ALUMNI INFORMATION SYSTEM

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ABSTRACT

Alumni Information System is an interactive generic web application and a mobile application designed for the faculty and alumni of any kind of university. The application aims to keep track and maintain the school's record of alumni information and create opportunities for alumni and their institution to stay connected and engage with their college mates and friends.

The application has two main modules: a University Management System and an Alumni Management System.

Application evaluation was conducted to measure the overall experience of the users while interacting with the system and to measure the usability of the application. The purpose of this is to understand how users interact with the system and identify areas where improvements can be made to enhance the overall user experience. The evaluation assesses different aspects of the user experience, such as satisfaction, ease of use, and perceived usefulness of the system.

Based on the user testing results, the system resulted in an excellent rating with an average System Usability Scale (SUS) score of 80.5, indicating that the system has an acceptable or good rating. While the Measuring Task Success results indicate that the system is usable, improvements are needed to address the encountered bugs. The user testing results, including SUS average scores and MTS rating, suggesting that the Alumni Information System is user-friendly and has the potential to engage both alumni and the alumni office. The system provides an easy and convenient way for alumni to update their information and stay informed about events happening at the university. The researchers have recommended additional processes to be included in the system to enhance its usefulness even further.

KEYWORDS

Web development, Alumni Information, Mobile application development

1 INTRODUCTION

Every year, a large number of students graduate from their various schools or universities. It is incredibly difficult for universities to maintain complete data, resulting in a disconnect between graduates and their alma mater. Even if we have to invite alumni to meetings or activities, schools, and universities will have a difficult time reaching out to them. Many graduates will start their own enterprises after graduation; colleges must keep in touch with such alumni to ensure that they get the most out of their education.

Communication between graduates and institutions can be quite advantageous in a variety of circumstances. For example, the university may be interested in hosting a guest lecture by a successful entrepreneur from its alumni. If there is inadequate contact, the institution must spend time tracing the contact. As a result, keeping consistent data is linked to developing effective communication abilities. This technique is designed to aid with this effort by allowing alumni to keep in touch with one another and the organization.

The researchers were able to come up with the idea of developing a generic website application and a mobile application that will help maintain connections between fellow alumni and their universities. This web application and mobile application are accessible anywhere and anytime. These applications will create networking opportunities and other opportunities, which can connect recent graduates and other alumni with established professionals and help them pursue and excel in their careers. Provide updates about the university and maintain the relationship of the alumni with fellow alumni and

2 REVIEW OF RELATED LITERATURE

2.1 Alumni Management Existing System Currently Use In Ateneo de Naga University

The existing system is a computerized system that is maintained in individual databases i.e in excel sheets, it's a time delay process. And maintaining all the records in excel sheets is difficult. If they want any records they have to search all the records. The existing system doesn't also provide multiple-user accessibility and has different user privileges meaning only the one holding the record can access the data and the system is not accessible to all the employees of the organization. There is no centralized database, no easy access to the particular alumni's basic information/data, and individual alumni have no direct control over their data

2.2 Differences And Similarities Of Other Systems to the Proposed System

According to "Dynamic Alumni Monitoring with Decision Support System (2021)"[7] The system is able to track the whereabouts and accomplishments of their graduates, their employment, and pro-ductivity. The system can also generate reports that are needed by the faculty and administrators and can trace the information and whereabouts of the graduates as one of their key features. While according to the study titled "An Alumni Portal and Tracking System (2021)"[5], their system is accessed by the alumni for the sole purpose of updating their information and for searching the whereabouts of their fellow alumni. This means the features of the system are only for viewing, searching for other alumni, and updating their profiles. This has the same concept as "Alumni Information System (AIS) (2020)"[27], but in the system it has only one user which is the adminis-trator that is able to view, search, and sort on the alumni information table list. The system allows the KSU administrator to keep track of Master of Science in Information Technology graduates and their career paths. The system also provides various functionalities which include: User-friendly GUI interface, Import New Graduate data into the database, Search functionality, Backup and Restore, and allows the system admin to update alumni's information (jobs, education, email, and such). The system was also developed using php and MySQL workbench.

