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Mobile Based Voting Application

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Abstract: *Now a days electronic voting is a good practice, although it contains some issues like long lingering lines, time consumption, registration process being tedious and lack security; due to which people may not turn up at polling station in fear of been bullied to vote someone else they don't wish to. The proposed project is based on mobile voting application. Mobile-base voting application can prevent above issues and it is the most secure way to vote as it contains fingerprint and face verification technique. In this proposed project the user registers with application. Further the user will have to provide details along with his fingerprints or face-scan according to user's desire. Post registration the user will authenticate themselves by providing fingerprint or face-scan; if the fingerprint or face-scan matched with that of the stored in Firebase then and only then the user is authenticated, hence user need not remember any password in order to log in to application. This will reduce the complex task of remembering the password and increase the security as the bio-metric is unique to every person. The proposed architecture is expected to provide secured access to only authenticated users of a system within a short period of time and prohibit violators from gaining any access. This proposed system prevents duplication of vote and allow voter to vote in their comfort zone.*

Keywords: *Firestore, Android 3.0.2, Fingerprint, Face Verification, Mobile Voting.*

I. INTRODUCTION

Voting is the fundamental right in any democracy[1]. It expresses the choice of the people and upholds the meaning of a system governed by the people's choice. Any voting system must maintain the privacy of voters, and should maintain that only enrolled voters are allowed to cast their vote.

Only one vote per person should be maintained, there should not be an opportunity for authorities to swindle the vote counts or choice, and there should not be any receipt of the voting account. The system should also display transparency but be discrete in the procedure, and finally it should be an accurate system that can withstand the usage of multiple voters. Different mechanisms have been introduced in various nations around the world to help accommodate the needs to progress into the best possible voting system. The voting process is been fully manual and paper based. This process can be overwhelming, time-consuming and prone to security breaches and electoral fraud.

Over the years technology related systems were developed to resolve some of these issues like Electronic based voting that is been actively used for voting in countries like India and so. However these systems were still prone to electoral frauds and voters has to make tremendous effort in order to cast their ballots.[2] Electronic voting technology can include punched cards, optical scan voting systems and specialized voting kiosk.

This process cleared up lots of problems and barriers faced by the paper based voting process, however problems of long lingering lines still persists on the day of voting. Not enough persons are voting simply because citizens just can't be bothered because of the time it consumes. Persons neglect that aspect of their civil right because the registration process is tedious and by extension the voting process can be time consuming.

Another reason for the lack of participation within the voting process is that of security. Even though everyone may have a civil right to vote in a democratic country, persons may not want to turn up at the polling station in fear that they may be bullied into voting for someone that they don't wish to vote for. Or in some cases political riots may occur because of different allegiance to the various political parties. Another reason is that person may vote fictitiously, hence using votes illegally. Also if they have. These are just a few reasons why person may be reluctant to exercise their rights to vote. Stats of expenses for 2014 national elections in India were as follows: 1) Over 5 billion dollar were spend on elections, yet government spend exceed upto 3500 crores excluding security and political party expenses. 2) Nation came for stand still nearly for 2 months conducting over 9 phases in 35 days. 3) 10 million officials were deployed including police and security. 4) 930000 polling booths were set up. 5) And last but not the list counting was held in 989 centers. Hence with all these in mind, we here propose Mobile based voting application that will erase all these issues. With this application, a person can vote from anywhere they are around the country.

II. LITERATURE SURVEY

A. *Biometric Secured Mobile Voting[1]*

In as stated by the authors voting process being paper based and fully manual; has been tedious, time consuming and are prone to security breaches. Over the years as technology evolved, methods changed and electronic voting systems were introduced. In country like India electronic based voting systems were actively being used. However the system still face issues like electoral frauds and it took tremendous efforts for the voters to cast their votes. The paper introduced us with three methodologies: 1. Paper based voting 2. Electronic voting 3. Smart card in voting.

Paper based voting and electronic voting had a common drawbacks of vote duplication. A smart card is a device having major hardware constraints that are low power CPU, low data rate serial I/O, little memory (typically 1-4 kb RAM, 32-128 kb ROM and 16-64 kb Flash RAM).

They were used for banking transactions, security access at work places and in recent times used as part of an Electoral Voting process. The use of the smart cards and kiosk made a significant leap in voting technology as persons were able to vote within their own comfort zone.

The need for the various human security bodies was eradicated. Provided anyone who is eligible to vote must have a pre-program smart card.

