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NEW APPLIED E-VOTING SYSTEM

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ABSTRACT

This paper introduces on electronic voting system, that have security context or known as e-trusted voting system. In this study, the prototype builds based on secured and trusted framework for electronic voting. The System allows the voters to participate by using username and password .Voter can enter the system and votes on the existing text during election date and the voter can see the result after the end of election date. In order to test whether the system had been fully functioning and meets the user's requirement, we have to apply the system to a sample of 20 persons and finally the prototype occur the objective and give us a general prototype system that provides security and trusted electronic voting.

Keywords: *Electronic Systems, E-voting, Internet Voting Security.*

1. INTRODUCTION

Voting is a process at the heart of a democratic society. Voting schemes have evolved from counting hands in early days, to systems that include paper, punch card, mechanical lever, and optical-scan machines.

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 [1].

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 evaluating system performance. The criteria to be developed are such as accuracy, democracy, convenience, flexibility, privacy, verifiability and mobility [27].

The aim of this paper is to develop a general prototype system that provides security and trusted electronic voting system.

1.1 Problem Background

Electronic voting is an emerging social application of cryptographic protocols. A vast amount of literature on electronic voting has been developed over the last two decades.

While e-voting has been an active area of research for the past two decades, efforts to develop real-world solutions have just begun [5]-[12], posing several new challenges. The use of insecure Internet, well documented cases of incorrect

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implementations, and the resulting security breaches have been reported recently [14]-[17]. These challenges and concerns have to be resolved in order to create public trust in e-voting.

An important step towards streamlining this effort is to develop a framework and identify necessary properties that a secure and trusted e-voting system must satisfy to reduce discovery redundancy. Such a framework will allow us to evaluate as well as compare the merits of existing and future candidate e-voting schemes.

1.2 Problem Statement

Making the electronic voting system has a security and confidence system by the user, usually user can access to the electronic voting system and voting on the text without security system, that any user can access to the electronic voting system through the ID number for another user and he/she can vote more than one time at the same text, The users could know the result of voting during the process of voting which make the system dicey and mistrust, The user can dominate the result of voting by the access that he or she has of the result before the end of election day

1.3 Research Objeactive

The main objective of this study is:

- To develop a general prototype system that provides security and trusted electronic voting.

1.4 Scope Of Study

The scope of the project is that it will use the ID of the user as the main security to the votes system.

2.0 LITERATUE REVIEW

2.1 Background

While e-voting has been an active area of research for the past two decades, efforts to develop real-world solutions have just begun [5]-[12], posing several new challenges. The use of insecure Internet, well documented cases of incorrect implementations, and the resulting security breaches have been reported recently [14]-[17]. These challenges and concerns have to be resolved in order to create public trust in e-voting.

Other researchers have done work in electronic voting; while they may not explicitly mention voting from remote poll sites, their work is nonetheless relevant to any effort at designing or implementing a remote poll site voting system. [10] could be classified, like the [5] researchers, as a cautious optimist. She acknowledges the problems inherent in each kind of voting apparatus, but does not make an overt recommendation on her site for one technology over the rest.

Some other academics, like [28] who moderates the risks mailing list, are less optimistic. They agree mostly with the [5] committee, but their papers focus on the immensity of the problem one faces when trying to design and implement a truly secure voting system. They often remind of Ken Thompson's Turing acceptance speech and the fact that really can not trust any code which did not create them. Therefore, they tend to be extremely suspicious of proprietary voting machines and their makers who insist that should just trust them.

[28] gives a list of suggestions for "generic voting criteria" which suggests that a voting system should be so hard to tamper with and so resistant to failure that no commercial system is likely to ever meet the requirements, and developing a suitable custom system would be extremely difficult and prohibitively expensive.

[24] invented the [23] method for electronic voting. A critical component of this method is very similar to the [5] proposal: a voting machine must produce human-readable hardcopy paper results, which can be verified by the voter before the vote is cast, and manually recounted later if necessary. Her philosophy and Neumann's are very similar; in fact, they've written papers together on the subject.

[9] presents a very interesting scheme, whereby voters could get receipts for their votes. This receipt would allow them to know if their votes were included in the final tally or not, and to prove that they voted without revealing any information about how they voted.

2.2 E-Voting

A general e-voting process and the actors involved can be summarized as in Figure 1 [6]-[20]-[11].

