ANDROID MOBILE BASED VOTING MACHINE

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Abstract-

India is largest democracy in the world .Every citizen above 18 years has right to vote. Earlier in India, the voting process was mostly manual and paper based. In election a voter used ballot paper to cast his vote. This process is time consuming and very much prone to security, error and fraud. To overcome some of these issues, now a day paper based voting system was changed to electronic voting machine which is more secured. But still voters have to take tremendous effort to cast their ballots.

We all know that the power of today's information and communication technologies. The advancement in wireless and web technologies given rise to the new applications in e-Government services such as online tax filing, license renewal, and benefits claims. Mobile technology has attained heights and the market trend is that every citizens of India will possess a handset by the year 2020 at cheaper rates of service. When such a PDA is available why not mobile using it for a time saving, cost effective, secured method of voting? So considering these areas, this paper presents mobile voting system with biometrics authentication. The proposed work uses android mobile OS to develop an application and fingerprint supported biometric control information to make voting process more secure. Using android smart mobile device makes the system even more robust.

*Keywords-**Electronic Voting, Mobile Voting, SSL, Android, Open Source OS, Fingerprinting Technology.***

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INTRODUCTION

In India, voting is an important tool to collect and reflect people's opinions. So it must be more efficient, reliable, and secure. Traditionally, voting is conducted in centralized or distributed places called voting booths. Voters go to voting booths and cast their votes under the supervision of authorized parties. The voting process is been fully manual and paper based. In some cases there may be needs for recounts. These processes are often tedious, inaccurate, and risky and in some cases the final count may be skewed this manual process leaves windows for errors, political dishonesty and political fraud. With the rapid development of computer technology and cryptographic methods, electronic voting systems can be employed that replace the inefficient and most importantly error-prone human component. To increase the efficiency and accuracy of voting procedures, computerized voting systems were developed to help collecting and counting the votes. These include Lever Voting Machines, Punched Cards for Voting, Optical Mark-Sense Scanners and Direct Recording Electronic (DRE) votingsystems. [1][2]

Electronic voting machines cleared up lots of problems and barriers faced by the paper based voting process, but still people neglect that aspect of their civil right because the registration process is tedious and they have to take tremendous effort to cast their ballots. Voters have to go voting booths stand in long lingering line on the day of voting. Because of long lingering line, voting process which is actually few minutes process, takes whole day of people.For a variety of reasons, voters may be unable to attend voting booths physically, but need to vote remotely, for example, from home or while travelling abroad. Hence, there is great demand for remote voting procedures that are easy, transparent, and, most importantly secure. Another reason for the lack of participation within the voting process is that of security. In some cases political riots may occur because of different allegiance to the various political parties. Voters may not want to turn up at the polling station in fear that.

Voting for any social issue is essential for modern democratic societies now a day. So it is becoming very important to make the voting process more easy and efficient. In other hand the rapid development in operating system of the mobile phones gives rise to the application development on the large scale. This paper presents voting system on android mobile with biometrics authentication. The main reason behind the tremendous development in android application development is that the android is an open source operating system. It means that the developers can have customization rights. As well as the SDK provides tools to build and run

android applications. The paper is divided in four parts. The first part describes the literature survey i.e. Indian Voting Machine. Then the further parts will describe about the proposed Android Mobile Voting architecture, Design Flow, Technology Specifications like advantages and disadvantages.

I. INDIAN VOTING MACHINES

Electronic Voting Machines ("EVM") are being used in Indian General and State Elections to implement electronic voting in part from 1999 elections and in total since 2002 elections. The EVMs reduce the time in both casting a vote and declaring the results compared to the old paper ballot system. Indian voting machines use a two-piece system with a balloting unit presenting the voter with a button (momentary switch) for each choice connected by a cable to an electronic ballot box.

An EVM consists of two units:

- Control Unit
- Balloting Unit

The two units are joined by a five-meter cable. The Control Unit is with the Presiding Officer or a Polling Officer and the Balloting Unit is placed inside the voting compartment. Instead of issuing a ballot paper, the Polling Officer in-charge of the Control Unit will press the Ballot Button. This will enable the voter to cast his vote by pressing the blue button on the Balloting Unit against the candidate and symbol of his choice.

