implemented. This system provides extra bandwidth utilization for voting system.

Electronic voting technology intends to speed the counting of ballots, reduce the cost of paying staff to count votes manually and can provide improved accessibility for disabled voters. Also in the long term, expenses are expected to decrease. Results can be reported and published faster. Voters save time and cost by being able to vote independently from their location. This may increase overall voter turnout. The citizen groups benefiting most from electronic elections are the ones living abroad, citizens living in rural areas far away from polling stations and the disabled with mobility impairments. For the country, electronic voting may improve the country's image and serve as a promotion.

II. PROPOSED SYSTEM

In project, modules play an important role such that through modules everyone get a clear idea about the project. The project is divided into different modules based on their purpose. Here the modules are mainly divided into three. They are:

- User Module
- Admin Module

- Server Module

A. User Module

This module mainly deals with the user where he or she interacts with the system. Under this module comes two android applications and a windows application. The android application includes:

- Registration Application
- Vote station application

Both these application are design in a way so that the user can interact with the application in comfortable manner. In both of these application the admin login is common. The application is only useable if and only if the admin has logged in. The user need not worry about the background working at all in both the application. It is to be noted that the user can only cast his or her vote if he or she have registered via the registration application. One of the main highlight is the security provided in both the application. Even though some one manages to break into these application the person is not going to get any resources from the application as it does not store in the device and all the date is stored in the highly secure database in the cloud. Both these application is designed to act as a doorway to make changes in the database.
The below given flowchart giver the detail description of the registration application:

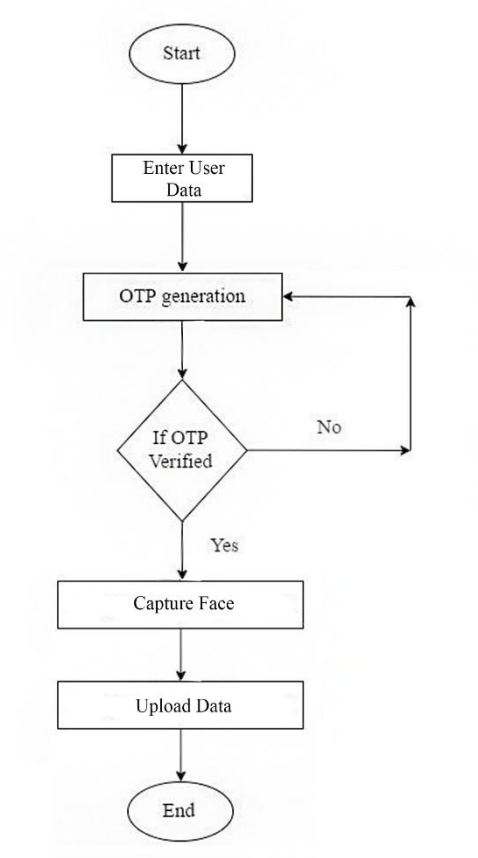

Fig 1. Registration flowchart

The above figure gives the detail description of the registration application. In this process first the user needs to enter the user data such as their Name, Aadhar number and their e-mail id. Then the user is taken to next activity where he or she need to enter their mobile number and wait for the OTP. After a successful OTP verification, the user's face is captured and taken for processing. If the all the entered data is suitable then all these data is entered to the secure cloud database.
The below given flowchart giver the detail description of the vote station application:

