

WEB-BASED ELECTION SYSTEM FOR STUDENTS' UNIONS OF FACULTIES IN SRI LANKAN UNIVERSITIES

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ABSTRACT:

The aim of the study is to analyze the current traditional election system and suggest an online election system, which will allow people to cast votes in a more convenient way. This paper includes the initial reading to understand the way of traditional voting system, different stages and the issues related to the traditional way that gave us spark to develop the online voting system. This paper also discusses the advantages of the online voting system which motivate different governmental and non-governmental organizations, other universities, institutes, schools to develop the online voting system. This paper reports about the key issues, strengths and the weaknesses of this approach. And also, we have discussed the design of the project and the information on the tools and techniques that we used to implement this application. Included the testing part that is obviously important to the success of any information system.

Keywords:

Online voting, student union, E-R diagram, Database

1. INTRODUCTION

Typically, all countries depend on computer-based systems in most sectors. This paper is about to design and develop a secured System for voting system of elect office bearers for Faculty Students' Union. Some of the other universities, institutes in here and abroad, are using a different kind of complexed online voting systems for electing their office bearers. Therefore, we thought to find out and implement an easiest approach to our Sri Lankan Universities.

The main goal of this approach is to build a software system, which manipulates all the security activities, online voting, speed up and make easier the process. To prove the validity of this approach, we have implemented a system and shown the result. For this purpose, as a template we used the Faculty of Applied Sciences Students' Union of the Vavuniya Campus, University of Jaffna, Sri Lanka.

The Examination and Student Affair Department of the Vavuniya Campus currently use manual voting system. Current manual

system voting process is more complex and having problems in privacy and confidentiality of voter. In this manual way, process of publishing results is very slow, because of taking a long time to count votes. For voting, the student must appear in the election center of the faculty premises.

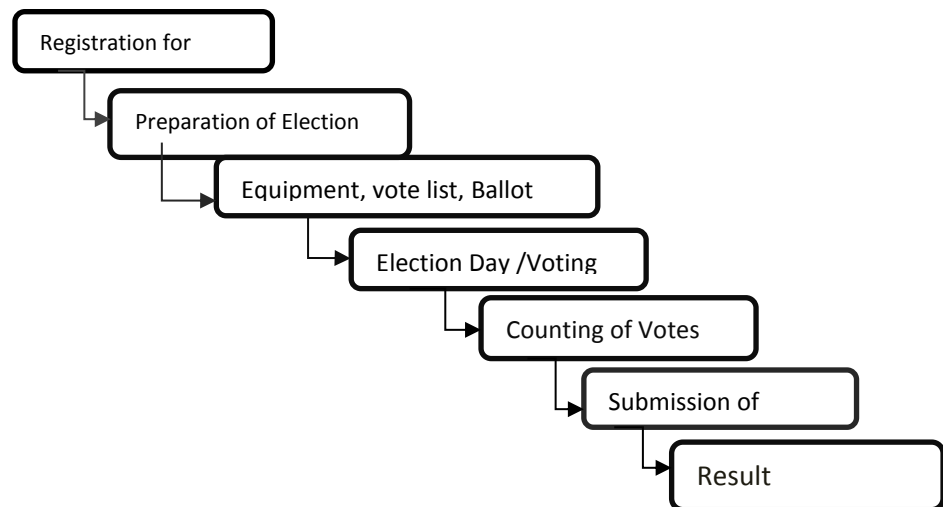


Figure 1. Current Manual Voting Procedure

Due to the paper ballot based election system, voters face some problems before or during elections and administration faces some problems before and after the voting as well. In the new era of advanced technology where online system boosts work speed, reduces mistakes and promotes the generation of accurate results, having manual election system becomes a misfortune.

Some of other advantages are achieved through our approach such as increased turnout, convenience; security, reduce the expenses, able to get more information of candidates, fewer usages of paper, overcomes the issue with other online voting, malicious payload, fraud etc...

An online system, which involves procedures such as registration of voters, vote casting, vote counting, and declaring results etc. This would be a good solution to replace the current system. The system proposed in this paper will be helpful for the voters by using any resources like their own system. In this study, we tried to cover the problems confronted by voters, officials, political parties, during elections. And to suggest a system ensures the security from fraud during elections and to facilitate with a safe and rapid counting of votes afterwards.