The controller used in EVMs has its operating program etched permanently in silicon at the time of manufacturing by the manufacturer. No one (including the manufacturer) can change the program once the controller is manufactured.[3]

Fig 1:Bollot unit(left), Controll unit(right)

A. The benefits of e-voting

E-voting systems offer multiple advantages that increase citizen access to democratic processes and encourage participation.

• Reduced costs - E-voting systems reduce the materials required for printing and distributing ballots. Internet based voting, in particular, offers superior economies of scale in regard to the size of the electoral roll.

• Increased participation and voting options - E-voting offers increased convenience to the voter, encourages more voters to cast their votes remotely, and increases the likelihood of participation for mobile voters. Additionally, it permits access to more information regarding voting options.

• Greater speed and accuracy placing and tallying votes -E-voting's step-by-step processes help minimize the number of miscast votes. The electronic gathering and counting of ballots reduces the amount of time spent tallying votes and delivering results.

• Greater accessibility for the disabled - Because they support a variety of interfaces and accessibility features, e-voting systems allow citizens with disabilities-especially the visually impaired-to vote independently and privately.

• Flexibility - E-voting can support multiple languages, and the flexible design allows up-to-the minute ballot modifications.

II. PROPOSED ARCHITECTURE

Mobile technology has attained heights and the market trend is that every citizens of India will possess a mobile handset by the year 2020 (at cheaper rates of service.) When such a GSM is available why not using it for a time saving, cost effective, secured method of voting. GSM is a digital wireless network standard widely used in European and Asian countries. It provides a common set of compatible services and capabilities to all GSM mobile users. The services and security features to subscribers are subscriber identity confidentiality, subscriber identity authentication, user data confidentiality on physical connections, connectionless user data confidentiality and signaling information element confidentiality.[4]

In proposed system where the voting machine works on an embedded system with a memory unit kept at the main office. The machine can be used for normal voting and mobile voting also. The mobile users have to dial a designated phone number and follow the instructions using a password already provided. The machine is very useful and can be used for infinite users with

very high security, as the main memory unit will be kept with the Central office, which makes the booth capturing virtually impossible. Instant results can be gathered by using this remote machine at the main office. This was tried during 2000 Kerala election in India [4].

To enforce security and confidentiality of voter which cannot be altered, this Mobile Voting project uses Biometrics Technology and cryptography. Biometrics technology is an irrefutable verification or identification of a person by various physiological characteristics, which cannot be transferred or copied. So based on that Biometric based Mobile voting is been proposed based on mobile technology from the client side, with use of Android (3.0) [5] and VeriSign for trusted SSL Certificate , and integrated secure access level databases from the server side.

Elections in India are conducted by Election Commission of India. To explain the proposed Mobile Voting application, the Election Commission office should be maintain information of eligible voters and set of participants who tries to access the E-voting application which use the application available on Android smart phones. For the implementation of the application on the Android phones, it is assumed that every voter's device associated to its owner, through a validation database. Even though the system enables voters to poll their vote from anywhere, initially the voters should have to provide their voter id number to authenticate themselves and establish their user-ids.[3]

The Android operating system will be used in conjunction with the mobile device. The mobile device will be sensitive to capture biometrics information, for example high tech camera and scanning capabilities to capture ridges of the finger prints. Each voter will be assigned to a mobile device hence government would have tied their biometrics information to the device at the time of verification. To store and manage data in an accurate and secure way the government database will use Microsoft Sql Server as the database. The database architecture will be separated into two levels. There will be two levels of Servers also. Firstly theConstituency Level; this database will be able to view datawhich are pertaining to voters and politicians within therespective constituencies. Each constituency will have thesame database architecture structure. The Constituency leveldatabase will allow ballot casting and counting. This willmake the counting of ballots easier. Authentication andverification will also be done at the constituency level. Onlyvoters found in a particular constituency database will beallowed to vote in that constituency. The second layer ofdatabase in the Architecture is the General (or main) DatabaseLevel. This layer of database is like a watch dog. It monitorsthe validity of the

information it captures and stores voters'and politicians' information for all constituencies. Itcommunicates with all the constituency level databases toensure that person doesn't vote in more than one constituency.And it tallies all the votes by constituency the Architecture ofthe proposed system and is shown in Fig.2