3 THEORETICAL FRAMEWORK

This chapter presents technical terms, relevant algorithms, and possibly mathematical theorems used in the study for a better understanding of the readers. The researchers will also define the architectural framework used to define concepts and flows in developing the system. Different applications and languages that are used will be also defined and it's essential in the implementation of the research.

3.1 Architectural Framework

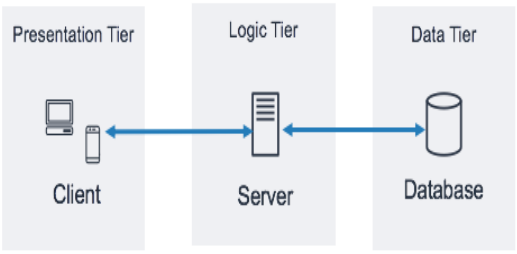

Figure 1: Architectural Framework

The architectural framework that is used in developing the system is the Three-Tier Architecture. The Three-Tier Architecture is a software application architecture where it organizes applications into three logical and physical computing tiers: the Presentation tier, Logic tier, and Data tier.

The presentation tier is where end users interact with the system, the purpose is to collect information from the users and display it in the system. Researchers plan to use the controllers like buttons, text boxes, labels, and other features that will be used to gather information from the users. The logic tier processed the collected information from the users. The data tier is where information processed by the logic tier is stored and managed by the admin of the university, this gets the collected data from the logic tier and sends it to the database. Information processed by the logic tier is stored and managed by the admin of the university, this gets the collected data from the logic tier and sends it to the database.

3.2 Programming Language/Scripting Language

PHP/

PHP, which stands for Hypertext Preprocessor, is the most frequently used open-source and broad sense server-side scripting language for developing dynamic websites and apps. This will be utilized for the application's backend.

Laravel/

Laravel is an open-source PHP framework that is both robust and user-friendly. It follows the design pattern of model-view-controller.

HTML/

HTML is a well-known markup language for web design. Everything about a web page element can be modified. To markup and organize the content, it employs simple labels.

CSS/

Cascading Style Sheets (CSS) were used to manage the layout of several web pages simultaneously. This will be helpful on

our end in terms of modifying the appearance of the web just by using a single file.

Node.js/
Node.js is an open-source, cross-platform, back-end runtime environment for JavaScript that executes JavaScript code outside of a web browser and runs on a JavaScript Engine (i.e., V8 engine). It was created to help create scalable network applications. JavaScript can be used by developers to create command-line tools and for server-side scripting, which produces dynamic web page content on the server before the page is transmitted to the user's web browser.

JavaScript /
JavaScript is a high-level, frequently just-in-time compiled language with dynamic typing, prototype-based object-orientation, and first-class functions. It supports event-driven, functional, and imperative programming paradigms and is multi-paradigm. It offers application programming interfaces (APIs) for using the Document Object Model, regular expressions, dates, and standard data structures (DOM).

MySQL/
A relational database organizes data into one or more data tables, each of which can be coupled to another; these relationships assist structure the data. SQL is a programming language that allows programmers to create, change, and extract data from relational databases, as well as control user access to the databases.

Flutter /
Flutter is Google's UI toolkit for creating beautiful, natively built mobile, web, and desktop applications from a single codebase. Flutter is free and open source, compatible with existing code, and is utilized by developers and organizations all across the world.

Dart/
Dart is a programming language designed for client development, such as for the web and mobile apps. It is developed by Google and can also be used to build server and desktop applications. It is an object-oriented, class-based, garbage-collected language with C-style syntax.

3.3 Development Tool

Software:

Github
Github offers access control, issue tracking, software feature requests, task management, continuous integration, and wikis for every project in addition to Git's distributed version control.

Visual Studio Code
Visual Studio Code is a streamlined code editor. This will help our development in speeding considerably by utilizing the Emmet features, and the support in development like debugging.

Android Studio
Android Studio is the official integrated development environment (IDE) for developing Android applications. It is built on IntelliJ IDEA, a Java-based integrated development environment for software, and includes code editing and developer tools.

XAMPP Server
XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mostly of the Apache HTTP Server, the MariaDB database, and interpreters for PHP and Perl scripts.

Hardware:
Laptop: Acer Nitro 5
PC: AMD Ryzen 5 2600
Mobile: Google Pixel API 31

3.4 Software Engineering Tools

Use-Case Diagram
Use-case diagrams depict a system's high-level functions and scope. This will help in summarizing details in a system.

