



Mobile e-Voting Service for m-Governance in Ethiopia

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ABSTRACT: Voting is the vital part of democratic process to ensure one's decisions to elect their leaders in transparent way. So it is becoming very important to make the voting process more easy and efficient. Traditional voting technologies include hand-counted paper ballots and then the electronic voting machines. These traditional methods have many drawbacks. In order to overcome these drawbacks, we use an android-based e-voting system, which gives the privacy in expressing their decisions to elect their representatives. The android platform gives the portability to the application.

Android e-voting system on smart phones is an application with an interface for consultation to a dynamic web page which allows the user to cast their vote from anywhere in the world. E-voting system provides several other advantages like cost reduction, greater accessibility for the disabled, increased participation and voting options in a secured environment.

KEY WORDS : E-voting, Privacy, Android

I. INTRODUCTION

Elections are a critical component of any democracy, whether they are considered 'safety' or 'mission' critical. Elections decide the fate of countries and their citizens, so while the introduction of e-voting may seem like a natural step in the modern world, it is one that should be taken with caution.

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. Internet census takes precautions to prevent people from stuffing the ballot box; they generally do so at the expense of voter privacy. Recent democratic elections using voting machines have shown that the winning margins could be less than the error margins of the voting systems themselves, making election an error prone task. Electronic voting systems provide some characteristic over traditional voting technique. Formerly when elections were made traditionally, organizers determine who is eligible to vote. This may involve a formal registration period or an announcement that anyone who is a member of a certain group as of a certain time may vote. Once the election begins, administrators may validate the credentials of those attempting to vote. This way could involve asking voters for identification cards or passwords. Generally, this procedure also involves keeping track of who has already voted so that eligible voters may vote only once.

Moreover, the traditional way of voting generates mores constraints; election fraud could be prevented by using physical security measures, audit trails, and observers representing of all parties involved. But the prevention of election fraud is made more difficult by the frequent requirement that votes remain private.

Contrarily to the traditional way of voting, electronic voting is essential because it considers ways in which the polling tasks can be performed electronically without sacrificing voter privacy or introducing opportunities for fraud. In order to determine whether a system performs these tasks well, it is useful to develop a set of criteria for



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evaluating system performance. The criteria to be developed are such as accuracy, democracy, convenience, flexibility, privacy, verifiability and mobility. The aim of this system is to develop a general prototype system that provides security and trusted electronic voting system.

II. HISTORY

EXISTING SYSTEM-Electronic Voting Machines ("EVM"). EVM's are being used in advanced countries for General and State Elections to implement electronic voting. The EVMs reduce the time in both casting a vote and declaring the results compared to the old paper ballot system.

However, EVMs have been under a cloud of suspicion over their alleged tamperability and security problems during elections. Advanced countries introduced EVMs with Voter-verified paper audit trail (VVPAT) system.

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.

III. PROPOSED SYSTEM

We propose an Android-based E-Voting system, which gives the privacy in expressing their decisions to elect their representatives. The android platform gives the portability to the application. Portability of the application leads to increase in percentage of voter participation in elections.

The E-Voting system described in the document enables secure voting, provided that sufficient organisational, physical and technical security measures are implemented, a basis for conducting E-Voting at least as securely as traditional voting.

This system has several advantages that had been achieved. The advantages of the system are as follows:

- Unique identification of voter: As we are using unique voter id list provided by Government so each voter can be get uniquely identified.
- Accurate vote counting: There is no duplication of the voters which helps in counting the accurate number of votes only.
- Portable system. The system is on Android smart phone which itself is an portable device so the system is portable.
- Improves participation of voters.
- No fraud vote can be submitted
- It gives confidence in voting system
- The legitimate voter is allowed to gain access to voting .
- The app is user friendly, in the sense that the user can easily understand the system though the user is a first time user. This is because the design is simple, attractive and do not have too many graphical items.

