M-Vote (Online Voting System)

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Abstract - *With the advancement of mobile technology and internet, and progress towards digitisation has made everyone tech-savvy. From communications to financial transactions, everything is being performed through digital medium. This has paved way for us to develop a smart and portable voting process, which is easy, safe and yet highly efficient. This article provides the specification and requirements for Online Voting with Android mobile platform. The online voting is the voting process used in the any type general elections by using mobile devices. We will also describe how the android mobile phones are efficient and can be used for voting. Altogether the application will be one of its revolutionary kind by providing identity of a voter based on his biometrics, which will be mapped to his/her Aadhaar number, which in addition will be used to track whether voter has casted his vote or not and will prevent and avoid duplicate voters from misusing the privilege given by the system. Also, there will a SoS mechanism through which a voter can send a distress signal along-with his/her location to the security systems of the application as well as to the concerned authorities, without letting nearby persons know that the given voter has sent a distress signal. The UI of the application is designed and developed with Android SDK (software development kit). Using the Google's API for Geo Location, Fingerprint scanning, and Facial Recognition provided by the Android SDK, voter's security parameters will be developed. For cloud and push messaging services, Firebase will be used*

***Key Words:** online voting, qr scan, fingerprint authentication, facial authentication*

1.INTRODUCTION

Current voting system for any election is entirely traditional, where voters cast their vote on an offline machine. In traditional system lots of manual work is required to be done, which consumes time right from setting up the ballot box before elections to declaring results. Voters and the election conducting body has to do in great efforts, along with spending time in the process. Election authority has to take security at highest level to keep the polling process clean and trouble free.

With the advancement of technology and internet, and progress towards digitisation has made everyone tech-savvy. From communications to financial transactions, everything is being performed through digital medium. On the other hand, android has also gained highest popularity as the operating system for mobile. The main reason behind the tremendous development in android application development is that the android is an open source development platform. It means that the software developers can have customization rights. As well as the software development kit provides tools to build and run android applications.

On this line of development is our android based application "Online e-voting System". Key features of the app are:

1) Unique user identity - with Aadhaar number
2) Biometric Verification of user –
   i) Using face recognition
   ii) Using fingerprint scan

3)Generate a QR code based secure ID card, which will help system to identify user

4)Secure voting PIN – Used as vote confirmation password, if entered in reverse order will send a SoS signal / Alert to admin and displaying to the user that vote is registered successfully. Helpful in case of user is compelled or threatened to vote forcefully.

5) Intruder Alert: Many times users don't want other people peeking into their phones when they are away from it.

6) Tracking users Geo-location at the time of vote.

7) Provide details about upcoming elections and about the contesting candidates.

It will help voters to cast their vote at their convenience without being in queue and generate the results of election rather quickly. Also the app will ensure security of the votes being casted so that clean results are obtained

2. LITERATURE SURVEY

Prof. K. P. Kaliyamurthie, Prof. R. Udayakumar and Prof. D. Parameshwari, "Advanced Secure Voting System with IoT" published In: International Journal Of Engineering And Computer Science (2016), addressed the question of what Internet voting may mean. Their intent was not to propose a particular online voting solution, but rather they focused on to provide input to a future government committee or a task force that may be created to delve further into the topic and help build a robust and dynamic voting system. They suggested the core democratic principles that shape modern electoral systems, which are: accessibility, equal voting power, secrecy, security, audit ability, transparency, and simplicity. The usage of online voting has the capability to reduce or remove unwanted human errors. In addition to its reliability, online voting can handle multiple modalities, and provide better scalability for large elections. Online voting is also an excellent mechanism that does not require geographical proximity of the voters.

As per the article by Ms. Nithya S., Mr. Ashwin C., Mr. Karthikeyan C. And Mr. Ajith M., fingerprints have been one of the most highly used methods for human recognition for over a century; automated biometric systems have only been available in recent years. This work is successfully implemented and evaluated. The arrived results were significant and more comparable. It proves the fact that the fingerprint image enhancement step will certainly improve the verification performance of the fingerprint based recognition system. Because fingerprints have a generally broad acceptance with the general public, law enforcement and the forensic science community, they will continue to be used with many governments, legacy systems and will be utilized in new systems for evolving applications that require a reliable biometric. Thus, the advent of this biometric voting system would enable hosting of fair elections in India. This will preclude the illegal practices like rigging. The citizens can be sure that they alone can choose their leaders, thus exercising their right in the democracy
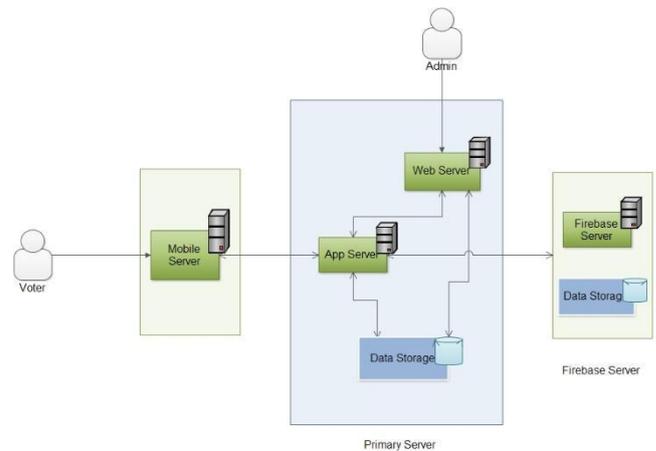
3. SYSTEM ARCHITECTURE

