Makerere University

College of Engineering, Design, Art, and Technology

The department of electrical and computer engineering

Project Proposal

Title: Design of a smart voting system (Online Polling station)

Project Team: Tipan Coders

Project Leader Details
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Date: Friday, 13 September, 2019

Executive Summary

Of recent conducting of elections in the appointment of leaders is in almost every single part of our day to day life, for instance in workplaces, schools or even in electing political leaders in the country. The main challenge is however in developing countries like Uganda these tasks are being conducted manually which in fact requires much human intervention. The rapidly increasing knowledge in IT (Information Technology) could actually ease this task by writing computer network programs.

In my quest for knowledge in computer programming I told myself what if at Makerere University we have such a smart polling station that would not require students lining up to vote, all they would need is access to the Internet and any smart handset such as a mobile phone or a laptop. So I have come up with a web program that will automate the voting system in this institution, although still under development the present version of this program can illustrate its capability.

This program is solely a network program that works only when one has access to the Internet, and to simplify its access I have endeavored to create installer versions that a user can install on their mobile phones and this will act as a portal to the website on which they will conduct activities.

Although the project started as a one-man project currently I have many of my fellow students interested in joining it. Most of them are under my training, giving them the necessary principles required for the project because I would like the entire product to be CEDAT made.

This whole program is being developed in Python Programming language, and specifically using the Django Web Framework, it is such an elegant language with a clean syntax. It is using the MySQL database for development for storing applications and user data. It has the user or student management, the candidate, and voting functionalities all embedded.

If this project is given a go-ahead I can a sure everyone that it will not only save costs on conducting elections traditionally but will save time significantly.

As per now I have created the so-called prototype of my idea, which I believe will sufficiently communicate my imagination.

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Problem Statement/ Abstract

Currently, in Makerere University voting for leaders in Colleges or halls is being conducted manually and traditionally, which is not only cost ineffective but also time-consuming. Most times on days of elections many lectures are interrupted because students are supposed to attend to votes, or even some students may fail to vote in case they do not turn up on that day for school. So to curb this problem fully I have thought of designing a smart polling station that will automate this process, and even those who can not come around school premises on that day can vote online provided they have access to the Internet.

Reason for focusing on this project

Engineering has been defined as " a design within constraints" and engineers must use the scientific principles they learn to solve real-world problems while dealing with the constraints on material strength, budget, and environmental impact. This project is not that costly, has minimum impact on the environment, and addresses a real World problem that calls for attention.

Strictly speaking, the online voting system may be present in some institutions around the whole but not in Uganda, thus it will be of great honor to this Institution if it is the first to adopt such a system. Thinking of that, possibly in the near future, the government can adopt the same idea for conducting national elections as well.

This project is also helping me complete my quest in web programming since developing all the required codes from scratch makes me discover many programming aspects that I need to know as an engineer with my team inclusive.

Problems that will be addressed by this project

1. It will save on financial costs on conducting elections, normally the institute has to employ say the police at the poll stations for security monitoring, cost on ballot papers and other expenses.
2. It will save time since everyone can vote at any instance from their mobile devices, and thus there will be no interruption of lectures.
3. Errors in the counting of votes will be curbed away since this process will be automated in the system.
4. Impersonation will be stopped since every student will only use their student number as the username to access the service and the system will allow one to vote only once. Nonstudents will not be able to vote.

5. Energy-saving: In the manual system fuel has to be consumed to transport voting materials, ballot papers have to be made all these contribute to climatic change on the global view. However, the impact of using such a smart system will be really on a minimum scale.

Benefits of the project

1. It will uplift the name of the college when outsiders hear of the innovation they will come to appreciate the existence of CEDAT.
2. It will promote innovation in the college because many students after that will opt to be the next innovators in line.
3. It will open up ways for other projects. Personally, I have a bunch of projects that I have started and those still in mind, because I would like all the soft-wares used in this country to be developed by Ugandans.

Project Scope

This web program has basically three different functionalities;

- Student account management: This will keep track of students and ensure that only eligible students are to vote for their favorite candidates.
- The Candidate Section: This keeps track of the history of leaders who led in the past, those currently in power and finally the contestants if its election time.
- The Voting Section: This allows students to vote only for candidates nominated by the student body above some threshold value. When the Window closes it gives the statistics of the votes.

For security reasons only the system will have one administrator whose task will be entering the details of contestants and days when the election Window opens and closes, otherwise all other functionalities are inbuilt and they run automatically to avoid human intervention and cheating of votes.