The E-Voting system to be discussed makes up a relatively small part of the whole Election process. From a technical viewpoint the elections are made up of the following components:

- Calling of elections,
- Registration of candidates,



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- Preparation of polling list,
- Voting (a subset of which is E-Voting)
- Counting of votes

Other components such as auditing, reviewing of complaints and other supporting activities could be mentioned. The E-Voting system discussed assumes that:

- a) Voter lists have been prepared and are available in a suitable format.
- b) The candidate lists have been prepared and are available in a suitable format.
- c) E-votes are counted separately and are later added to the rest of the votes.

In other words the input of the E-Voting system is made up from:

- a) Voter lists (including the polling division and constituency assigned to the voter),
- b) Candidate lists (by constituencies),
- c) expressed will of the voters,

And the output is made up from:

- a) Summarised voting result of e-voters,
- b) List of voters who used E-Voting.

IV. SYSTEM DESIGN

MODULES

The different modules include registration, contesting, voting and display result.

4.1. Registration

To participate in voting process, the user must get registered. To register he has to fill in the registration form provided by the Application. User has to enter his name, valid roll number, password, should confirm his password, email-id, 10-digit mobile number and branch. The user must enter all the details else he won't be registered as a voter. All these details submitted by the user are stored into databases maintained by Web Servers. Once a user gets registered, he can login into his account using his roll number and password.

4.2. Contesting

Registered users can only contest in the elections. In order to contest for any post, the user has to fill in the contestant form provided by the Application.

Name, branch and roll number of the registered user who want to contest will be retrieved by the Application. He has to give information of what he is contesting for and his motto. The contestant must enter all the details. All these details are updated into the databases maintained by the Web Servers. Once the user has contested, he is not allowed to contest again.

4.3 Voting

All the registered voters can cast their votes by logging into their accounts by entering user id and password. Clicking on vote button voter can view the list of the contestants nominating for the elections and also their respective profiles. All these information is retrieved from the databases present in the Web Servers. All the contestant nomination forms are scrutinised by the election officer who manually enters eligible contestants into a separate table in database. The records of this table are retrieved and displayed in the list of contestants from which voter casts his vote to candidate of his choice.

By clicking on the vote button, vote is casted after asking confirmation from the user. Once the user has casted his vote for any contestant, one vote is added against the candidate whom the vote is casted and recorded in the database. Once the user has casted his vote, he is not allowed to cast his vote to another contestant.



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4.4 Display Result

User can view the results of the elections by clicking on the results button. List of candidates and the number of votes polled per candidate are retrieved from the databases in Web Servers and displayed.

V. SYSTEM IMPLEMENTATION - TECHNOLOGIES USED

This project will be an application to be developed in android having

- Database Design (My SQL)
- Coding (PHP, ANDROID)
- Testing (XAMP SERVER, EMULATOR)
- Reporting Tool (DATA REPORT)

DATABASE

Database for system implementation are MYSQL Databases provided by Web Servers. It includes three tables voters table, contestants table and contestants1 table.

Voters Table

When the user submits the registration form after filling in the required details, all the entered details are stored in voters table in database. It keeps the list of all the registered voters.

Column	Type	Null
Rollno	varchar(10)	No
Name	varchar(100)	No
Password	varchar(20)	No
cont act no	int (10)	No
Email	varchar(100)	Yes
Branch	varchar(10)	Yes
castedVote	varchar(5)	No
Contested	varchar(5)	No
Code	varchar(100)	No

Voters Table Schema

Contestants Table Schema

When user fills in the Contestant Form provided by the application, all the details are stored into Contestants table.

Column	Type	Null
cname	varchar(100)	No
crollno	varchar(10)	No
cbranch	varchar(5)	No
cpost	varchar(10)	No
cdescription	varchar(150)	No

Contestants Table Schema



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Contestants1 Table Schema

Election Officer scrutinises the nominations received by the users and selects eligible candidates and enters the data of these eligible candidates into contestants1 table. The data from contestants1 table are retrieved by the application and are displayed as a list of contestants in the elections and allows the user to vote for an eligible candidate.