The voting Kiosk is where all the action is located. To start, the voter must place the voter token into the particular slot. The voting kiosk seizes this token until the voter has exercised the right to vote successfully. After the token is seized, the kiosk will verify the authentication of the token, this is done by looking at the RV signed token, timestamp and the polling site id. This system however had disadvantages as cryptographic technology was not been used to ensure security and also voters could vote multiple times without the help of inside knowledge.

There was also a bottleneck as persons would still have to stand in line in order to cast their votes. Taking all this is consideration the authors in proposed a biometric based mobile voting system using Android 3. Here biometrics play an important role as finger prints are unique which ensures to prevent security breaches.

B. *Development of electronic Voting Machine with the Inclusion of Near Field Communication ID Cards and Biometric Fingerprint Identifier[2]*

In this main focus was to eradicate duplication of votes. The authors developed an electronic voting machine with inclusion of near field communication ID Cards and biometric fingerprint identifier. The system included NFC controller shield for Arduino, optical fingerprint sensor, 16x2 LCD display, Arduino UNO, Arduino mega and Raspberry Pi. To ensure that the voter cannot vote more than once the information in each voters ID card was manipulated once they have casted their vote. Once the device is connected, the process of system is viewed through serial monitor on the Arduino software. After the NFC ID card is recognised it ask the user to input their fingerprint. Once the input finger print is matched it is proceeded to vote. The buttons sends signals to the Arduino and the corresponding candidates vote count is incremented.

C. *Online Voting System for India based on Aadhar Card[3]*

In the authors proposed model with greater security in context with passwords. To confirm vote password is confirmed first and then the vote is accepted in main database of election commission of India. Here Aadhar card number is used as the unique identity and is the centre point of the proposed model.

D. *Model for a Mobile Phone Voting system for South Africa[4]*

In the authors developed a mobile phone voting system which allows users to spontaneously vote timeously using cellular network service providers. As the use of mobile phones became extensive is short period of time, the thought evolved that when such devices are available why not use it for saving time, cost and implement a secured methodology of casting a vote. For implementation the authors used Microsoft C#, MySQL Server 2008.

Comprising these all we have proposed a mobile based voting application with Aadhar card verification to prevent duplication of vote and biometrics to authenticate users.

III. PROPOSED SYSTEM ARCHITECTURE

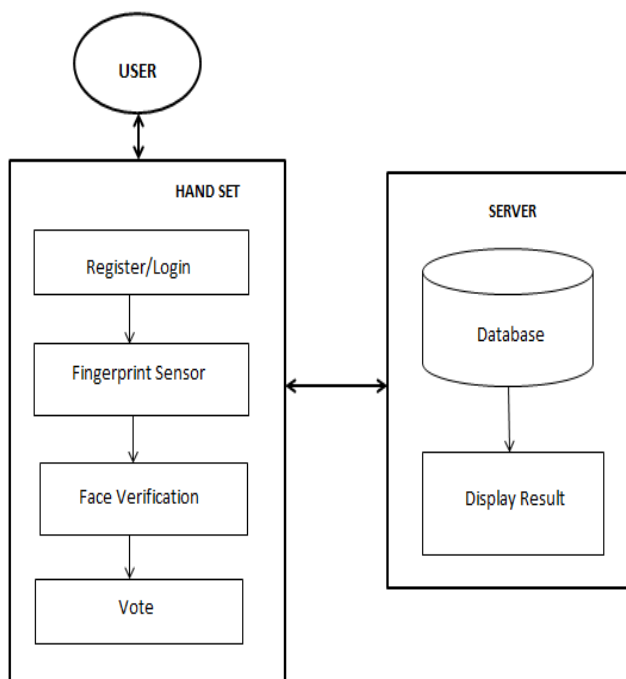


Fig1. Architecture of Proposed System

The proposed system has 3 main entities as follows:

A. User

The user enters his/her details in the handset so that the system can verify the user in future and all data will be saved in the firebase database. The user provides name, date of birth, Aadhar card number and phone number details. The module checks whether the entered user is valid or not by comparing it to the aadhar card database.

B. Handset

The handset is user's smart phone. Now a days smart phones have both fingerprint sensors and face scan options. The handset will act as an input device and take the details of user to store it in the database. Post verification, user can create poll for voting or cast vote that will be stored in database, the user will get notified about the same.. Lastly it shows the result passed from the database.

