# Android Voting System Using Facial Recognition

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**Abstract**: With the conceptualization of e-Voting, the voting process will be revolutionized. Till date, voting has been conducted either manually through ballot papers or using the electronic voting machines (EVMs) that are based on the Direct Response Electronic (DRE) or the Identical Ballot Boxes. For multinational companies and organizations, a more digitalized and convenient method of voting has been in demand. With the e-voting Android application, voting can be conducted using any Android mobile device. Our proposed application system will allow users to cast a vote on any survey question created by an administrator. Login will be fully authenticated using a novel two step process – finger printing and facial recognition. Post development of this application, several enhancements can be made to the system, in order to fully customize the experience for the users.

**Keywords**: ICT, Android, voting, application, e-voting

## I. INTRODUCTION

In present day, employment of one's democratic rights has become increasingly important. To comprehensively exercise the privilege of choice, societies have become equipped with education as a means of exchanging and communicating ideas and beliefs. This exchange of ideas and increased communication has been made easy through the advancements in ICT. In particular, the mobile phone has become a versatile tool for communication, entertainment, education, gaming and for commercial work in businesses and organizations. Hence, the last decade has seen a rise in the development of applications to accommodate users in every aspect of their lives. The use of Android platform to develop an e-voting system is a concept in its infancy that aims at making vote counting simple and accessible, especially for businesses that require constant employee feedback.(1) .

## II. LITERATURE SURVEY

Existing system:
Currently, e-voting applications using an Android-based system, such as ePoll Plus by Karvy Computershare Pvt Ltd. and Online Voting System – Ballot by New York Software Services LLP (2), have been developed in other countries and have gained immense popularity and positive feedback. In India, electronic voting machines (EVMs) (3) have been employed to collect votes from the general public during election periods. EVMs are based on two systems: Direct Recording Electronic (DRE) and Identical Ballot Boxes. Despite the use of EVMs, e-voting applications for mobile phones have yet to be developed for commercial use in India.

## III. PROPOSED SYSTEM

In our proposed system, we develop an Android-based application that allows users to cast votes using their mobile phones. Voting will be done through a mobile phone. Throughout the voting process, an internet connection is essential. The issues or arguments will be fed into the system by the administrator and employees can then vote yes or no, in response to the survey question. Users can only vote once for any given argument and each vote recorded in the system is stored against it. The proposed application has been designed specifically for organisations and businesses that require constant employee feedback in response to new policies, regulations and issues. However, since voting is a common and convenient form of providing and receiving feedback, this proposed application remains useful for any group that requires vote counting.

The process of E-voting:
i. Registration: first-time users will need to download the application from a source. After installation, they will be required to sign up using a username and password. For subsequent logins, users will verify their identities using fingerprint and facial recognition. Thus, registration also requires users to provide a fingerprint and an image using the camera application which will be stored in the online database against that username.

ii. Authentication: users will be required to verify their identity in two steps. Users will provide a fingerprint and if correctly matched with the one stored in the online database, the application will take an image of the user, using the camera application. If correctly matched with the image.

## III.   SYSTEM ARCHITECTURE

The proposed system's (Figure 1) user interface will have two login pages – user login and administrator login. In user login, first-time users will designate a username and password for their application use. This information will be stored in the online database for retrieval during subsequent logins.

Users wishing to access the voting portal after registration will verify their identity through two steps – fingerprint and facial recognition. Upon login, users will provide a fingerprint and then an image, taken via the camera application. Both forms of data will be matched to that stored in the online database, against the given username.

## IV.   FUNCTIONAL MODULES

1. Login/Register Module (Figure 1A): users will give their information to make their account in order to get access to the voting system and into the modules which contains details about the elections. Authorisation Module: this module consists of all the details and methods used to authenticate users to continue using the app.
2. Fingerprint Authorisation (Figure 1B): after sign-in, users are required to be authenticated using the fingerprint sensor built in the mobile phone. This provides an additional layer of security. View Elections/Polls: this module consists of all the elections that are available on the server database. These are pulled from the server by making appropriate calls to the server.
3. Cast-a-Vote (Figure 1C): users can view the elections by opening the 'all elections' module of the app. Upon selection of a particular election from the list, the user can vote on it using the given options. View Election Status: this module consists of all the elections that are available on the server details or of any other employee. This section can help users in validating as well as verifying the elections that they have voted in, hence providing a way of keeping proof of user votes and elections.
4. Create an Election (Figure 1D): organization officers (app administrator) have the ability to create elections within their organizations, either for the entire community to vote in or exclusive to organization members. The elections are based on policies that are awaiting implementation in the office. A user that creates an election can look at the details and figure out votes of that election. View Election Status: application administrator can authorize the users (employees of the organization). The administrator can check details of the users and can authorize them explicitly. This feature mainly authorizes the users whether they are valid to vote or not. Application administrator as well as access level 2 or higher users can access this site on the application to verify user integrity.
5. User Data in App (Figure 1E): user data section will contain the details of the various employees of the organization. In this section, the application administrator as well as the other employees will be able to view their database. These are pulled from the server by making appropriate calls to the server. Election status: election status shows the status of the elections i.e. which elections are active /inactive. It also shows how many votes have been given to which particular election and provides a detailed report of the status of the various elections.
6. Facial Recognition Authentication (Figure 1F): facial recognition system is capable of identifying or verifying a person from a digital image or a video frame from a video source. One of the ways to do this is by comparing selected facial features from the image and a face database. It is typically used in security systems and can be compared to other biometrics such as fingerprints. Facial recognition is used in the application to carry out additional authentication for the login in the portal.