Flow Chart
A flowchart illustrates the individual steps of a process in chronological sequence. By laying out the procedure in detailed form, it will be simple to increase quality and consistency.

Data Flow Diagram
A data-flow diagram depicts the flow of information through a system. This will be utilized to map out, plan and better organize the program.

Entity-Relation Diagram
An entity-relationship diagram illustrates how certain entities are related to one another. Utilizing this tool will help the database structure to be easily comprehended

3.5 Modeling Tools

Draw.io
Draw.io is proprietary software used in producing charts and diagrams. This will benefit us in creating and sharing our preferred diagram and chart visualizations.

Adobe XD
Adobe XD is a vector-based experience design platform that is both powerful and simple to use. We're using Adobe XD to generate wireframes and screen designs for the application.

Lucid Chart
LucidChart is a diagramming tool for the web. It draws diagrams while engaging with your group in real-time.

4 METHODOLOGY

The system is developed using the agile methodology. These are short cycles of work that allow for rapid production and constant revision. It is a project management technique in the software development process. The researchers used this developmental research method to gather requirements, organize, design, develop, test, implement, gather feedback, and present the portal web system to the users. This is for the improvement of connectivity among alumni and their institution and provides updated information on the alumni database for each university that is using and will be using the system.

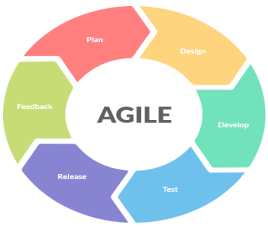

Figure 2: Agile Methodology

The methodology consisted of these phases:

- **Requirements** - The researchers made a set of a plan to guide the development of the proposed system. The researchers conducted meetings to discuss the objectives and scope of the system. The researchers use a GANTT chart to set a plan and visualize the project.
- **Design** - For the design phase, the researchers designed and created diagrams needed for the project such as ERD, Use Case, Data Flow Diagram, Context Diagram, Level 0 Diagram, and Swimlane Diagram using Draw.io. The diagrams assisted the researchers in developing the proposed system.
- **Development** - During the development phase, the researchers developed the web application and mobile application by combining the product requirements gathered.
- **Testing** - Both the mobile and web application features, functionalities, and designs are tested to see if there are issues and bugs encountered using the system. The proponents use (ATDD) Acceptance TestDriven Development, both developers and testers work hand in hand in the development phase, in every functionality and module added tests are conducted. This is to ensure that the system is reliable and to make sure that all the functions of both mobile and web applications are met. If any errors, bugs, and defects are encountered during testing it is assessed and fixed.
- **Deployment** - After the features, designs, and testing are finalized and done in both web and mobile applications the application is finalized for deployment. The system is deployed in the cloud and there is a web server that processes data from both mobile and web applications and collects data from the server. The system is used in Ateneo de Naga University for a month before letting other universities use the system to make sure that all the objectives, functionalities, and specifications are met.
- **Maintenance** - During maintenance period patches are done to maintain, fix bugs, and defects encountered by the users. The system is regularly checked and maintained to guarantee that the system and both applications are functioning well.

4.1 System Design

The Alumni Information Systemhas 2 major modules: the University Management System(Admin) and the Alumni Management System.

- University Management Module - The university management is responsible for approving and dsiapproving all the post request of an alumni user in the system. The university management can post announce, jobs, photos related to the university. The administrator and alumni can interact in the system.
- Alumni Management System - The alumni management can access the system by registering an account and wait for an approval of the university management, the alumni can post a announcement, and photos related to the university with the approval of the university management. The alumni can also post job, and a forum without the approval of the university management.

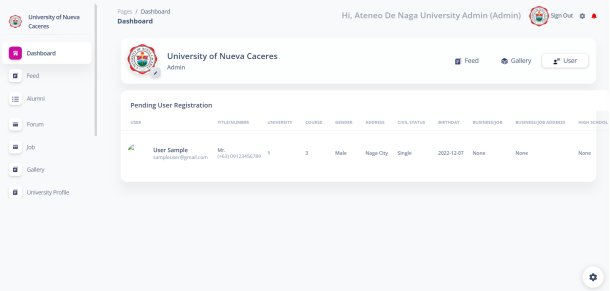

Figure 3 : University Management Home Page

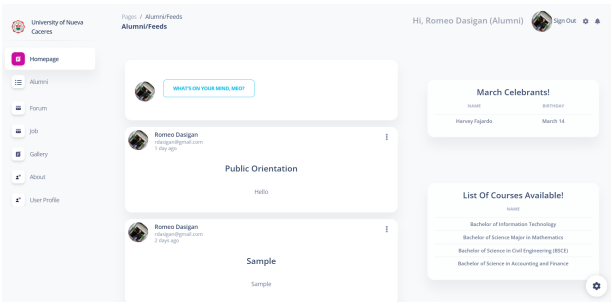

Figure 4: Alumni Management Homepage

5 RESULTS AND DISCUSSION

This chapter discusses the results of the assessment and user testing of the web and the mobile application of the Alumni Information System. The results accumulated during the assessment will be reserved as a guide to the researchers and be able to evaluate the results of the assessment, this helps the researchers to further improve the system. The researchers used the SUS Questionnaire to gather information for improvement of the system.

5.1 University Admin, Alumni and Students Evaluation using SUS questionnaire

During the user testing to University Admin, Alumni, and Students, the researchers discussed the processes of the system. The researchers focus on discussing the processes to the university admin since the university admin is the one who will manage the system. Guiding them each on process on how the system works. After guiding the university admin, they were asked to answer the evaluation form using the SUS questionnaire with 5 points Strongly Agree and 1 point for Strongly Disagree. For the Alumni and Students, the researchers give the url website and the mobile application installer to test the usability of the application. The users create their own account to test the registration form of the system. After creating an account the university admin approves the user registration request for alumni and students to access the system. The researchers were able to guide the users on the process, on how to use and on what processes are needed for an approval when posting. Below are the results of the evaluation form.

5.2 SUS Result of Alumni Users

The result of the user testing of the alumni is excellent, having an average of 88.75. There were five(5) alumni who were able to get an excellent adjective rating while one(1) alumnus got a good adjective rating with a 77.6.

5.3 SUS Result of Student Users

The result of the user testing of the students is poor, having an average of 63.33. There was one(1) student who gets an excellent adjective rating with an average of 82.5 while two(2) students get a poor adjective ratings with 55.0 and 52.5

5.4 SUS Result Overall Average

Based on the graphs and the results from the SUS questionnaire, both mobile and web AIS applications have a positive reaction from the users. The SUS scores show that most of the users can easily use the system meaning the system is user-friendly. Some alumni still need to be guided in using some functionalities of the system, the SUS scores average from the Alumni user is "88.75". While the result of the admin user testing is graded A or in the adjective rating is excellent having an average SUS score of "92.5". Lastly from the student users the average SUS score is 63.33 or in the adjective, rating is "okay", they had a hard time using the system because the testing was done in an online manner and they also encountered a bug during the testing. The result of the user testing for admin, alumni, and students was excellent in adjective rating having an average of 80.5. This indicates that the system would help both end users in an engagement type of set-up. However there are still processes that some users need guidance and functionalities that need to be included in the system for it to be more engaging.

5.5 Measuring Task Success

The user testing was conducted to measure some of the functionalities of the system and mobile application. Based on the gathered data some functionalities of the system do not work and users have difficulty using the system that needs assistance, but most of the users were able to use the functionalities in system and mobile applications easily.

5.6 MTS Testing Result

There are three types of user groups that the testing was conducted to which are the Alumni, Admin, and Students. Based on the graphs and the results from the Measuring Task Success (MTS) the admin was able to execute all the 24 commands in the web application without the support of the researchers, the alumni was also able to successfully execute the 19 commands without the support of the researchers and the other 2 with the support/help of the researchers in the web application, and the last one are the students 15 commands were successfully executed without the help of the researchers, 2 were successfully executed with the help of the researchers, and the other 4 was not successfully executed due to the bugs that they encountered during the testing.

While in mobile application, there are two types of user group that the testing was conducted to which are the Alumni and Students. Based on the graphs and the results from the Measuring Task Success (MTS) the alumni testers was able to execute all the 14 commands in the mobile application without the support of the researcher while in the student group they were also able to successfully execute the 13 commands without the support of the researchers and the other 1 was not successfully executed due to the bug that they encountered during the testing.

In the admin side of the web application the result of the Measuring Task Success was successful. The Admin was able to follow and apply all the commands listed. There are 24 commands and all of it was successfully followed and

executed by the admin. The result of the Measuring Task Success for Alumni in Mobile Application was successful. There were 14/14 commands that were successfully executed by the Alumni. The result of the Measuring Task Success for Students in Mobile Application was successful. There were 13/14 commands that were successfully executed by the Students and 1/14 that were not successfully executed due to the bugs they encountered in the mobile application.

5.6 MTS And SUS Testing Summary

Based on the SUS questionnaire and MTS testing, the Alumni Information System will be a useful web and mobile application, this system would benefit the Alumni Office and fellow Alumni in updating their current information. There are still a lot of recommendations that can be implemented in the system for it to be more useful and engaging. The Alumni Office recommendations are listed and will be used in further studies that will be worked on by future researchers who will be using the same system/research.

6 CONCLUSION & RECOMMENDATION

6.1 Conclusions

The Alumni Information System can aid the Alumni Office in managing their alumni, keeping them updated on the events happening in the university. The Objectives that were achieved by the proponents during this capstone project are the following: first, the proponents have successfully gathered information and system specifications to fully grasp the needs and requirements of the system that has been developed. Second, the proponents have successfully created the University Management Module that enables the Alumni Administrator to navigate and perform administrative-related tasks within the system. Lastly, the proponents have successfully created the core module of the system which is the AMS or Alumni Management System that enables the organization to fully automate alumni matters in a single web application and mobile application. This module core feature enables the user to create an account in the system, view and create job postings within the system and act as a social platform where the user can post images and statuses with the approval of the administrator as well as other sub-feature that enables the alumni to have an ease of access, with this the proponents have successfully contributed to the Ateneo Alumni Committee by developing this program and enabling its target stakeholders to have a more profound experience being an Alumni. The web and mobile application will be helpful on both ends, for the alumni the results of the SUS and MTS scores show that the users can easily use the system. The student results of the SUS scores show that they still need to be guided on how some process and functionalities of the system works, the results for the student's SUS questionnaire are Graded as D, or the adjective rating is poor. The students must be guided on the processes available in the system. For the Alumni Office, the results of the admin user testing is Graded as A or in the adjective rating is excellent, they were able to easily use the system and were able to easily learn how the system works. The SUS average scores and MTS rating shows that both ends of the users were able to use the system easily and that the system would help both the users in an engagement type of setup, the alumni who will use them can update their information without going to the office of the alumni, they can also be updated on what is happening in the university. The alumni office would be able to maximize the system by posting events such as a donation drive and other important announcements. The Alumni Information System is useful, however, there are still some processes that can be included in the system which the researchers indicated in the recommendations.

6.2 Recommendations

The web and mobile application still need some improvement and additional processes in the web and mobile application to be more efficient and user-friendly, providing a better user experience for both alumni and university administrators. It is recommended that the Alumni Information system would:

- Integrate an excel import function to easily upload all the data of the students that are recorded in the excel database. With these, it would be efficient to upload alumni data rather than inputting it manually. Using a manual process would take time to finish all alumni information of all alumni in the university.
- Automatic creation of accounts upon uploading alumni information. Using the information that is present in the excel file the system should be able to create an account for each alumnus presents in the database.
- Comment and like functionality in the post to make it more interactive.
- Edit user profile functionality in the mobile application.
- The system should be available on iOS devices because the mobile application is currently limited only to Android devices. It would be better if both Android and IOS devices can be installed on mobile phones.
- A chatbot that can cater to repetitive queries or questions asked by alumni.
- Video and audio guide on how to use the system.
- An obituary tab.
- A pop-up notification upon login for special announcements.
- Messaging functionality.
- Donation tab.
- An upload video and image functionality on the feed tab.
- Payment functionality for alumni processes that needs payments for easy transactions.
- Can be able to tag other users in a post or announcement.
- Can see active or inactive users.
- Mobile interface for admin.
- A delete button for the admin to delete users or accounts of alumni. With these improvements, the Alumni Information System would become a more complete and robust platform for alumni engagement and communication.

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