Final Year Project Proposal
Development Project

Project Title: Electronic Voting System Project

Project Advisor: Mr. Asim Rana

Submitted By

<table>
<thead>
<tr>
<th>Serial #</th>
<th>Students Name</th>
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<tr>
<td>1</td>
<td>Muhammad Hamza</td>
<td>13031598-022</td>
</tr>
<tr>
<td>2</td>
<td>Hafiz Sajid Mahmood</td>
<td>13031598-033</td>
</tr>
<tr>
<td>3</td>
<td>Muhammad Irfan</td>
<td>13031598-031</td>
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APPROVAL

I Prof./Dr./Mr./Ms. ____________________________ am willing to guide these students in all phases of thesis/project titled “______________________________” as advisor. I have carefully seen the title and description of the thesis/project and believe that it is of an appropriate difficulty level for the number of students named above.

__________________________  ____________________________
Date                                           Signature of Advisor

Submission Date: _____________
Introduction:

Fingerprint Based Voting Project is an application where the user is recognized by his finger pattern. Since the finger pattern of each human being is different, the voter can be easily authenticated. The system allows the voter to vote through his fingerprint. Finger print is used to uniquely identify the user. The finger print minutiae features are different for each human being. Finger print is used as a authentication of the voters. Voter can vote the candidate only once, the system will not allow the candidate to vote for the second time. The system will allow admin to add the candidate name and candidate photo who are nominated for the election. Admin only has the right to add candidate name and photo who are nominated. Admin will register the voters name by verifying voter. Admin will authenticate the user by verifying the user’s identity proof and then admin will register the voter. The number of candidate added to the system by the admin will be automatically deleted after the completion of the election. Admin has to add the date when the election going to end. Once the user has got the user id and password from the admin the user can login and vote for the candidate who are nominated. The system will allow the user to vote for only one candidate. The system will allow the user to vote for one time for a particular election. Admin can add any number of candidates when the new election will be announced. Admin can view the election result by using the election id. Even user can view the election result.

Problems in existing system:

In the following subsections, I will document some of the shortcomings of the current standards, with illustrations from my experience evaluating voting machines for use.

Accuracy Standards, a Mark Sense example

The current Federal Election Commission standards require a recording accuracy of "one part in one million" (Section 3.2.4.2.7 for direct-recording electronic voting machines, 3.2.5.2.1 for punched-card and mark-sense machines).

On the face of it, this standard appears to be objective and measurable, but it is not! There are two basic problems. First, the standard specifies no measurement methodology, and second, the standard itself, "one part in one million" appears with no justification; it appears to be a number pulled out of thin air!
In actual practice, we have one useful measure of voting system accuracy, provided by the institution of the recount. Recounts detect other things as well, but when you exclude recounts that have found lost ballots and clerical errors, the difference between the first count and the recount represents the actual error level in the voting system.

In order to test this system, I took several hundred ballots out on the street and asked random people to mark the ballots as I instructed, quoting the marking instructions from the Chatsworth and Micro-vote documentation I had been given. When we counted and recounted my test deck, we found that the reader rarely came within a few percent of the count it had previously given. Thus, we are speaking of an accuracy of significantly worse than 1 in 1000!.

When we asked about these problems, the vendor's representative cited the FEC Standard, Section 3.2.5.2.1, that "valid punches or marks shall be detected, invalid punches or marks shall be rejected," and turned this on its head. In effect, if the machine detects a mark, it is valid, and if the machine fails to detect a mark, it is invalid. Thus, in effect, the machine sets the criteria for what is and is not a vote, entirely independent of how a human looking at the marked ballot would interpret it! The solution, in this case, involved changing both the ballot marking instructions and the specific model of ballot reader used; with these changes, we were able to approve the system.

The root of the problem was twofold. First, under the original marking instructions, voters had been free to use any pen or pencil. Indeed, the Chatsworth reader was able to read most pen and pencil marks, but some colored pens and hard-lead pencils produced marks very near to the threshold for the reader. The other problem was that the reader was nominally able to read ballots in any of four orientations (reversed top-to-bottom or front-to-back or both). As a result, any given mark on the ballot might be seen by any of 4 different sensors, and the sensing thresholds of these sensors were obviously not equal!

Some elections administrators deal with this problem of near-threshold marks on mark-sense ballots by requiring that, on a recount, all ballots be recounted by the same machine that was used in the first count. In fact, I believe that this is a serious mistake! If counts on two different machine reveal significantly different counts, then either the standards for adjusting the sensitivity of the sensing mechanisms on those machines are inadequate
or the ballot marking instructions are inadequate, leading to too many near-threshold marks!