Purpose

The main purpose of this study is to boost the turnout of votes. For this purpose, we have to view all the aspects responsible for the low turnout. Some students hesitate to come to the polling station to cast the vote due to the rainy condition during the election. Students who are outside of the polling station do not wish to come to the station for just casting the votes due to the expenses and troubles of transportation. A second purpose is to make it more difficult to commit fraud and cheating. By creating an online database covering, it will be possible to eliminate the double casting of votes.

Stages of online voting system

The general online voting system is divided into six phases. Those are,

1. Registration
2. Authentication
3. Voting and saving the votes
4. Managing the votes
5. Counting the votes
6. Auditing

In the first phase, the administration registers and issues the username and password for each candidate and voters to access their account.

Candidates nominate for the posts and the administration conducts other processes. In the second phase, the system authenticates and verifies the voters according to their credentials. In the third phase, the voters can cast the votes and the system saves the votes into the database. In the fourth phase, the system prepares the votes for the counting by the sorting procedures. In the fifth phase, the system decrypts and counts the casted valid votes. In the sixth and the final phase, the system prepares the final tally, which contains the summary of casted valid votes for each candidate.

2. METHODOLOGY

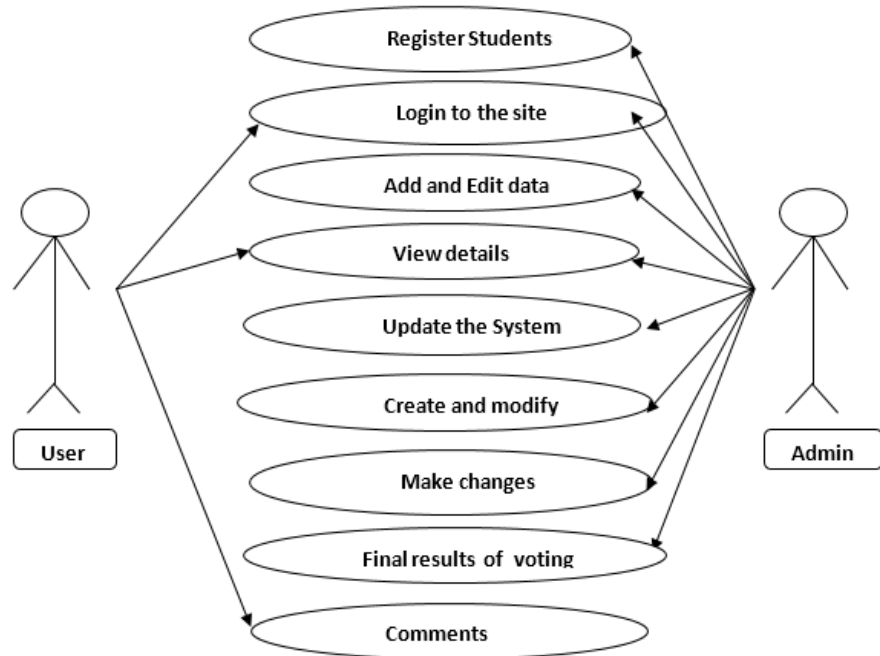
2.1 System design

This part shows the design or sketch of how the system looks like. This discusses the methodologies used to design the system. In this part, the following three things are going to be considered:

1. Use case modelling
2. Entity relationship modelling
3. User interface design

2.1.1 Use Case Diagram

We use two actors, named user and administrator. Moreover, use cases are student registration, login into the site, add and edit data, view details, and update system, create and modify data, make changes, final resulting and comments.