Introduction

The “Tipan Coders” Group is a team of students formed by me the author of this proposal, we are interested in developing desktop applications, mobile and web programs. The first program I developed was an advanced desktop calculator program, which can perform graph plots, obtain common transforms, solve ordinary differential equations, solve both linear and non-linear equations and many more functionalities.

After taking more time in understanding web development I then thought of developing the Smart polling station for Makerere University for the reasons given in the Abstract.

Project objectives

- To Automate the voting system of Makerere University.
- To enable students like me and any other doing such projects to appreciate their times in school, and apply principles they learn during their time of the study.
- To Inspire the students out there yet to join the campus in undertaking engineering courses, since the project will show them that everything is possible once someone is committed to doing whatever they want to achieve.
- To uplift the name of our college. Being an engineering college people bringing up such a nice innovation can give it recognition in Uganda, Engineering societies and globally too.
- To enable students to use their times well in generating good innovative ideas in their quest for knowledge.

Project vision

As a team, we are looking forward to automating many tasks in this University, Country and the World at large. We would like to encompass IT in every part of life so that this country's technological standards will as well be raised like most developed countries. We also like to make students appreciate programming by engaging themselves in such activities.

Design Methodology

As stated previously the project is web-based, and since we are much interested in Python programming language, it will be the tool of use.

Although the language has so many frameworks for web development, we will use the Django web framework for its unique abilities and big projects like Instagram accomplished using it.

Django offers a development server that runs on the local machine that enables us to write and test the scripts locally. But to access it globally we use the web host "Python Anywhere" who grants a free account of 512 Mb although with no much power on the domain name to be used for the site.

The program being a network application uses currently the MySQL database for storing user data and application data.

Security in the application is implemented using the inbuilt security functionality in the Django framework as shown in **Figure 1, 2**. But for most of the coding, the GitHub platform will be used since it offers many collaborative abilities for teamwork.