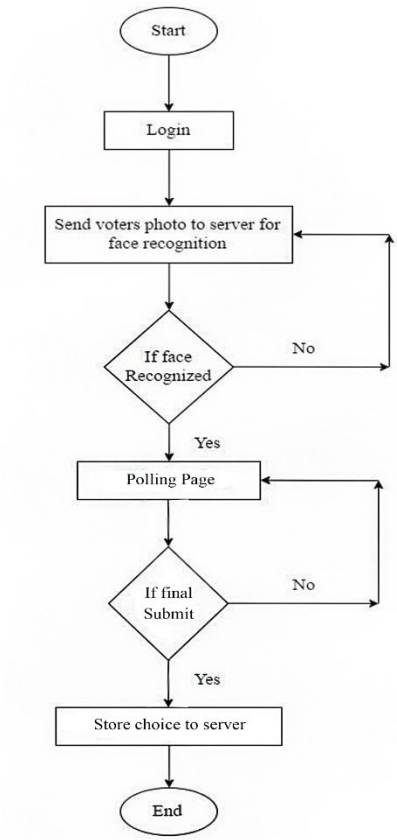

Fig 2. Vote station flowchart

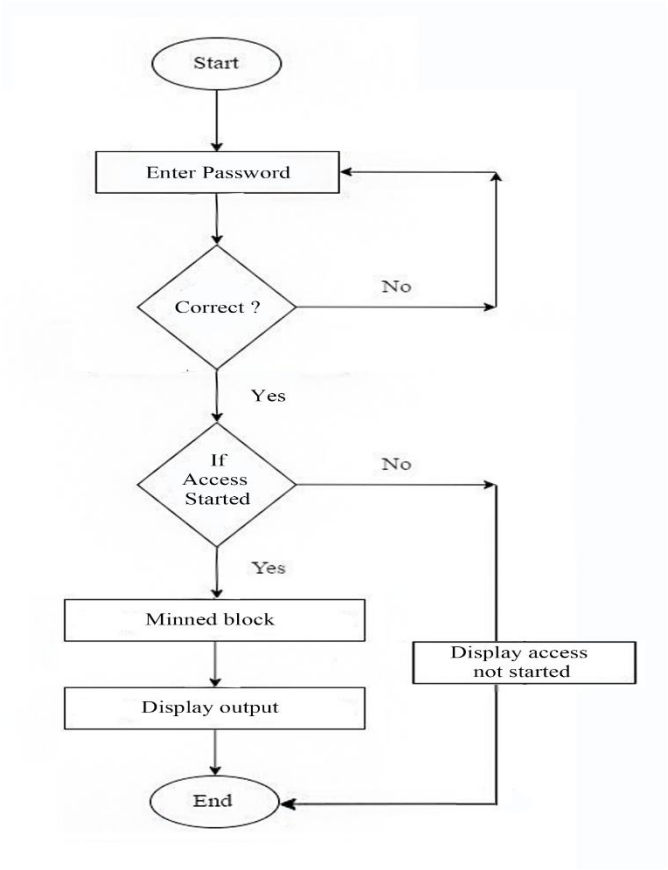

Fig 3. Blockchain flowchart

The above figure gives the detail description of the vote station application. As this application must be user friendly there is no much need for the user enter any details. In this application the user is directly taken to the facial verification and if the user passes the verification he or she can cast their vote. On selecting the choice and clicking the submit the user is taken to a portal where he or she needs to conform the choice. It is to be noted that each user gets only one minute in the polling portal and if the user fails to cast their vote in the given time then the user's choice is taken as nota. On clicking the final submit the user's choice is encrypted using AES 128 and sent to the secure cloud database which is 256-bit encrypted. Finally, the user gets a conformation that his or her vote has been casted.

Finally, the third application in this module is the windows application for mining the blockchain. The below given flowchart giver the detail description of the blockchain application:

The blockchain application is not given to all the users but to selected users. First of all, if the user wishes to setup the blockchain node in his or her PC has to request it through the web page that has been hosted for this. The user has to enter all his details such as the users name, e-mail id, phone number, Aadhar number and a permanent address. After submitting the user may get e-mail with a windows application and the password for that user to run the application. It is to be noted that to get the e-mail is not compulsory as not everyone is given this access. To run the application, the user must have installed java 1.8 or higher version in their PC. On running the application, the user first sees a button to connect to the server, on a successful connection next the user is asked to enter the password. On entering the password and submitting the application verifies the user and checks if the blockchain access has started or not. If the blockchain access have been activated, then the mining of the blockchain will be started. After the mining the total output is printed in the console and a file is also created with the output results in it. It is to be noted that user has to start mining before the blockchain access has stopped. The advantage with blockchain is that even if the user tries to alter the blocks it can be easily identified by calculating the hash.

B. Admin Module

Under this module comes a single android application that is the Admin application. The admin is the person who is responsible for conducting the election. He has the whole control over the process.

In the admin application there is various option like configure the polling that is to start the polling and to stop the polling. When the admin makes the polling status as finished then an e-mail will go all the user who have registered for voting. It is also possible to view the vote count which is an option built in it where the admin can view the poll count in real-time also this feature makes the solution for avoiding the tedious process of counting the votes and can publish the results in the matter of seconds. Admin can also view all the user and can get their information. Another option that is given to the admin is to change the candidate name. it is also possible for the admin to reset the database if necessary. Finally, the admin is responsible for the configuration of the blockchain where the users can get the access to the blockchain if the admin activate through the admin application.

To make all these option secure so that only the admin can access it the admin has to login with his or her login id and password that is known only to the admin. With the help of the admin application every action in the system can be easily tracked and a total control over the system is possible.

