



E-Voting System using Android and Web-Based Platform

Vishal Kulkarni, Mangesh Devraj, AjitSingh Chauhan, Anujkumar Pandey and Prof. Smita Chavan
Computer Engineering Department, PCCOE, Pune University
Sector 26, Nigdi Pradhikaran, Pune - India

Abstract: The exponential growth in the newer technologies like electronic gadgets and internet connectivity has led to many advancements in the existing systems and has provided a scope of many more such possible advancements. This research paper provides a detailed idea of the possible implementation of an efficient e-Voting system using web-based platform and also portrays the scope of deploying the idea onto an android platform making an android application that can be used instead of the website for the same known purpose. This idea easily depicts how the voting process can be made much more easy and efficient. This e-voting system promises the safest possible way to cast a vote and the best possible algorithm for calculation of the results. This paper provides the idea of the proposed system in terms of the specifications and requirements of the system. e-Voting basically means the process of voting done through an electronic device like personal computers, laptops or smart phones etc. In the starting, an introduction and brief idea is provided about the proposed system through a general diagram. This section is followed by the concepts, surveys, design and implementation details that would be made use of in the work.

Keywords: e-Voting, Android application, SMS Short Messaging Service, Web-based platform, Cipher key

I. INTRODUCTION

This paper presents an idea of the newly proposed system, its design parameters, its implementation techniques and parameters in detail. The proposed electronic voting application for the web-based platform along with an android application aims to provide the voters a clearly comfortable experience in the process of voting. The system makes sure that the new and efficient voting process does not make itself seem a long-drawn process just like the traditional way of voting process to the voters. This system makes sure the voters of the nation no longer have to shell out un-necessary money and invest more time in the voting process. The application shall be designed in such a way that makes sure of considering and working on all the system quality attributes like security, reliability, consistency, integrity and accuracy. It will make sure that the system is reliable, usable and also that it has a very promising user friendly interface. The application and the website, both shall be made sure of including some additional features like a customised help section for the new users to rely on, a secure login system, avoidance of multiple login instances from a single unique user irrespective of the instance login platform. This system specifically targets those voters who are unable to make it to the voting poll stations due to some specific set of reasons. This system in turn makes it very much possible to increase the total participation of the voters voting process. This paper explains the architecture and its components in detail in the following sections.

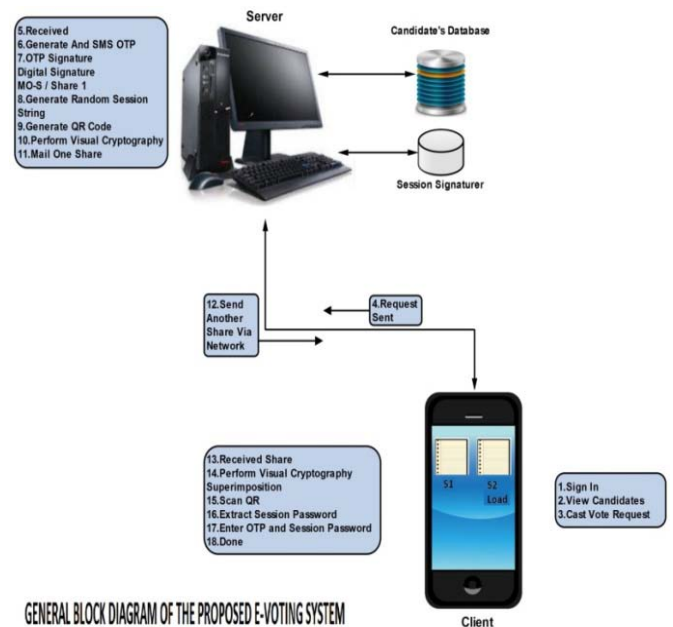


Figure.1 General Block Diagram Of The Proposed System

The figure 1 shows the general block diagram of the proposed e-voting system. The main focus is on the session One Time Password that is provided to the voter during the process of casting a vote. The One Time Password is nothing but a One-Time Password that is required to continue with the process of voting and this makes the system secure and free from misuse by an external party.