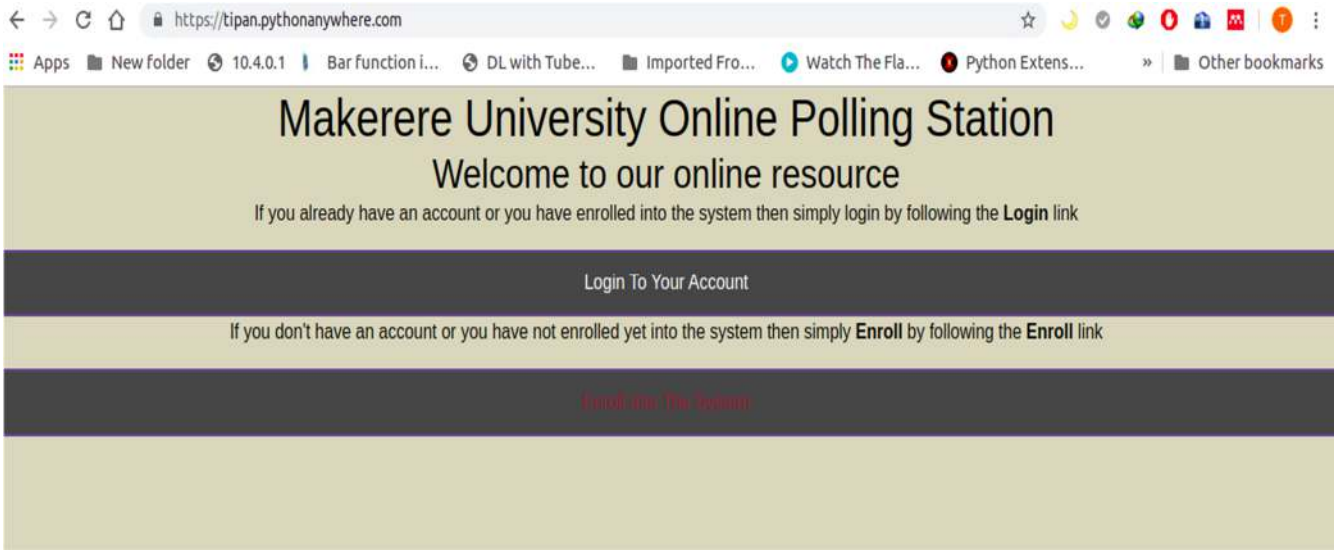


Figure 1: The Welcome page

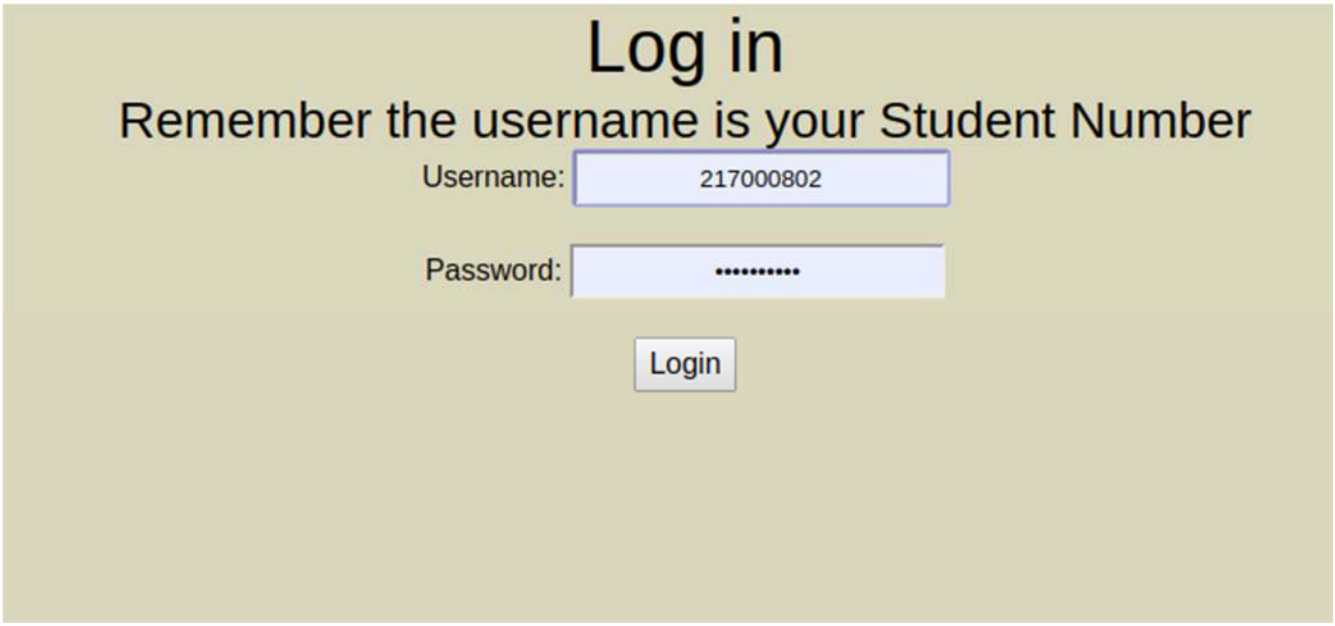


Figure 2: The Login page

The different functionalities will be selected from the navigation bar: The top navigation bar allows the user to go to the main functions as displayed in **Figure 3.**