C. Server Module

This module mainly deals with the backend server, the web page hosting and the facial verification system. It is the most secure part of the system as all the data is stored in this server. This part becomes the most complicated past as it is responsible for all the functionality in the system. The main aim in designing this server is to keep the system secure. This is done with the help of Google Firebase. The facial verification is done with a separate server that run a program in it for facial verification. The most vital part of the system is Google Firebase. It acts as the backbone of the system. There are many functionalities in this server and most of the used functionality include authentication which is used in all the authentication in all the application in the system, the next is database which is the place all the data including user details and polling count is stored, the image of the users are stored in the storage of the server and there is functions declared in the server which are mainly for sending email to the user about the notification and also for the working of the blockchain system.

The web page is also hosted with the help of the hosting in the firebase server. With the help of the entire data in it is 265-bit encrypted. The next part in this module is the web page which is hosted in google firebase. The web page is hosted so that the user can get access to the blockchain. The user has to enter all the details and these details are sent to the database. Further selected users are given a mail with the windows application and the password with it. Other than these the web page contain general instruction and other information's. Finally, this module contains the facial verification server. This is the place where the faces are compared and results are produced whenever a user register his face is entered to the storage in firebase and when the facial verification application comes online it downloads all the new faces into its database. So even if the data is lost at the facial server the data is secure at the firebase storage. It is to be noted that no other data comes in and out this server. All of these functionality make the overall backend server secure, fast and reliable.

III. RESULT AND DISCUSSIONS

The Let's Vote application aims to change the whole voting system. Presently the current voting system is very slow and it costs too much. So to make all this process much comfortable and quicker Let's Vote system can be a good solution. As the current system has many flaws and security issues, this cause fake votes and malpractices in the system. these issues can be rectified using the Let's Vote application. It is achieved with the facial algorithm uses in the system. The facial recognition used is of higher level. Tensor flow based Deep learning algorithm is used identify faces with higher level of accuracy. Also, a lot of other security measures are taken for this purpose, some of them are OTP verification, in app 128-bit AES encryption and a 256-bit encryption at the server side. The new system is so user friendly that users can easily interact with it. The cost of EVM at present is about thirteen thousand and the total cost in conducting election in India is about fore crores. This is a huge amount invested for this process, so this cost can be reduced significantly by Let's Vote application. Using the blockchain technology alone just redefines the overall project. This will enhance the storage security to a whole new level. For any software system there is still the possibility that a hacker could break in and manipulate the database to their own ends. That was the main problem that made the software level voting not a viable replacement option to the current systems. Blockchain technology solves these problems by creating a network of computers (called nodes) which each store a copy of the database, and a set of rules (called the consensus protocol) which define the order in which nodes may take turns adding new changes to the database. By using the website, anyone who is registered there

could mine the result by using the program given by the admin. The given program is also secured, which requires a password to operate. Hence any user who is properly registered can have the right to mine the original voting results, just after finishing the polling. The user also gets alerts in his/her mail when the polling is done, and the registered individuals gets the download link of the software to mine the results, which is stored in the blockchain network. Thus, the results will be made transparent to the public and will be available within a day itself. No other voting system existing today have the features and security such as the Let's Vote system. Hence this proposed project will be the future of voting system, that could potentially revolutionise the current systems.

IV.CONCLUSION

This project has successfully introduced a new design of E-voting application using Android Platform. It is hoped that the proposed approach will provide comfort and security to the voters. It is believed that the lengthy process of voting, the amount of expenses, time and energy that is wasted due to the current system will be nullified due to this application. This project concisely explains the design and working of this application, which delivers enhanced voting features, transparency, greater privacy, good interface and reliability towards the entire election process. The utilization of modern technologies like face recognition using tensor flow based deep learning algorithm, block chain and several other security measures ensures that the application uses latest advances in technology and thus gives better performance. Hence this system is much more efficient than all other systems that exists today. This voting system helps everybody to cast their votes easily without fully reconfiguring the existing voting system. So, this will increase the inclination of voters towards voting and will give us the better results. This proposed system uses firebase server. Firebase is a real-time server. It also has a build in encryption system for better privacy. It has an API that synchronizes application data across iOS, Android, and Web devices, and stores it on Firebase's cloud. The Firebase Real-time Database is a cloud-hosted NoSQL database that lets you store and sync between your users in real-time. The Real-time Database is really just one big JSON object that the developers can manage in real-time. With just a single API, the Firebase database provides your app with both the current value of the data and any updates to that data. Firebase Authentication provides backend services which is essential for this project. To improve the overall project flutter can be used to build apps. Using IOS platform much more security can be obtained. Currently the project uses deep learning based facial recognition. In future much more improved 3D face capturing algorithms can be used, also other than facial other biometrics such as fingerprint, retinal scan etc. could be used. This will overall increase the functionality and the usability of the application.

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