Fig.-1: System Architecture

Our proposed system will consist of two servers, first one is primary server where our project's server-side files will be hosted along with storing voter's basic data, and a secondary Firebase server which will provide various API's for push notifications, cloud services and storing voter's secured data.

Primary server includes a Web Server which will handle inputs from Admin, which will in turn connect to the core application server i.e. App Server which will handle all the data processing input and output of the whole application. Firebase server is third-party server which will be used to store biometrics data and handle notifications

4. GOALS AND OBJECTIVES

- Voter registration involves biometric data registry, like fingerprint and face recognition, and a voting PIN.
- Voter will be able to cast their vote only if biometric data is verified and authenticated by the system
- Voting PIN will act as a voting transaction password which entered properly will submit voter's request to cast their vote, and if entered in reverse order it will generate a SoS alert message and send to concerned authorities.
- Helps voters to maintain anonymity on the votes being casted.
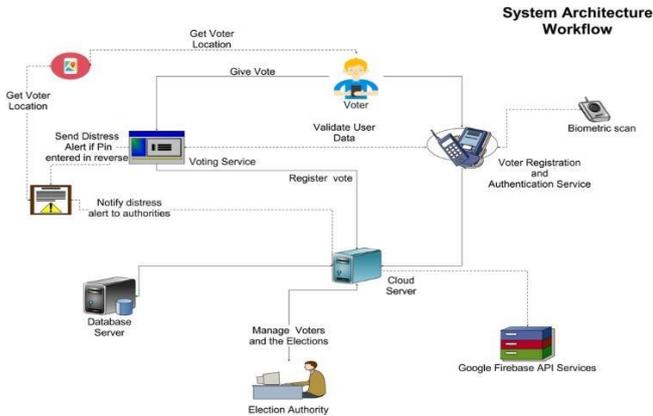
5. EXPERIMENTAL RESULTS

Fig.- 2: System Workflow

5.1. Application Flow

Step 1: Begin
Step 2: Install client side android app
Step 3: Register Aadhaar, name, email, mobile number and other relevant details.
Step 4: After successful registration, Login to the System.
Step 5: First time Login will prompt user to register Biometrics data:

    1. Facial image for facial recognition
    2. Thumb impression for fingerprint recognition

Step 6: Once successfully registered, admin will provide voters card with QR scan code, which can be used to login to the app with the registered device only.
Step 7: Then user can choose following options:

    1. View upcoming or active elections
    2. View candidates
    3. Cast vote
      (a) Identify by face and fingerprint scan
      (b) Once authenticated enter secure voting PIN to proceed and vote your favourite candidate.

– If voting PIN is correct, vote validated
– If voting PIN is in reverse order, system will generate a SoS alert and invalidate vote, register voter location and display successful message.
4. Update account details
Step 8: End

5.2. Result Analysis

Based on the tests performed on the application for accuracy and processing, we did some comparisons in the tables for fingerprint & face detection mechanism.

System is detecting the images as per the camera input whether they are having proper content or not. For face recognition, if the person's face is not recognised it will show error message else it will give success results.

	Without Face	With Blurred Face	With Proper Face
Processing Time	2.3s	5.3s	4.1s
Detection Time	1.3s	3.7s	3.2s

Table 5.1. Face Processing & Detection Time

Without Face	With Blurred Face	With Proper Face
100	100	95

Table 5.2. Face Detection Accuracy

For fingerprints, we are matching the edges and ridges of stored fingerprint data. If all points are matched then only the fingerprint is verified as correct else incorrect match.

	Without Finger Image	With Blurred Finger Image	With Proper Finger Image
Processing Time	2.3s	5.3s	4.1s
Detection Time	1.3s	3.7s	3.2s

Table 5.3. Fingerprint Processing & Detection Time

Without Face	With Blurred Fingerprint	With Proper Fingerprint
100	100	90

Table 5.4. Fingerprint Detection Accuracy

6. CONCLUSION

Online voting system is a highly secure application, which will help users cast their vote with confidence and at ease.

It will give voters the benefit of casting their vote on the go. It also ensures that no one misuse the vote in a fraudulent way, like by using others credentials to login and vote as it will require the biometric scanning as and when needed. Also, if someone threatens a person to vote forcefully against his/her will, then user will have the privilege of generating a SoS signal which will seek help from the concerned authorities of the system and protect their vote. This application will give a better perspective to those who are unable to vote due to their commitment to work or due to them being at remote location on the date of vote

7. REFERENCES

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