**Accuracy Standards, Direct Recording Electronic Examples**

When we examined the Global Election Systems Model 100 Electronic Ballot Station in 1998, as the examination progressed from the sales presentation to the actual qualification test, we were warned by the sales representative that we would have difficulty testing the machine and that, in fact, a useful hand test of such a system was generally difficult. I do not want to single out Global; Fidlar-Doubleday has a system that is both similar looking and subject to the same problems. These machines use a touch screen for voting, and I imagine that, as a voter, I would have immense confidence in them, both because they are excellent representatives of current technology and because the computer interfaces on these machines are generally very well designed.

During testing, however, we quickly learned that the warning from the sales representative was correct. Casting one ballot on this machine is something of a peak moment, psychologically, but to perform an interesting test, it is necessary to cast several hundred ballots. After casting five or ten ballots on this machine, the job became tedious, and after casting twenty or thirty, it became a stressful exercise. By the end of the test, two of the three examiners had made so many mistakes that their test plans were of little use. I made it through my test plan without error but with sore fingers from poking at the touch screen and with a splitting headache and a sore neck.

In discussing our tests, the vendor's representative said that, really, we should not expect to make realistic tests, that, in effect, we just had to trust the testing done by the vendor and by Wyle Labs. We could not duplicate the human factors present at a real polling place in our tests, and we should trust the vendors and the labs to do that for us. Trust, however, is a dangerous thing in the world of elections. Every step in the election process needs to be testable, and with direct-recording machines, testing is becoming extremely difficult! In this particular case, I suspect that the large scale testing was done with robotic fingers touching the screen in pre-determined patterns, and this too does not duplicate the human factors elements in real voting, as no humans are involved!
**Proposed system:**

E-ELECTION SYSTEM An election is a decision that is made by voting, it’s either electronically or manually the decision that is made by allowed citizen to voting. Every modification from past until now is create new generation and each modification of ICT and computer science creates new election generation because there are direct relations between computer and ICT modifications with E-Election for example; the internet facility changed traditional election to EES [MA13]. The improvements of technology develop the election steadily and facilitate fast and continuous enhancement in better security by both of the bar code reader and fingerprint. The price performance [MA14] of mentioned E-Election is much higher if compare to manual voting or other fingerprint or barcode reader individually. The bar code reader, fingerprint and web ballot together help better QoS with premium security. The design of a “good” voting system whether electronic or using traditional paper ballots or mechanical devices must satisfy a number of sometimes comparing criteria [EEEETS11]. Nowadays election is a very important serious topic and much concentration is paid on it, therefore E-Election has becoming a growing interest for the electors, candidates, citizens and all the stakeholders involved, E-Election refers to the use of modern ICTs to convenience requirements of citizens and government.  

Fingerprints are one of many forms of biometrics used to identify individuals and verify their identity. Fingerprint recognition or fingerprint authentication refers to the automated method of verifying a match between two human fingerprints. In this project we will be using a Fingerprint reader for providing access to the voter as well as making a log if the person has voted or not [Amo11]. Electronic democracy (e-democracy) is a necessity in this era of computers and information technology. Electronic election (e-election) is one of the most important applications of e-democracy, because of the importance of the voters’ privacy and the possibility of frauds. Electronic voting (e-voting) is the most significant part of e-election, which refers to the use of computers or computerized voting equipment to cast ballots in an election. Electronic voting are passes three impotent steps which are:

1) Pre-voting (preparation and administrating, committee, candidates, and voters).
2) Voting (Voting process itself) and

3) (Post-Voting (Result Counting and generating reports) [EEEETS11]. While all steps in traditional voting system are more costly in term of money and time than the E-voting and the security of the traditional voting is not controlled. Finally, the all outcomes from the system provide an excellent suggestion to become conscious that cooperation between three parts, namely independent national electoral commission (INEC), votes, and candidates makes election strategy enhanced because the system is a perfect intermediate between three parts.

Main Modules:

Finally, the main components of the interface are divided into three categories, the first category is for voters, the second is for candidates, and third is commission as administrator. The entire categories have the following major inputs, functionality and outputs:

Inputs

1. Apart from their registered fingerprint image and ID barcode in the database backend as administrator and for the reason of higher security the Independent National Electoral Commission (INEC) must provide them a random username and password for those staffs are working in voting stations.

2. The voters must entered valid fingerprint and barcode ID into the system in any voting station in the city and there are computers with web-ballot for voters.

3. When the system recognized getting a valid barcode ID with fingerprint. The webballot interface with a vote-push-button appears and after tick the box next to the candidate must click on vote-push-button.