-Figure 2: Use Case Diagram-

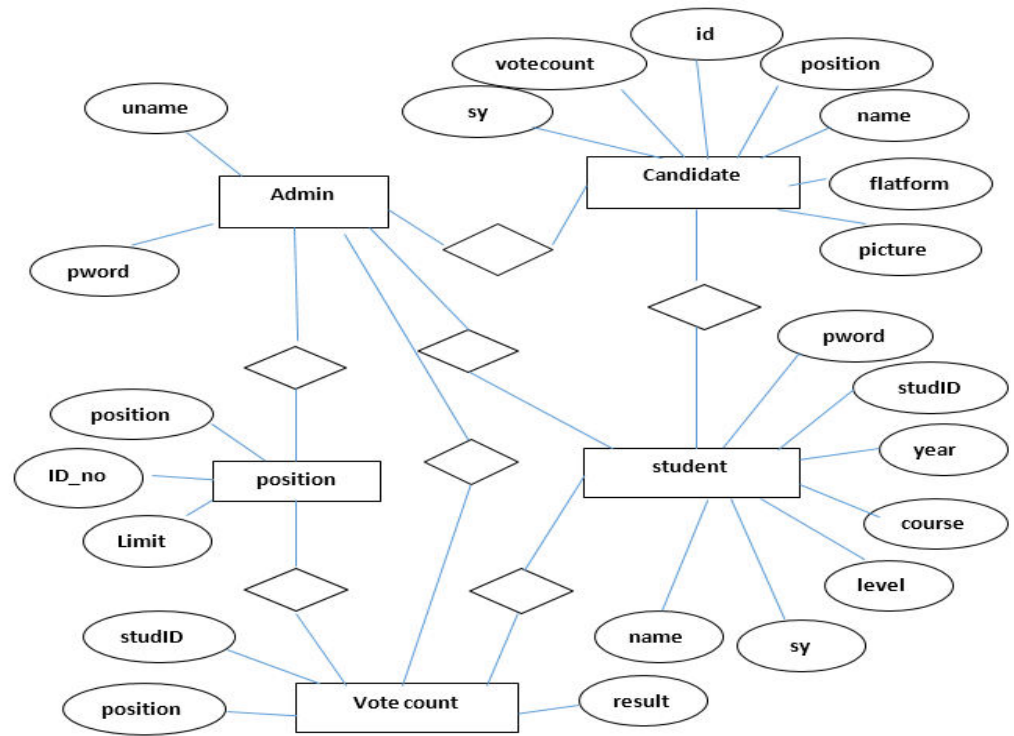


Figure 3. ER Diagram

2.2 Implementation

This section discusses about webpage implementation, database implementation and various other features to make the website more dynamic.

To implement this easiest system, PHP and html languages can be used. MySQL database is used to store all details. There are two views each for the user and administrator.

Our system with three layers

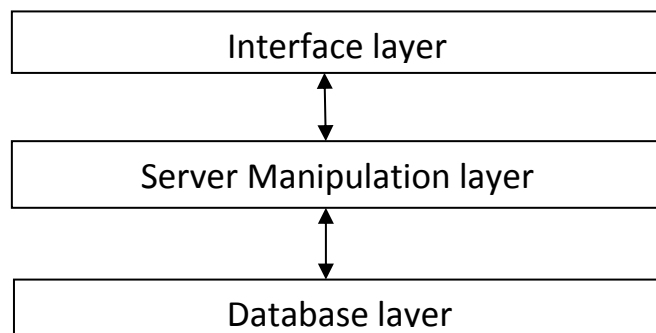


Figure 4. System Layers

2.2.1 Interface Layer

The interface layer is the medium to make the interaction between the user and the system, administrator and the system as well. We simply used html, dream viewer tool, JavaScript and css3. Here are some images of interfaces



Figure 5. Starts Voting Admin



Figure 6. Logging by Users / (Votes)