## V.   HARDWARE AND SOFTWARE REQUIREMENTS

Hardware: Android mobile with minimum Android Kitkat. (Android 4.4 and above). To support such level of Android, the device has certain hardware requirements (Table 1).
Software: Android Kitkat; better if Android Lollipop.

## VI.   FUTURE ENHANCEMENTS

In our proposed system, we aim to deliver a basic e-voting application that enables voting and vote counting to be performed. In the future, this simple model can be enhanced and extended by customizing it according to user requirements. User login can be diversified by enabling access using the Aadhaar card API. Organizations with greater concerns regarding their security can make use of sturdier encryption algorithms to collate votes and process results.(4) Fenhancements and improvements that can be made in relation to the e-voting application.

## VII.     CONCLUSION

The development of an e-voting application paves the way for digital voting and effective feedback delivery, especially for commercial use. This will be most beneficial to the organizations and businesses that require constant employee feedback. Through this application, vote counting will become simplistic since it is based on querying the database. A stable internet connection is the sole requirement for operation and utilization of this application, thus it will become an inexpensive and time-saving alternative to existing electronic voting systems.

## REFERENCES

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[5]   Elmasri and Navathe "Fundamentals of Database Systems, 6th Edition, Pearson Education, or larger organisations, with geographically dispersed branches, centralised servers and cloud storage can be utilised. In our proposal system we have made use of fingerprinting and facial recognition, however other biometrics like retina scan can be incorporated into the system by making appropriate hardware and software modifications.(5) Overall, there is a wide range of

Fig. 1System architecture
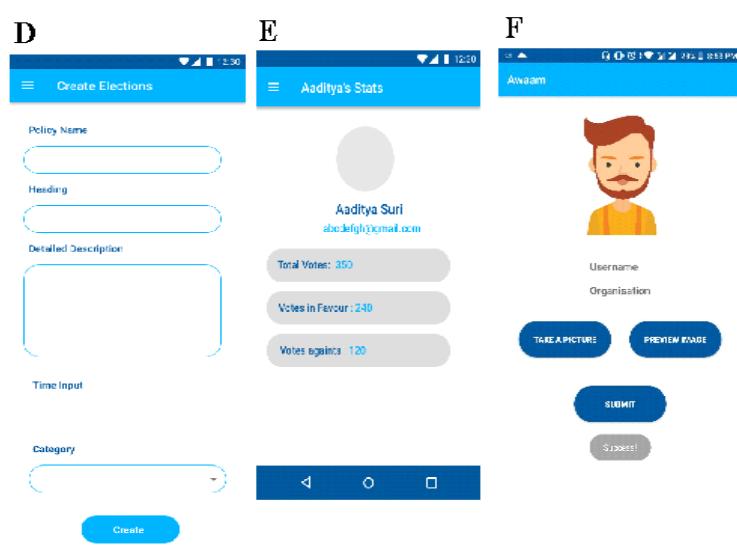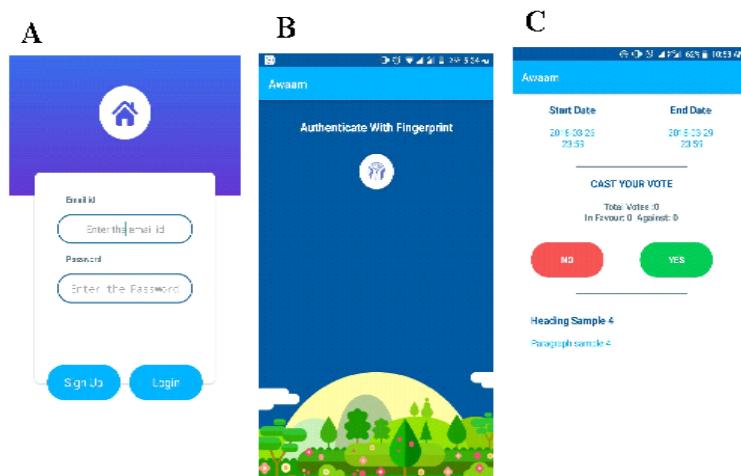


Fig. 2.  Functional Modules of the Application

TABLE I
HARDWARE REQUIREMENTS FOR APPLICATION

| | |
|---|---|
| **Operating system** | Android 4.2, Android 4.4.2, or Android 4.4.4 |
| **Processor** | Intel Atom® Processor Z2520 1.2 GHz, or faster processor |
| **Storage** | Between 850 MB and 1.2 GB, depending on the language version |
| **RAM** | Minimum of 512 MB, 2 GB is recommended |
| **Hard Disk** | • 2 GB of available hard-disk space for installation; extra free space is required during installation.<br>• You cannot install using a removable flash storage device. |
| **Video** | 1280 x 800 pixels or higher on a 10-inch device |
| **Software** | PDF viewer |
| **Browser/Internet** | • This application is designed to work offline.<br>• To download and launch Google Play* Store apps within the application, a high-speed Internet connection is recommended. |