- 1) Register: In the proposed system, the user registers with the following fields: name, date of birth, phone number, aadhar card number. On triggering the register button, the user details shall be stored in the database. User will receive an OTP on that phone number via SMS. This OTP verifies the authenticity of the user.
- 2) Login: While logging in, the user have to enter the password which was set during the registration. Once the password is approved, it asks for fingerprint of user as the second stage of security. Once the finger is verified, it will go for next module that is Face verification.
- 3) Fingerprint sensor : After successful login, the next step is to verify the Users fingerprint. The user will have to give the fingerprint and the system will match the fingerprints from the mobile database and the fingerprint provided by the user. If the fingerprint match, it will give move to the next step for the facial scan of the user. For fingerprint verification, we'll use the fingerprint pad on the smart phones.
- 4) Face verification: For the face verification, the system will use the camera on the handset. The database will already have the face of the user from the database. The proposed system will match the input face with that stored in the database. If matched, it will confirm that the user is verified and is valid to vote for the candidates. It will allow the user to vote. In this system Microsoft Azure with cognitive service face API is used. This calculates the confidence number that is nothing but the probability of how similar or same the faces are

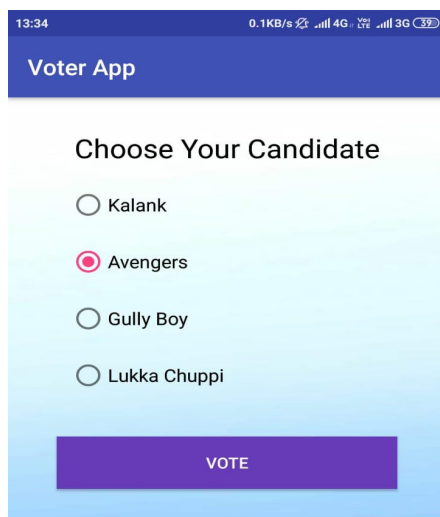
C. Server

The server will have the database of the user who have logged in, the database of the candidate for the election, the database of the Aadhar card details. Firebase is used as database in this project. It contains the following tables related to Candidate name, polls, login details and the votes. The logged in or registered user is marked which will prevent duplication vote. The database analyses the votes and it will pass the result to the next entity of displaying the result.

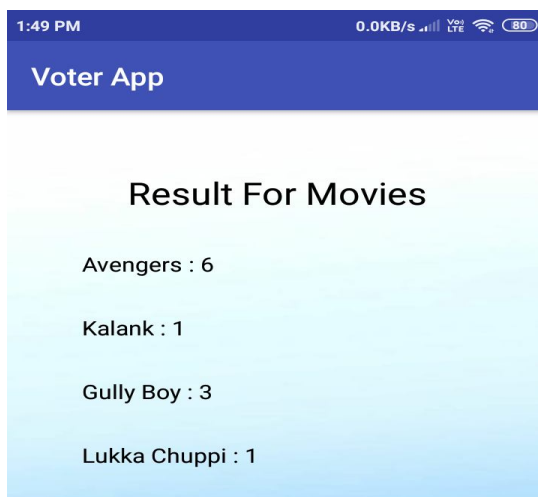
1) *Display Result*: The votes for the candidates will be counted and displayed on the screen.

IV. RESULT

By using Android studio, Firebase and Microsoft Azure with cognitive service face, you can see following are the snapshot of what we have done till now. The successful use of Android studio, firebase and Microsoft Azure with cognitive service face is done. The application takes registration details, allows to login only when provided by proper password and fingerprint, allows user to create or vote for suitable candidate.



Voting for candidate.



Result of voting.

V. CONCLUSION

In this project, we have successfully implemented our mobile based voting application and using Firebase as it's database. This Application allows the user to create and vote for the candidates without being physically present at the polling booth. The application is secured and does not allow the user to vote again or to register again with the same phone number or same aadhar card number. The face verification module was not integrated in this application, as 'Microsoft Azure with cognitive service face API' is not a free-source. But a different module was created for it.



VI.FUTURE SCOPE

As of now, this is just a small scale application. This application can be used on a large scale like for Government elections, if added more security features. Microsoft Azure with cognitive service is not integrated in this application but in future it can be integrated, so to get more security. This is an open source but we need to pay for the service after a certain period of time. Also it detects any facial expression no matter even if it is a portrait or a statue. Hence we will find an open source without cost consumption and work with the detection drawback and then integrate it to our current module.

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