Column	Type	Null
crollno	varchar(10)	No
cname	varchar(100)	No
cbranch	varchar(5)	No
cpost	varchar(10)	No
cdescription	varchar(150)	No
votes	int (10)	No

Contestants1 Table Schema

VI. REQUIREMENTS

Functional Requirements

Enhancement to the E-Voting system will primarily provide a more precise vote management tool that will establish accountability and improve data accuracy, and thus allowing voters to feel a greater level of confidence in the reported data. The majority of the precinct managers, who will benefit from these enhancements, currently use their professional judgment and expertise to anticipate the voter's needs when making decisions.

They also rely on outside vendor data and poorly captured metrics from the current state of traditional voting system. Appropriate behaviour constitutes the functionality of a system and there is often a tight correspondence between particular requirements and particular functions of the solution system. The following represents a partial list of functional requirements for the E-Voting System:

- The system must provide voters with accurate data
- Metric reports of current/live votes must be provided
- It must adhere to government requirements
- The system must supply standard reports for decision making
- The system should allow voting administrators to make updates to the voter information database
- The system must verify responsible users ID and passwords
- The system must provide standard error checking
- The system must provide data integrity checks to ensure data remains consistent and updated

Major Constraints

When dealing with requirements engineering for any systems, there are some constraints that must be considered. The major constraints for the E-Voting System are:

1. Voting is carried out from many consoles on smartphones.
2. All voting is done in one day.
3. Many interfaces exist.
4. The operating system in use is ANDROID.
5. Many different levels of expertise in the system use will be prevalent.
6. Each state can administer the system differently depending on state laws.
7. Each state can have unique election and proposals, needing many different administrative interfaces.



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Non Functional Requirements

Non-functional requirements are requirements that are not specifically concerned with the functionality of a system. They normally place restrictions on the product being developed and the development process. Non-functional requirements may be regarded as parameters of functionality in that they determine how quickly, how accurately, how reliably, how securely, etc., functions must operate. Some of the E-Voting System's non-functional requirements are as follows:

- Response and net processing time must be acceptable by user and by application
- Defects in the local voting database file must be less than 0.0001%
- Defects contained in the collection server must be less than 0.0001%
- Defects in the database must be less than 0.0001%
- When checking the database for errors, a 100% scan of the data is required, rather than selecting a sample set.
- The system must be working at 100% peak efficiency during the voting process.
- Transfer of existing and future data to an Voting Management Data Centre must be granted.
- The system should be allow adding more voters to allow a greater connectivity rate
- The system should support response time for addressing severe issues in less than 5minutes, due to the shortness of the voting time frame.
- The system should provide documentation to inform users of system functionality and any change to the system
- The system should provide friendly graphical Interface to ensure ease of use when end users utilize system functionality.

VII. SOFTWARE AND HARDWARE REQUIREMENTS

- The software requirements for application development includes
- Eclipse IDE Software
- Android SDKs
- ADT Plugin for Eclipse
- XAMP Server

The hardware requirements for application developments include Processors like

- Pentium II, Pentium III, Pentium IV or higher. The requirements of RAM size is 128MB or higher and Hard Disk space is 130MB or higher.
- The requirements for application deployment include any Android based smart phone with version of 2.2 or higher and a web server which supports MYSQL Databases.

VIII. CONCLUSION AND FUTURE SCOPE

This system focused on the analysis of development of E-Voting application on an android platform. The system deals with how an E-Voting process should be designed and implemented in order to comply with the democratic election principles and rights and as well as to other human rights, which constitute the cornerstone of the legal civilization.

The usability of this system is very high if it is used in real life election process. It will definitely be helpful for the users who wish to vote and the voting process will be made very easy by using this application. Portability of this application also leads to increase in percentage of voter participation in elections. The scope of the system is limited to general college elections. It extends also to the general state elections and also includes every election or decision – making process, which takes place through voting.

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