II. PROBLEMS WITH THE CURRENT PROCESS OF VOTING

The current election voting process can be more elaborated as a drawback to the efficient voting process. The existing process has more loopholes and more disadvantages than advantages. Though the current voting process promises transparency and reliability, the following observations can be made to support the explanation on why

there is a very need to have changes in the current voting system.

- a. Low voter participation
- b. Tendency to enjoy voting day as holiday rather than attending the voting process just because of the lengthy queues and time consuming process
- c. Long distance travel between the polling booth and voter
- d. Voters unavailability due to certain reasons like being out of station
- e. Vote counting procedure very slow due to manual process
- f. Human errors possible
- g. Low convenience for voters
- h. Vote manipulations possible
- i. Conventional voting results declaration takes time

The problems listed above reduce the active participation of the voters. So, all the problems listed above must be taken into consideration and an efficient voting system must be developed. Hence, an efficient e-Voting system using Android and Web-based platform is proposed.

III.LITERATURE SURVEY

An electronic voting system was implemented for the first time in Brazil [1] in 1996. In 1985, an automated electoral register was used by Brazil. The electronic ballot was developed in 1995. The system was made use of for the first time in the municipal elections of 1996.

The first voting experience through micro-computers was realised in the city of Brusque, Brazil. Initially the electronic ballot box was called as the EVC - Electronic Vote Collector.

Electoral system in India uses the electronic voting machines. India has 2 systems deployed for the process of voting, the first being the DRE - Direct Recording Electronic machine [4] and the second being the Identical Ballot Box [9]. A DRE system records the votes by means of the electronic display provided with the electro-optical components. These components are activated by the voter during the voting process. The Identical Ballot Boxes work in such a manner that they hold the ciphered vote. The ciphered vote is encrypted with the PMA voting key and the ciphered ID card number is encrypted with their personal 4 digit key.

As discussed in [5], Although India makes use of electronic voting machines, but still there is no adoption of online voting done. The online voting system is not implemented in India on a national level till now. A foundation is being laid for implementation of such system. Unique Identity cards are being provided to the citizens of India as a base work for the unique authentication of the citizens in India. This unique authentication id card number is being planned to be made use of in the national level online voting system implementation. The issue of these cards began in India in 2010, and still is going on. There is a plan to issue over 600 million unique identity cards to the citizens of India by the end of year 2015.

Internet Voting is growing in India at a very slow pace. The internet voting was first observed in India in the state of Gujarat. This trial was first carried out in September, 2010. The system was made use of later in the municipal elections that was held in April, 2011. The system used by Gujarat was developed by Scytl, a well-established internet voting

system provider which is based in Spain. The facts of the April, 2011 elections say that 77.16 percent of registered voters made use of the system efficiently and had cast their votes online, either from their home computers or from the kiosks.

The other implementations being carried out globally include the locations of Canada, Europe, United States and Australia. Municipal elections of Halifax and three Nova Scotia towns made use of the online voting system. The European countries are the most experienced ones in the online voting system. They have the most advanced online voting systems developed for the purpose of elections. The United Kingdom, the Netherlands, Spain, Germany, France, Switzerland [11] and Estonia, all these countries have trialled the online voting system. United States is being very cautious when it comes to online voting system. They have implemented the online voting system and trialled four times including the presidential elections in 2000 in Alaska and Arizona. The 2007 federal elections in Australia were through online voting system. The overseas defence personnel were issued a unique personal identification number to login to the online voting portal application via a secure internet. The other systems implemented earlier included usage of [10] thumb impression, the security provided was using steganography and cryptography. Face recognition system was also used for authentication system. The Caltech/MIT Voting Technology Project was used to develop a new voting technology to prevent a recurrence of the problems. [2] These problems had threatened the 2000 US Presidential Elections.

IV.FEATURES OF THE PROPOSED SYSTEM

The proposed e-Voting system is expected to exhibit certain features and quality attributes [3], [6] listed below:

A. Working Approach:

The complete process of working of the voting system shall be systematic. The data shall be properly stored and maintained in the database server, which will help in faster retrieval of records upon need. Also it will make the storing of information process efficient and faster.