For the purpose of this research the smart phone must be compatible with the Android 3.0 Operating System.[6] The mobile company will register the SIM and phone identity to the individual. Users will go to their constituency office to register their information in voter's list and get their fingerprints scanned along with the verification of residential addresses and other personal information. This information will be authenticated at the Authentication Centre. It is of most importance that the system should be highly secured.The biometric data, cryptography and the use of a secure socket layer technology will enforce the level of security needed.[7][8]

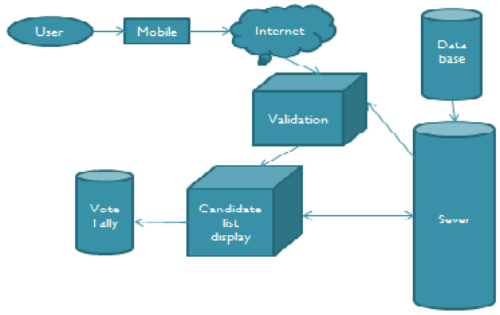

Fig.2 Architecture of Mobile Voting System

With the Android 3.0 it offers all the tools developers need to create incredible visible in interaction experiences on the devices, which includes but not limited to:[9][10]

- Fast and easy to create great apps
- High-performance 2D and 3D graphics
- Enhancements for enterprise
- Compatibility with existing apps
- High security
- Sqlite
- Large screen.
- High tech camera.

III DESIGN FLOW

A. The Components:

• *Mobile Equipment (ME):* In electronic voting schemes, voters need to use dedicated voting devices to cast their votes electronically, for instance, Internet connected computers or DRE machines. In our scheme, the voting device corresponds to the GSM mobile equipment (ME), which consists of a GSM SIM card and a GSM card reader.

• *Authentication Centre (AC):* AC is an entity within the GSM network, AC generates the authentication parameters and authenticates the mobile equipment.

• *Verification Server (VS):* VS belongs to the voting authority, who organizes the voting event. It verifies the legitimacy of the voter and issues a voting token to the voter. VS also publishes a list of voter information.

• *Collecting and Counting Server (CS):* CS is the server that collects and counts the votes to give the final result. CS's action need to be audited by all candidate parties.

B. Structural Implementation

The structural outline process of mobile voting system is as below:

1. Voters and prospective voters will open the application without the security and login requirements.

2. If the user intends to Voting process from his mobile device then they he should register his mobile number by passing his information and fingerprint to sever side.

3. If user is authenticated and identified then he will get fingerprint image and URN(unik referncne number) for login.

4. If the user have already registered and authenticated by their finger-print then they can login using their

Finger-print and URN.

5. After authentication and identification, the candidates list will open and user cas cast his vote.

6. A user also has the option to change his/her information such as phone information (in the case of a lost or stolen phone), and also address information. To get access to this functionality, users will have to supply finger-print and voter's ID.

7. The fingerprint information is encrypted and sent to the government server along with the voter's ID. (The government server also has an encryption algorithm which is identical to encrypt finger-prints to make a match)

8.If the user chooses to register then information is stored on the government databases and server but they are not allowed to vote or make changes to any information given until all information are verified and then authenticated by submission of finger-print in person.

9. After the user have submitted the correct finger-print from the correct phone and also provide the correctvoter's ID then the server will authenticate the voter. After which the voter is now permitted to vote.

10. When the voter cast his/her vote then voter status will be changed and also the party count will increase as per the voter's choice. The voter's identity however will not be tied to the party which he/she voted for.

11.This information is then stored on the government server and databases.