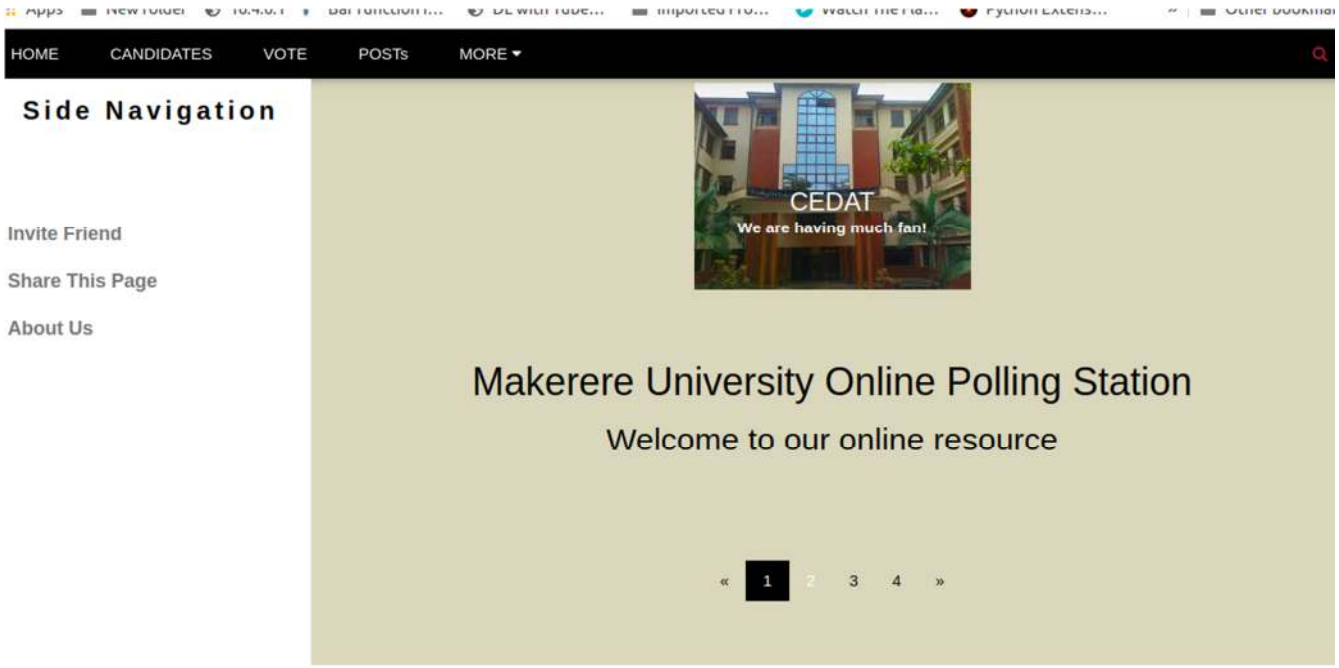


Figure 3: The Home page

The side navigation bar on the left pane will allow the user to use functions under the main ones as shown in **Figure 3.**

The “CANDIDATES” tab, exploits the functions inbuilt in the candidate app, described in detail in the next section.

The “POSTS” Tab, have social media functionalities, which allows the users to post news and any important information about the election to be viewed by other users.

The “VOTE” Tab, exploits the functionalities in the Vote app described fully in the next section.

And then the “MORE” tab contains other functionalities such as viewing one's account, logging out and etcetera.

Project Plan

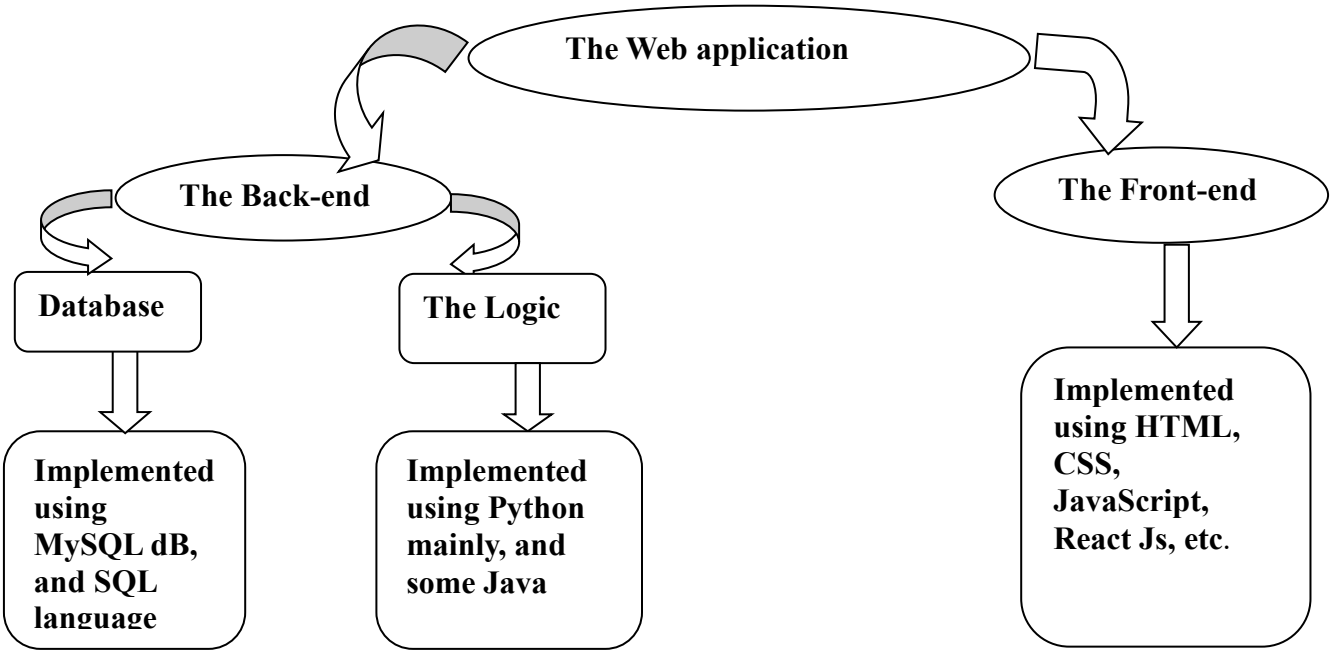
This section will explain how the whole project will be executed.