B. Accuracy in the System:

The accuracy shall be maintained in the proposed system and the level of the accuracy shall be high. All operations done correctly shall be again verified to ensure accuracy of the system working process. This will lead to maintain the accuracy quality factor.

C. Increased Reliability:

The system shall be highly reliable due to the reasons stated above. The reasons above make sure that the system becomes reliable and very much efficient. The proper storage of necessary data and information is the main reason behind the increase in the reliability of the system. The system shall be made sure of resisting any sort of system failures so that there is no loss of data collected from the voters.

D. Redundancy Removed:

Utmost care is taken in this proposer voting system that no information is duplicated or manipulated in the storage or otherwise. This would make sure of the economic use of

storage space and consistency in the existing data and newly fed data. A single unique voter would not be able to cast a vote more than once. This makes sure that there is no duplication of votes.

E. Voting Through Remote Systems:

This feature is the heart of the system. This is the feature that enables a voter to vote securely from anywhere without moving to a voting machine. The voter can cast a vote by either using the website through a personal computer or a laptop else the voter can also use the android application that runs on the android powered smart phone. A voter can have exactly one login instance irrespective platform i.e. android app or from website.

F. Voter Secrecy Maintained:

In the proposed system, no person would ever come to know whom a voter voted to. Each voter will have his own authentication user id and a password. The complete data from android device to web server shall be encrypted resulting in the greater security of the complete system.

G. Interactive and Easy To Use User Interface:

The user interface of the system shall be completely user friendly and very interactive. The interface shall be so interactive and easy to use that the system will have a very high factor of usability quality attribute. This will make sure that a new user shall be able to handle the system very easily and get used it in no time. Usability shall be maintained throughout the system, be it the website or the android application. The voter is encouraged by the ease of the new voting process. It will increase the participation in elections.

V. PROPOSED ARCHITECTURE OF THE SYSTEM

The figure 2 shows the basic architecture of the proposed system.

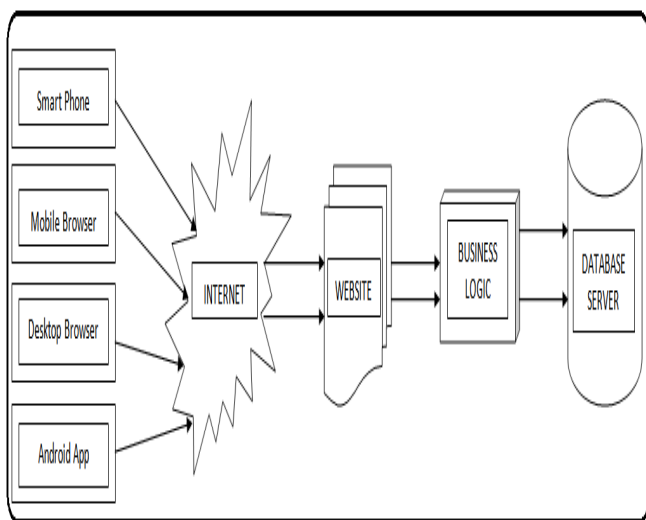


Figure. 2 Block Diagram Of (3-Tier) Architecture Of The Proposed System

The system will consist of a website which can be accessed through any web browsers on both the desktop computers, laptops and the smart phones. The website can be accessed only if there is an active internet connection. All the business logic is saved in the business tier. Basically the architecture used is a 3-tier architecture. There is a separate data layer which forms the 3rd tier of the system. It contains

the database information and data is stored and retrieved from this database as and when needed.

The android application too shall be connected to the same website through the application interface. So there is no need to maintain two separate websites for the purpose. There shall be the following pages [8] in the system:-

- Login / Registration Page
- Display Candidates Page
- Vote Page
- Acknowledgement Page
- Results Page
- Help Page
- Contact Us Page

The pages listed above are common for both the website and the android application. The navigation throughout the pages shall be very quick so that the session timer would not become a problem.