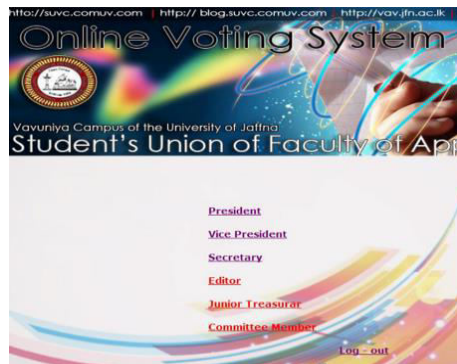


Figure 7. Voting Page

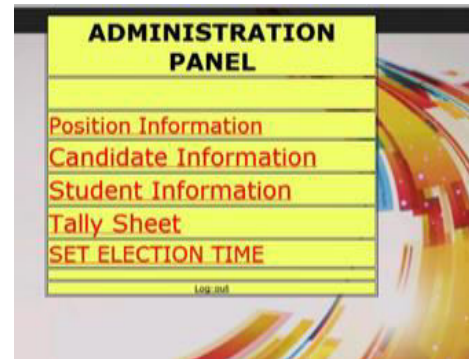


Figure 8. Admin Panel

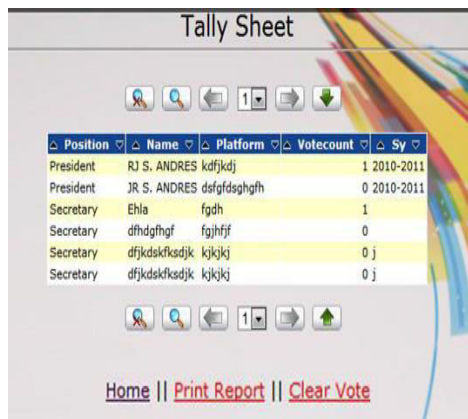


Figure 9. Admin Panel: Tally Sheet (Results)

President		
Janaka Balangoda	4 - 40.00 %	<div style="width: 40%; background-color: red;"></div>
Shan Rajakaruna	2 - 20.00 %	<div style="width: 20%; background-color: red;"></div>
Kulunu Madubahan	2 - 20.00 %	<div style="width: 20%; background-color: red;"></div>
Vice President		
Palinda Wijekoon	8 - 80.00 %	<div style="width: 80%; background-color: red;"></div>
Secretary		
Madusanka Premaratne	6 - 60.00 %	<div style="width: 60%; background-color: red;"></div>

Figure 10. User View of Results Sheet

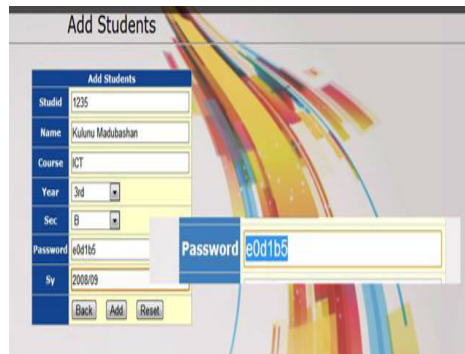


Figure 11. Admin Panel: Add Students (Password Auto Generation)

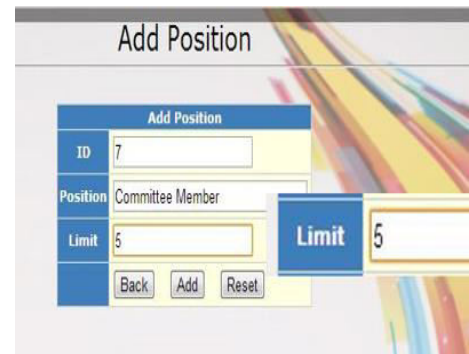


Figure 12. Admin Panel: Creating Position (Limiting Available Seats)

2.2.2 Server Manipulation Layer

The PHP script is used for make connection with the database and to show the query results. This server scripting language uses a kind of date and time functions to display the pages with the current time to the users.

Forms in the PHP pages post the queries to the server and displays their results in another page. Moreover, session and cookie functionality helps to user logging and store some temporary data values in browser memory.

Special functions implemented

For Student Registration

When the students are registering in the system for the first time, system automatically generates a password and send username, and password to the e-mail address provided by the student to the registration.

For Positions and Voting

An important thing is, system asks how many members can be elected in the election through voting by using the 'limit' variable. If it is answered as more than 1, then voters can be able to vote more than one candidate for the position.

Example:

once we need to select 1 member for treasurer, when adding that post to the system we need to set the available seats as 1. If we need to select 3 committee members, when adding that post to the system we need to set the available seats to 3. Then system allows more than one selection under committee members position.

2.2.3 Database Layer

Our database layer was created by using MySQL, and PHP MyAdmin tool, we manipulate and make more creations in the web database. There are five tables to keep data.

Admin table	This table is to keep data about administrators' usernames and passwords.
Candidate table	Data of candidates who participate in the current election.
W Position table	Positions to which candidates are going to be elect
Students table	This table is for handling the registration of the students to the system. And keep students' data
Vote count table	This table stores the data about election results of the candidate.

and Blogs

Additionally, we designed a website and a blog for students' union of the faculty of applied science Vavuniya campus. In addition, we embedded an image gallery, twitter feed stream and Facebook with the website. This website notifies when the election is announced.