C. Application start up presents the user with 4 options:

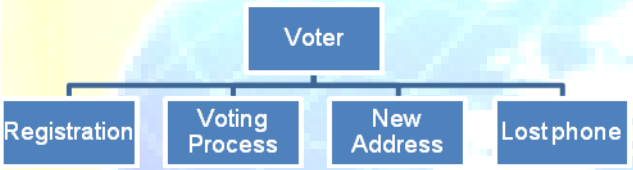

Fig3. Application start up

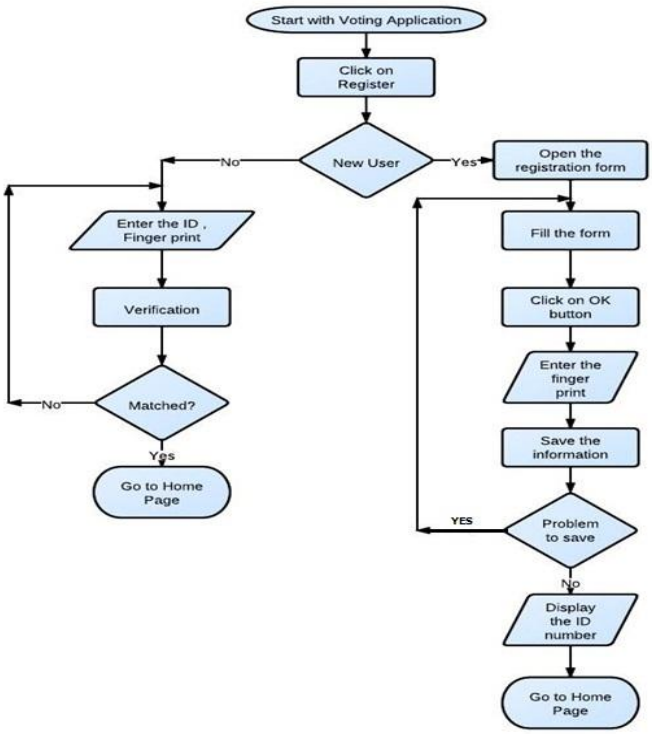

Fig4.Android Mobile Voting Application Flow Char

IV. TECHNOLOGY SPECIFICATIONS

A. The most important requirements for e-voting can be characterized as:

- Eligible voter is authenticated by his/her unique characteristics.
- Eligible voters are not allowed to cast more than one vote.
- Votes are secret.
- Auditors can check whether all correct cast ballots participated in the computation of the final tally.
- Result of election should be secret until the end of an election.
- While voting is on, there should not be a method of knowing intermediate result that can affect the remaining voter's decisions.
- All valid votes must be counted correctly and the system outputs the final tally.
- It must be possible to repeat the computation of the final tally.

B. Advantages of Android Based Mobile Voting Machine

1) Unique identification of voter: As we are using unique voter id list provided by Government so each voter can be get uniquely identified.

2) Accurate vote counting: There is no duplication of the voters which helps in counting the accurate number of votes only.

3) Portable system. The system in on Android smart phone which itself is a portable device so the system is portable.

4) This is less time consuming so it improves participation of voters.

5) No fraud vote can be submitted.

6) Because of Fingerprint Biometric Technology for authentication system become more accuracy and security.

7) It eliminates the possibility of invalid and doubtful votes and reduces bogus voting.

8)System is Eco-friendly.

C. Disadvantages of Android Based Mobile Voting Machine:

1) Device dependency: The application is only for an Android smart phone. So this is device dependent.

2) Failure of device: If sometimes Android phone is get failure because of other applications of an phone, then user is not able to run the e-voting application

CONCLUSSION AND FUTURE SCOPE

The main purpose of this paper to develop a time saving, cost effective, secure E-voting application on an android platform. The usability of this system is very high if it will use in real life election process. It will definitely helpful for the users who wish to vote and the voting process will be made very easy by using this application. The system in on Android smart phone which itself is a portable device so the system is portable. Which makes Voting process for users easy , time saving and safe.

Future developments in this system that application should be device independent and Registration including fingerprint and Address verification also should be automated over internet instead of going to electoral office. Also for future development, an additional biometric feature could be added to strengthen security such as eye.

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