Session Timeout shall be designed to run in the system that will make sure that there is no misuse of the logged in account in case the authentic voter has left the account open. As soon as the voter logs into the account, the timer shall be enabled and the session expiry countdown shall be running behind. The session timer shall be of 60 seconds once the user has logged in because the next and only step to be carried out is to mark the candidate and cast a vote. If casting of vote is not recorded in time then the respective user may once again log in to the account using the authentic credentials and the same process repeats.

Help section is provided in the system that will make sure that the voters are comfortable in understanding the process and the help section shall be made available even when the election windows are closed. Results page shall also be made available once the voting window closes after the voting process so that all the registered candidates shall be able to see the results of the elections in the portal itself. The results shall be announced or published on the website within a couple of hours as the vote counting system is computerized and hence there shall be no chance of occurrence of any kind of mistakes in the results.

The system includes a One Time Password type of PIN number [7] system that makes sure that the voting process generates the one time password which is sent to the voter before finally casting a vote. This makes sure that there is no misuse or manipulation in the voting process and there are no compromises at all.

VI. CONCLUSIONS

This paper has successfully made an introduction to a new and efficient design of electronic voting application for the process of voting using the web-based platform along with its android application. This system is more reliable for the voting process as the system will provide the desired comfort for voting process along with the security factor to the voters. The system easily bypasses the current lengthy process of voting which makes the voter spend un-necessary money and extra time for the process. It can efficiently handle the post-voting procedures like accuracy in counting the votes, generating proper and accurate results of the elections, displaying the results within a couple of hours post the election process and to make sure there is no compromise in the system. One Time Password feature makes sure that there is no misuse of the system during the process of voting and hence the system is highly reliable.

VII. REFERENCES

- [1] César R. K. Stradiotto, Ângela I. Zotti, Cláudia O. Bueno, Sonali P. M. Bedin, Hugo C. Hoeschl, Tânia C. D. Bueno, Thiago P. S. Oliveir, Vinícius O. Mirapalheta , “ Web 2.0 e-Voting System using Android Platform”, Progress in Informatics and Computing (PIC), 2010 IEEE International Conference on (Volume:2), 10-12 Dec. 2010,.
- [2] Dr. Aree Ali Mohammed, Ramyar Abdolrahman Timour, “Efficient E-voting Android Based System”, International Journal of Advanced Research in Computer Science and Software Engineering on (Volume:3), 11th November 2013.
- [3] Ankit Anand, Pallavi Divya, “An Efficient Online Voting System”, International Journal of Modern Engineering Research (IJMER) on (Volume: 2), 4th July-Aug. 2012.
- [4] Kirti Autade, Pallavi Ghadge, “E-voting on Android System”, International Journal of Emerging Technology and Advanced Engineering on (Volume: 2), 2nd February 2012.
- [5] Craig James, Acting Chief Electoral Officer, British Columbia, “Discussion Paper: Internet Voting”, 31st August, 2011.
- [6] Pranay R. Pashine, Dhiraj P. Ninave, Mahendra R. Kelapure, Sushil L. Raut, Rahul S. Rangari, Kamal O. Hajari, “Remotely Secure E-Voting System Using Android Platform in Features of proposed system”, International Journal of Engineering Trends and Technology (IJETT) on (Volume:9 Number 13), March 2014.
- [7] Firas Hazzaa, Seifedine Kadry, "New system of e-voting using fingerprints", International Journal of Emerging Technology and Advanced Engineering (IJETA) on (Volume:2 Issue 10), October, 2012.
- [8] Rajendra A B, Sheshadri H S, "Visual Cryptography in Internet Voting System", PET Research Center, Karnataka in 2013.
- [9] Sanjay Saini, Dr. Joydip Dhar, “ An eavesdropping proof secure online voting model “, 2008 International Conference On Computer Science and Software Engineering.
- [10] V.Jothi Lakshmi, P.Vineka, V.Anbarasu, “Biometrics And Steganography Based Secure Online Voting System”, International journal of research on Engineering and Advanced Technology on (Volume 2 Issue 2), April – May 2014.
- [11] Rolf Oppliger, “Addressing the Secure Platform Problem for Remote Internet Voting In Geneva” on May 3, 2002.