In the literature, numerous e-voting protocols have been proposed [30]. In those protocols, different requirement sets are defined, and whereas fulfilling these requirements different cryptographic tools and primitives are used. These underlying primitives are mainly blind signatures [8], mix-nets [7] and homomorphism encryption [1].

2.2.1 E-voting requirements

[11] pioneered the verifiability in e-voting protocols by forcing voters to involve more than

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one round. Voter has to participate in the counting stage by checking that his vote is listed correctly in the tallying list, and then sending a part of the vote in order to complete voting. In this protocol, verifiability is defined as "No one can falsify the result of the voting".

Later, [29] introduces the concept of universal verifiability to emphasize the importance of auditing of overall election by categorizing the verifiability as individual variability and universal verifiability. Further e-voting studies apply this categorization. [29] defines individual and universal verifiability respectively as "A sender can verify whether or not his message has reached its destination, but cannot determine if this is true for the other voters" and "In the course of the protocol the participants broadcast information that allows any voter or interested third party to at a later time verify that the election was performed properly".

[10] makes the definition of universal verifiability narrow by limiting it as just counting the votes and defines verifiability as "Anyone can independently verify that all votes have been counted correctly". Most of the later studies use this definition since it is much more specific and measurable.

2.3 Internet Voting Security

Direct-recording electronic (DRE) voting systems have been widely criticized for various deficiencies and security vulnerabilities: that their software is totally closed and proprietary; that the software undergoes insufficient scrutiny during qualification and certification; that DREs are especially vulnerable to various forms of insider programmer attacks; and that DREs have no voter-verified audit trails paper or otherwise that could largely circumvent these problems. All of these criticisms of DREs apply directly to SERVE as well [17].

Because of space constraints, they have mentioned only a few of the possible attacks. These attacks depend on fundamental vulnerabilities in the current PC architecture for example, malicious code and in the Internet (such as spoofing and denial-of service attacks). These attacks can be launched by anyone in the world, and in many cases may be successful while remaining completely undetected. Consequently, they conclude that Internet voting in general and SERVE in particular, cannot be made secure for use in real elections for the foreseeable future [14].

2.4 Analysis Of The E-Voting

E-voting has been used in Europe, for legally binding elections, since at least 1982 [25]. Its use is still not widespread, though interest has increased. The Netherlands was a very early adopter, and it was almost a decade later (1991) that Belgium started experimenting with e-voting. Just a few years later, in the mid-nineties, France did the same. By the early 2000's, experiments or pilots had been run in the United Kingdom, Italy, Spain and the Republic of Ireland [2], among others.

In the absence of controversy, surveys of voter attitudes usually reflect satisfaction and trust [19]. When concerns are raised by experts and in the media, however, public opinion can change dramatically. For example: in Ireland in 2003 a survey by Amarach Consulting found that a majority of Irish citizens were in favor of the introduction of e-voting. Less than a year later, after controversy over the system had led to the establishment of the Commission on Electronic Voting, a Red C survey found that 58% of respondents felt that ". . . the e-voting proposal should be scrapped until such time as a paper back-up is incorporated into the system . . ." and "one third of all voters were unconvinced that their choices will be registered properly".

This instinctive trust of e-voting systems also appears to exist amongst officials. When government representatives speak about e-voting it tends to be in very positive terms. Their statements emphasize the benefits of e-voting; the largest obstacle, from their point of view, is usually gaining the voters' trust. The idea that the system in question might not deserve such trust is given little or no attention, except where it overlaps with "allaying public concern" about the security of the system [3]. Two prime examples of this are the web pages for the voting systems of the Irish Government and the Swiss state of Geneva.

In reality, implementing e-voting is not so simple. [23] identified one of the most significant obstacles – the conflict between the requirements for secrecy and accuracy. Serious problems also arise from the way in which voting systems are currently developed. To knowledge there is still no voting system that has been treated as safety-critical in its development and deployment [21]. The components of the systems are, in general, proprietary. These and other factors have combined to create serious issues in legally binding elections. Examples of worrying incidents in real elections in the US have been gathered by the Verified Voting Foundation's Election Incident Reporting System.

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3.0 METHODOLOGY

This General Methodology of Design Research will be used because it emphasizes the knowledge generation inherent in the method and because it originated in an analysis of the processes inherent in any design effort [32].

The methodology consists of five main phases as (Figure 2):

a) Awareness of Problem
b) Suggestion
c) Development
d) Evaluation
e) Conclusion

3.1 Awareness Of Problem

The first stage of this method is the understanding of the problem which needs to be solved, as well as the objective and the scope of this study. This project is aimed at developing a secured electronic voting system which will prevent casting of votes twice and also disallow people who are not right persons to vote from casting votes.

Therefore the awareness of the problem in E-voting has been reviewed from sources like books, proceedings, journals, white papers, reports, and news in order to gather and collect the information related to this project. After the problems are identified, the objectives and significance of the study are defined clearly after that. In completing this phase, the output of this phase is a proposal for a new research effort.

3.2 Suggestion

To offer a meaningful suggestion on the approach to follow in the design of this project, several alternatives are examined and discussed. There are many approaches to the problem of this project, which are discussed over a period of months. During the alternating cycles of discussion and individual cogitation that characterize many design research effort, several software engineering concepts were brought together with a final key insight to yield the ultimately successful direction for the development.

According to [26], design specification is used as a blueprint for the implementation of the system.

3.3 System Development

The Design is implemented in this phase. The techniques for implementation will of course vary depending on the artefact to be constructed. This project is web based system which detailed requirements and suggestion are already looked into in the previous stages. At this stage the system will be implemented based on the Rapid Application Development (RAD) life cycle.

a) Rapid application development

rad is a software development methodology that focuses on building applications in a very short amount of time; traditionally with compromises in usability, features and, or execution speed. Rad is an iterative approach which consists of four steps; requirements planning, user design, construction, and implementation.

the structure of the rad lifecycle is thus designed to ensure that developers build the systems that the users really need. This lifecycle, through the following four stages, includes all of the activities and tasks required to scope and define business requirements and design, develop, and implement the application system that supports those requirements. Rad has more advantages compared to other system development methodology. Speed and quality are the primary advantages of rad. The first advantage of rad is it increased speed. As the name suggests, rad's primary advantage lies in an application's increased development speed and decreased time to delivery. The goal of delivering applications quickly is addressed through the use of computer aided software engineering or case tools, which focus on converting requirements to code as quickly as possible.

the second advantage is increased quality. It is a primary focus of the rad methodology, but the term has a different meaning than is traditionally associated with custom application development. Prior to rad, and perhaps more intuitively, quality in development was both the degree to which an application conforms to specifications and a lack of defects once the application is delivered. According to rad, quality is defined as both the degree to which a delivered application meets the needs of users as well as the degree to which a delivered system has low maintenance costs. Rad attempts to deliver on quality through the heavy involving of users in the analysis and particularly the design stages.

the third advantage is reduced scalability because rad focuses on development of a prototype that is iteratively developed into a full system; the delivered solution may lack the scalability of a solution that was designed as a full application from the start.

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the forth advantages is reduced features. Due to time boxing, where features are pushed off to later versions in favor of delivering an application in a short time frame, rad may produce applications that are less full featured than traditionally developed applications. This concern should be addressed as soon as possible through clear communication with the client as to what will be delivered and when.

in this paper, the steps of rad are taken accordingly and briefly discussed below:

I) planing requirement

based on the design principles that have been suggested in the previous phase, a planning requirement of the system was built. The prototype of the system is developed in a web-based environment. Before developing the prototype of the system, the following software had been chosen as the development tools:

a) Microsoft internet browser:

as a web browser to launch the prototype.

b) Macromedai dream weaver mx :

a tool to design interface which can be linked with the programming language

c) Php programming lanuage:

php stands for hypertext pre-processor, is a serve-side scripting language for creating dynamic originally, in 1994, the language was designed as a small set of binaries used to collect some basic site traffic data. In 1997 the parser was rewritten by two israelis and the name was changed to the current acronym –it being determined that hypertext pre-processor was a decidedly more acceptable name in the business world. Web pages create using by macromedia dream weaver . Php is open source and cross-platform. When a visitor opens the page, the server processes the php commands and then send the results to the visitor's browser, just as with asp or coldfusion. Php's language syntax is similar to c's and perl's [16] .

d) Mysql database:

to well design mysql has been selected for prototype electronic voting .mysql is an open source relational database management system that uses structured query language. Information is stored in "tables" which can be thought of as the equivalent of excel spreadsheets. A single mysql database can contain many tables at once and store thousands of individual records. It's fast, reliable and flexible. Php and mysql work extremely well together [31].

Ii) user design

user design is also known as the functional design stage, this stage uses workshops to model the system's data and processes and to build a working prototype of critical system components. Project planning involves defining clear, discrete activities, and the work needed to complete each activity within a single project. There are various activities that must be performed during functional design stage. According to [13], project planning in information system project consists of ten activities.

Iii) construction

construction in rad starts when the process of designing the interface and developing the systems is implemented. In this process, the system is designed according to the requirement and the objectives listed in previous chapter. The detail design will be elaborated further with the functionality in the subsequent chapter (results and findings).

Iv) implementation

the final stage in this approach is the implementation phase. In this phase, user is encouraged to use the system. The new system is transfer to a working environment. This experiment is important and crucial since the efficiency and the functionality of the system can be tested in this phase. Any error with the system can be corrected once the system is being use by the user. Minimal instructions of the system also will be given to the user so that the user can understand the system easily. It is also at this stage that documentation is done in order to put into writing all stages of how the system works. User by reading such document should be able to use the system comfortably.

3.4 Evaluation

The evaluation was performed to determine the accuracy of the system. User acceptance is used to test the system whether it fulfilled user's needs and

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requirements. The detail test cases and results of this are explained in the preceding chapter.

3.5 Conclusions

The conclusion stage marks the end of the research effort. The outcome of the research is judged as good effort while any deviation is subject to further research. And facts that have been learned can be repeatable applied or repeatable invoked in future.

4.0 FINDING & RESULT

As shown in figures 4,5,6, and 7 the prototype occur the objective which give us a general prototype system that provides security and trusted electronic voting.

As shown in figure 4 the registration of voter in the page displayed signifies an incorrect ID Number other than the citizen of the country.. As shown in figure 5 the registration of voter cannot be done twice as can be seeing in the page above which display an error message at the event a voter try to register twice. As shown in figure 6 the voter can not elections more than once on the same text. As shown in figure 7 the user or voter cannot be allowed to see the result of voting until after the voting ends.

A comprehensive system testing is carried out for different modules of system .The summary of the result is shown in table 1.

The errors can be prioritized into high, medium or low. Low priority (L): Aesthetics, Message wording, Menu options, Wrong alarms, Help problems etc. Medium priority (M): When an error occurred leads to another error resulting in a variation in the functionality. High priority (H): When the application completely stops, the system gets hanged etc.

5.0 SIGNIFICANT OF STUDY

The using of electronic voting has the potential to reduce or remove unwanted human errors. In addition to its reliability, e-voting can handle multiple modalities, and provide better scalability for large elections. E-Voting is also an excellent mechanism that does not require geographical proximity of the voters. For example, soldiers abroad can participate in elections by voting online.

6.0 CONCLUSION

Based on the design principles and requirement, a prototype of the system for E-voting System has been developed using PHP. The system has several advantages that had been achieved. The advantages of the system are as follows:

i) It gives confidence in voting system, only the legitimate voter is allowed to gain access to voting .

ii) The system is user friendly, in the sense that the user can easily understand the system although the user is a first time user. This is because the design is simple, attractive and do not have too many graphical items.

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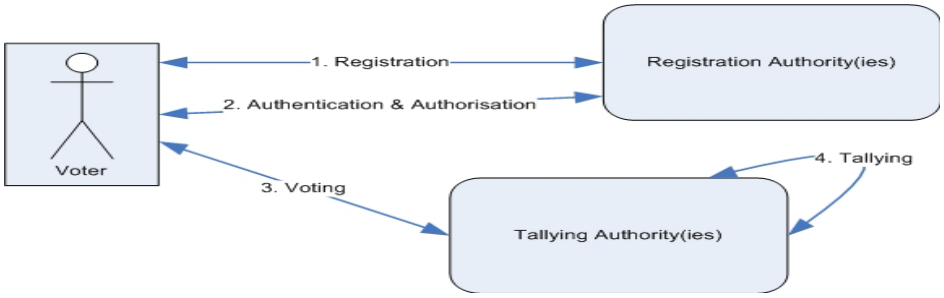