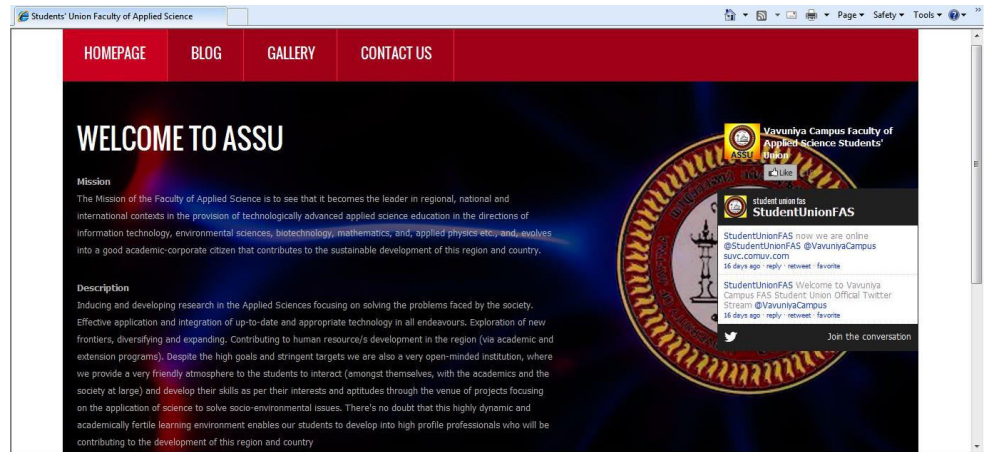
Moreover, we have added important links to that website such as Vavuniya campus official website, LMS of the Vavuniya campus, university grant commission website and official Sri Lankan government web portal. Finally, RSS stream for the web and blog.

Designing Website and Blog

Html5, css3, and Ajax technique are used to design. We implemented the image gallery that can upload images and make comments for each image.

Using WordPress, we created a dynamic blog with many custom widgets that implemented by us,

- ✓ Event calendar
- ✓ Polling system
- ✓ Photo and video stream
- ✓ Social network connections



3. EVALUATION AND VALIDATION

We organized a sample election to evaluate and validate our system. We hosted the system on a free server with two subdomains. One is for blog and other one is for voting system. We registered few students and let them to vote on the election and collected their comments through the online page. We added three candidates for the **President**, two candidates for **Secretary** and one for **Junior Treasurer** and 3 Students for **Committee members** among registered students. Election was conducted for an hour period. System Opened for voting at the pre-settled time by admin and closed after one hour. Then it displayed the results of the election by counting the votes automatically.

4. CONCLUSION

The system proposed in this paper is not only just to convert the current manual system into an automated system but also to be possible to run in parallel with the current system and thus make it easier for the students who are not able to cast their votes due to different reasons as stated above. Students able to cast their votes through their home PC. This multitude of opportunities will make voting more accessible, and thereby hopefully creates more attraction for those people who do not cast their votes today. Our approach gives a reliable output to the viewers

5. DISCUSSION

The implementation of this research is a sound success. Main strengths of this research are that, it has achieved most of the functionalities that were proposed in the system specification. The system has a secure login process. The voting system is user-friendly. The use of PHP as the server side scripting was the right decision to the problem arises while a huge number of voters visit the website at a same time. The system displays the accurate results, which maintain the reliability of the election. This web application has an admin side that enables the returning officer to edit the

candidates' details i.e. Add or delete the candidates who participating. This application is set out to the Students' Union site, and voting system active only during the election period. During the other time administration deactivates it. Therefore, anonymous cannot access the voting system. The online voting system is the vast area to have a research and improve them. This is the reason that most of the universities, organizations are not actually fully adopted this online system on behalf of the paper-based system.

As our future work, we would like to introduce different polls. We will try to make admin side user-friendly as to create new polls by the administrator, edit the existing polls by simply using the forms. This will save a lot of time and resources for the end users. We would also like to work on the security of the applications. We will work more on the cryptographic and encryption technologies that could be implemented to improve the system's security. And we hope to develop the mobile version application as well. The system can be made more user-friendly by adding technologies like speech recognition, fingerprint identification etc...

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