Like any other web application the design will have two broad ideas that are:

- The front-end also is known as the user side, this will be developed using CSS (Cascading Style Sheet), JavaScript, HTML, React Js and many other tools.

- The back-end also is known as the server-side, this will be developed in Python purely.

Figure 4: The Processes Involved in the project



For the proper execution of this project, the working team will be divided into two:

- The first group will focus on the logic, and database or more specifically the back-end. In which case the proposed language will be Python programming language.
- The second group will focus on the front-end, which is the user interface. This team will use HTML, CSS, JavaScript, and perhaps React Js where necessary.

With this plan, the project will take a period of one month or even less of the total focus on it to get it into full deployment. However, due to school tasks and other activities during the normal semester sessions devoting time absolutely to coding can be a bit of a problem. So if the real project execution is to start now then I supposed that it may take a little more time, this being a little busy semester.

To go much into a little depth, the Django framework is of my interest, because it offers a lot of abstraction and modularity which may not be the case of many web frameworks. Henceforth the project will be broken down into smaller applications:

1. The student application, which in this case will be handling student details, the accounts, the logins, and logouts. This will have a team that will work on it to see that it is well administered.

2. The Candidate application, which will, in this case, will handle anything to do with current leaders, contestants, and past leaders. This as well will have a team that will basically work on it.
3. The Voting application, which will administer anything to do with votes, results and other related items. For this as well a team will be designated to accomplish it.

Splitting the task into separates applications will make the work a little easier and faster. After every team has done their jobs, the different apps will then combined together to create the project. All this will fit in the proposed time above.

If the approval of this project is made then I and my team will make sure by the start of next semester, this project is executed since its the semester in which elections are conducted.

Proposed Budget/ Project Requirements

Soft-ware development requires an efficient and faster machine that will render faster coding abilities with ease and efficiency. Most time as developers we run more than one operating system on our machines to exploit the benefits of each, for instance, I run three operating systems currently that is Windows 10, Ubuntu and Kali Linux, and since all these come at a cost the computer becomes very slow especially if you are using Intel Dual-Core as I do.

So personally for this project and others that I have not addressed in this document, I would like a better machine that will ease my work and increase my efficiency in coding.

The prices of computers, in fact, varies but at least an “I Core 5” or better offer will be highly appreciated.

The entire project as mentioned above will be done by the students in CEDAT, except for cases where we need help, and only if there is a call for. Otherwise the only other financial support we will need right now will be in facilitating the project, especially being mobile internet bundles, as being a web program most of the coding has to be done Online collaboratively and since the team required will reach about 10, that will be a good push forward for the other people I am going to recruit in this project.

Currently, in the development, the project is being hosted and tested from the “Python-anywhere” platform and since we are using a lower pricing plan we pay $ 12 per month.

For productive deployment, and hosting the project on a remote server will need like $ 99 for limited control, but a price plan of $ 500 per month will allow custom hosting a full control over the host. However, if the University possesses a server then this cost can as well be saved, by running the application on its local server.

Lastly but not least we will need some fun to upload APK (Android and IOS) distribution packages to app stores for download by students to ease access to these sites, other than hard-coding the URL in the mobile browsers. However, the requirement for this will be communicated once approval is made and the deployment is at hand.

Project Deliverable

On completion of this project, in fact, we will present several deliverables some of which will include;

1) A fully functional web application ready to be deployed on any remotely accessible server. The app will be responsive in such a way it can be accessed using a device of any screen size without the user experiencing any dissatisfaction in the services offered.
2) A desktop installer, which can be downloaded for our website, this setup can be installed on desktop or laptop computers to access the platform without having to remember the URL of the site.
3) An APK (android or IOS) distribution packages that will be available on the app stores the is Google Play Store and Apple Play Store. This will allow easy access to the portal.

Conclusions

Conclusively this project is aimed at automating the voting system in Makerere University, which will address issues concerned with cheating of votes, time delays, human errors in vote counting and many other factors addressed in this text. Its mode of implementing this idea is by designing a web application with all the automation built in it that will run alone with no human intervention. With time consideration the project will be done by a team of students in CEDAT in a proposed duration of a month of active coding.

The main requirements are those for the hosting and testing the development version, facilitating the smooth running of the task, deliverable deployment, and a personal computer for the head of the Project for the reasons stated in the above text.

When all is accomplished the team can assure every member of this Institution the joy they will get from using the product.

THE END