FIGURE 1 : A GENERAL E-VOTING PROCESS

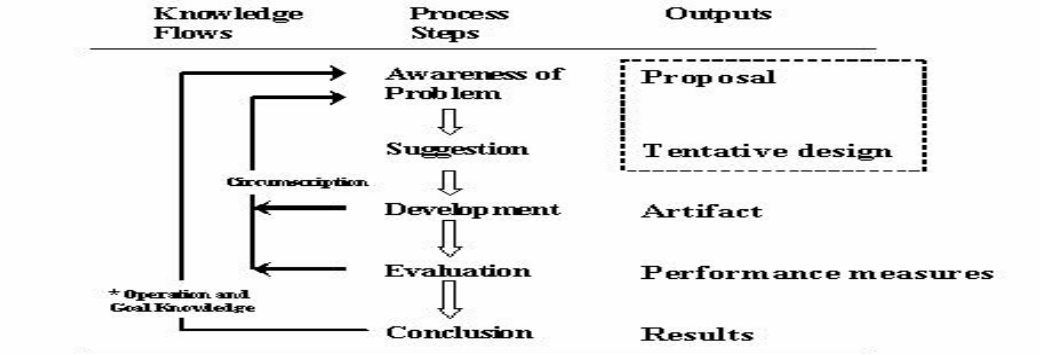

FIGURE 2 : THE GENERAL METHODOLOGY OF DESIGN RESEARCH (VAISHNAVI & KUECHLER, 2004)

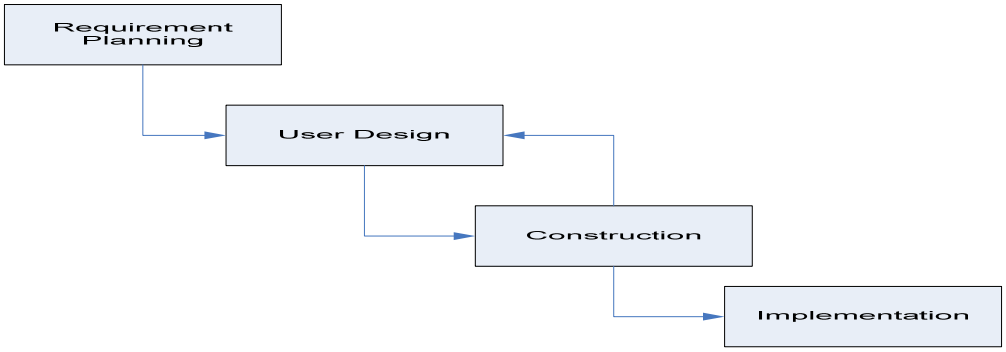

FIGURE 3 : RAPID APPLICATION DEVELOPMENT

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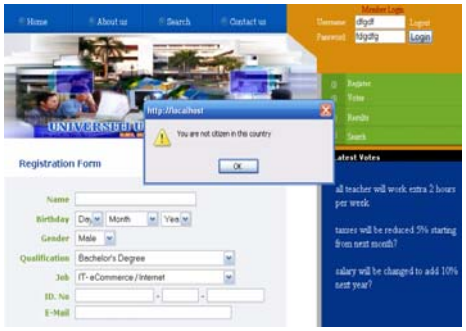

FIGURE 4 : REGISTRATION PAGE

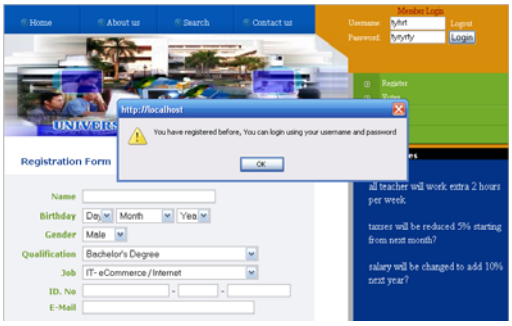

FIGURE 5: REGISTRATION PAGE

FIGURE 6 : VOTING OPTION PAGE

FIGURE 7: VOTING OPTION PAGE

S/N	Test Case Description	Number of times test carried	Actual Results for correct/wrong		Percentage correct	Severity Average (H-High, M-Medium, L- Low)
			C	W		
1	Login	5	5	0	100	Low
2	Register	4	4	0	100	Low
3	Vote A	5	5	0	100	Low
4	Vote B	7	7	0	100	Low
5	Result	4	4	0	100	Low
6	Search	5	5	0	100	low

TABLE 1: SUMMARY RESULT