4. By clicking on vote-push-button in the web-ballot, it let voter to vote and store elected candidate into database backend.

5. The separated tier architecture helps to input data and maintain each tier easily with better security.
**Functionality**

1. Registration: New administrator, voter and candidate can register using (barcode, fingerprint and form number).
2. Authentication: Registered admin, voter can get access to system through their ID, fingerprint and form number.
3. Storage: The profile of admin, candidates and voter are registered in a database.
4. Matching: The tools are developed in order to make suitable recommendation for admin and users.
5. Identification: Identifies the users and admin by fingerprint and barcode.
6. Verification: Verifies the users and admin by fingerprint verification process.
7. Prevent duplication: Prevents voting by same user more than ones.
8. N-tier architecture helps load balancing of the system.

**Outputs**

1. Displays votes account or vote result in a table.
2. Display vote result by chart and number.
3. Display message box for those voters made a mistake and elect two candidates by message “sorry must select only one option”
4. Display a message box for those voters, want to vote more than once and the message is “sorry duplicate”.
5. Display a message for those voters that forget to vote by message box “sorry must select only one option “in case of not selecting any option.

**Specification and Aspects**

1. While a new administrator becomes a member of the system, and he/she is added to the database by taking fingerprint, user name and password from each admin.
2. When voter becomes a member of the system, and voter is added to the database by taking the fingerprint, barcode from each voter (the period of a month for that process of pre-register).
3. A Part from registered barcode ID and fingerprint to the database, any Admin must get (Username, Password) as well from the INEC.
4. The username and password is random and valid for several hours.
5. Voters who live outside of the counter can vote through E-form.
6. System admin can login via username, password and fingerprint and barcode ID as well.
7. INEC can delete, update, and insert any information about candidates and voters.
8. Voters can login through his/her ID barcode and fingerprint.
9. Admin can account votes.
10. Admin can show result by table and chart (real time).
11. Admin can add new candidate.
12. Admin can add new user.

Expected Outcome:
The modification of paper-ballot to web-ballot in the proposed system is avoid paper work and create communication between dynamic web site (web-ballot), barcode reader, fingerprint and computer server over public network. The attractive of our proposed system is to improve toward fully EES with load balancing by separation of fingerprint and bar code reader as a frontend, C# is middleware and MSQL is backend over public network and TCP protocol. The suitability of the EES measured by speed.exe application software for fingerprint and bar code reader tools, the both tools are tested one time simultaneously and another time individually in frontend. The simultaneously or individually working together both tools in front end and backend will be tested and find out the best results.

Tools And Technology:
One Tier Architecture (1TA)
As mentioned before the one tier architecture is inapplicable for our proposed system due to not based on client and server(C/S).

Two Tier Architecture (2TA)
When the networked based on C/S connected between server and clients. The only suitable 2TA is thin-2TA because the functionality (middleware) and Data tier (back end) are in a server side. When the finger is taking as image, the functionality tier is responsible to transfer to backend tier (database). The fat-2TA is inapplicable because
middleware always place it with database and it’s impossible to place middleware with client. Figure 6 shows the used software development tools over 2TA. Also Table 1 show the speed test of thin-two tier architecture.

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<th>Table 1. The Speed test of thin- 2TA</th>
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<td><strong>Two Tier Architecture</strong></td>
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<td><strong>E-voting Methods</strong></td>
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<td>Barcode</td>
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<td>Finger Print &amp; Barcode</td>
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Three Tier Architecture (3TA)

The three tier architecture is separation of hardware into three different tiers which; presentation tier, functionality tier, and database tier. As shown in figure 7 the used software Development tools of BVS over 3TA. The better service is 3TA then the 2TA in respect of BVS. Also table 2 shows the speed test of three tier architecture.

<table>
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<th>Table 2. The Speed Test of 3TA</th>
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<td><strong>Three Tier Architecture</strong></td>
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<td><strong>E-voting Methods</strong></td>
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<td>Barcode</td>
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<td>Finger Print &amp; Barcode</td>
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N Tier Architecture (NTA)

The four or more tier architecture is separation of hardware into more three different tiers which; presentation tier, functionality tier, and database tier. As shown in figure 8 the used software Development tools of BVS over NTA. The better service is
NTA then the 3TA in respect of BVS. Also Table 3 shows the speed test of N tiers architecture.

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There are three different types of tests, each tier is used for different purpose and different limit numbers of users, the NTA is most suitable one for our proposed system due to load balancing and better security and maintenance.
References:

For a paper in a contributed volume:


For a paper in a journal:


For a book:


For an unpublished paper:


More References: