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Alumni Tracking and Social Network System

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ABSTRACT

Employability of graduates is one of the indicators being assessed by higher education institutions (HEIs) to find out whether the quality of education they provide is suitable for the needs of the industry. This study was conducted to develop an alumni tracing system designed to allow the university to purposely trace its alumni using the internet. The system can be used as a tool to find out important information about them, like their employment status, and to identify which skills are essential to their present work.

This information, in turn, can help the HEI determine the improvements that they need to make to the existing curriculum. It used developmental research method utilizing 15 evaluators, evaluating the software output. The system has the following features statical report for employment status of alumni, alumni messenger, chatbot, alumni profile, registration confirmation and adding alumni coordinator. The overall acceptability of the software project descripted as very much acceptable. Implementing an automated alumni tracking system can help overcome these challenges and enable educational institutions to better connect with their alumni community, leverage their expertise, and foster stronger alumni relationships.

Keywords: alumni, automated alumni tracking, curriculum development, employability, chatbot, online alumni tracing system.

1. THE PROBLEM AND ITS SCOPE

Introduction

Websites are now so common in today's society that virtually everything can be accessed on them, such as a research paper. Survey and alumni information are now gathered and created. Higher learning institutions (HEIs) must maintain close supervision among their students to ensure that they are getting adequate preparation to guarantee stable employment and to pass national board examinations. This could also help assess the usefulness of the academic programs offered by the HEIs.

Tracking alumni is challenged by factors such as the extensive cooperation needed among numerous institutional units, the multi-faceted approaches needed to collect necessary data, internal institutional policy barriers, and even a misguided notion that alumni tracking is not the job of postsecondary institutions (Chan & Derry, 2013). Additional challenges stem from the difficulties inherent in collecting person-level data such as employability, employment reporting, and other contextual factors.

According to Quitevis, et al. (2019), tracer study results could help assess the usefulness of the programs as well as their effectiveness, and eventually its success or failure. In fact, Commission on Higher Education (CHED) has been firm on its stand that part of the moral responsibilities of HEIs is to know the whereabouts of their alumni the kind of employment they have, their success and difficulties while seeking for jobs and while on-the-job. They are very rich sources of information which can help improve the HEIs' market relevance to address the following job-related problems (cited by Garcia, 2016). The same situations prevailed in later years. An article of Bernabe published in Philippine Daily Inquirer on October 28, 2013 reported a World Bank study in 2011 which found that tertiary education failed to meet its potential because HEIs were operating as disconnected individual institutions, rather than as parts of a larger ecosystem that included employers and companies.

The unemployment rate in the Philippines was 16.6% in the second quarter of 2012; however, this was lower than the 16.6% reported in the same period in 2011. College graduates make up the largest category of jobless or underemployed people in the Philippines. Graduates' struggles to get employment were frequently caused by their incapability and lack of skills for the positions that were open. The alarming youth unemployment rate and the demands of globalization on HEIs to produce graduates who are business-savvy or who can find employment quickly after graduation were also mentioned by Bernabe. This relieved the industry of the need to provide initial training for its recruits.

In order to assist HEIs in tracking the locations of their graduates across all of their academic program offerings, the researchers created an alumnus tracking and social network system. As part of the academic criteria for the student researchers who participated in this project, the researchers made the audacious choice to implement an alumnus tracking and social networking system in August 2022. It was made possible by the participation of all college deans and other HEI stakeholders, where the original survey was performed.

One strategy for enhancing the relationship between alumni and educational institutions is the development of a virtual, interactive portal that provides them with useful information. This will make it possible for colleges and alumni to keep in touch long after a course has ended, regardless of location or time. The least amount of manual entry and centralized data collection is required for the collection and maintenance of alumni records, which is the primary research topic that this essay aims to address. Alumni who have previously graduated and are preoccupied with their own pursuits may find it tough to persuade and motivate them to update their profiles.

The main research contribution of this study is the development and implementation of an alumni tracking and social network system with the following objectives: to maintain records of all Jose Rizal Memorial State University-Main Campus alumni, including their current academic and/or employment status, as well as their whereabouts. To create an online alumni yearbook as a stepping stone for alumni-student and inter-alumni relationships.

Allowing alumni to update and keep their own information will help ensure an up-to-date alumni database while automating the process of tracking alumni and the social network system. The possibility of having one's most recent profile appear in the yearbook alongside his or her classmates might, in some ways, encourage alumni to update their online profiles.

Additionally, initial information for alumni may be immediately pulled from the university student database, negating the need for laborious human data gathering and entry. From this work, similar system developers and researchers may be able to comprehend the key problems associated with the digitization and integration of student records. Other domains may also benefit from the approaches and heuristics used to deal with inconsistent and duplicate records.

Statement of the Problem

This study generally aims to develop an Alumni Tracking and Social Network System in Jose Rizal Memorial State University-Main Campus. Despite the growing importance of alumni engagement, many educational institutions still struggle to effectively track and connect with their alumni. This leads to a lack of communication and disconnection between alumni and their alma mater, hindering the development of mutually beneficial relationships. This study sought responses about the similarities and differences between the existing Alumni Tracking and Social Network System at Jose Rizal Memorial State University and the one being proposed in this study.

Specifically, it will seek answers to the following:

1. What is the current status of Alumni Tracking and Social Network System for JRMSU?
2. What are the features involved on the newly developed Alumni Tracking and Social Network System for JRMSU?
3. How the Artificial Intelligence (Chatbot) for Alumni Tracking and Social Network System can be Implemented?
4. How the developed systems assist in terms of:
   a. functionality;
   b. reliability; and
   c. usability

Significance of the Study

Alumni Tracking and Social Network System is one of the strategic things that must be done by every educational institution. The importance of this study is to obtained from the implementation of this activity, namely: 1) Knowing stakeholder satisfaction, in this case graduates, related to the learning experiences they experienced, to be used as an evaluator tool for institutional performance. 2) Obtain relevant input as a foundation for institutional development, related to the competitiveness, quality, and working experiences of graduates that can be used to seize opportunities and overcome future threats. 3) Improve the relationship of graduates and alma mater, because when viewed from the experience of well-known educational institutions, strong ties of graduates and alma mater will bring many benefits to the alma mater along with the recognition of the gait of graduates in the community

The study Alumni Tracking and Social Network System of Jose Rizal Memorial State University-Main Campus will be beneficial to the following:

To the **College Coordinator**, that they will know if the graduates are really finding jobs related to their field, so that the teachers can upgrade the standards of teaching and the curriculum based from reports.

To the **Alumni Students**, that they will know what they will be doing after graduating from the school.

To the **Undergrad Students**, that they will have an idea on what field will they belong in the industry based on their skills and field of expertise.

To the **future researchers**, that they may use this study as a reference to their research study.

Scope and Delimitation of the Study

This Study is limited only to Jose Rizal Memorial State University (JRMSU) Main Campus.

The automation of the process of alumni tracking and the social network system is a key focus of the study, which aims to provide alumni with the ability to update and maintain their own information in order to ensure an up-to-date alumni database. By enabling alumni to keep their profiles current and listed in the yearbook alongside their batch mates, the system can motivate them to maintain their online information. The social network component of the system is designed to provide alumni with a platform to connect, interact, and share information, media, and content with each other. By creating profiles, connecting with friends and colleagues, and sharing updates and photos, alumni can build a wider network and stay connected with their alma mater. This helps foster a sense of community and provides a space for alumni to share experiences and knowledge with each other. The desired web application will provide a simple and accessible platform for college graduates to update their current job status, which will be stored in a central database accessible to the faculty in charge of the college. Faculties can search the alumni through their names, batches, job postings, and other relevant information. This will not only help improve the relationship between the school and its graduates, but it will also reduce the workload of staff members responsible for monitoring the employment status of graduates and reporting to CHED. With its accessibility and ease of use, the alumni tracking and social network system will provide a valuable resource for alumni and colleges alike.

Operational Definition of Terms

Ajax (Asynchronous JavaScript and XML). It is a technique for accessing web servers from a web page. It allows web pages to be updated asynchronously by exchanging data with a web server behind the scenes. This means that it is possible to update parts of a web page without reloading the whole page. It also helps PHP execute all the programs connected to it.

Bootstrap. It is a free front-end framework for faster and easier web development. It includes HTML and CSS-based design templates for typography, forms, buttons, tables, navigation, modals, image carousels, and so on. It also includes optional JavaScript plug-ins and gives you the ability to easily create responsive designs.

Chatbot: A computer program designed to simulate conversation with human users, typically through text-based messaging. For the purposes of this study, a chatbot will be defined as a software application that uses natural language processing and machine learning algorithms to interact with users and provide automated responses to their queries or requests

Font Awesome. It is a font and icon toolkit based on CSS and LESS. Font Awesome has a 20% market share among those websites that use third-party font scripts on their platform. This is used by the developers to enhance the appearance of the icons, pictures, and font colors.

Hypertext Markup Language (HTML) 5.0 or higher. This scripting language is used to add paragraphs, headings, images, and links to the webpage. In this study, this is a very useful tool in designing the interface of the software, including its hyperlinks.

JavaScript. It is used in the development of the proposed website for the purpose of validation. In addition, it also supports external applications like PDF documents. It can also load content into a document whenever the user requires it without even reloading the entire page. Generally, this software is used in the proposed system to make the web pages functional.

JSON. It is used as a syntax for storing and exchanging data. It is written with JavaScript object notation. This software is used to create the dashboard, which shows the survey statistics through graph presentations.

PHP (Hypertext Preprocessor) Laravel. An HTML embedded scripting language and interpreter. It is used to develop the proposed system by connecting it to the database.

PhpMyAdmin. It is used to perform different tasks such as managing databases, tables, columns, relations, indexes, users, and users' permission.

Social network. A digital platform or website that enables users to create profiles, connect with other users, and share information, messages, and other content. For the purposes of this study, a social network will be defined as an online service that allows individuals to create personal or professional profiles, connect with other users based on shared interests or affiliations, and participate in a variety of interactive features such as messaging, posting, commenting, and sharing.

Visual Studio Code. A software that is used to edit the source code. In this study, this is used as the main source code editor in designing and developing the alumni tracing system.

Theoretical / Conceptual Framework

This study is based on the "Graduate Tracer System" theory put forth by Cabalan, Rael, et al. (2014), which has been producing professionals from a variety of courses at the University of San Carlos. These people are equipped to compete for positions and career advancement. Some of them are employed in fields related to their specialties. Some of them have jobs that have nothing to do with their areas of expertise. The University of San Carlos produces a large number of graduates, which makes it difficult to track down alumni and learn about their employment. It is challenging to keep track of graduates due to the variety of courses taken at the university.

The Graduate Tracer System, designed specifically for this project, provides support for this research. The Graduate Tracer System may follow graduates from particular departments to see if they are hired or not. If they are employed, the project will look at whether their jobs are suitable for their degree.

The Academe is responsible for deciding if any curriculum adjustments are necessary, as well as any changes to the rate of unemployment or job mismatch.

This study is dependent on the concept of following alumni using social media and the Google Map API utilizing GPS and LBS. This work was finished in 2016 by Nikita Mithapelli, Sneha Chavan, and Jyoti Kumari. More emphasis has been placed on network access methods and interactive applications made possible by mobile phones as a result of the rapid advancement of mobile internet technology and the extensive adoption of smart phones. The open-source platform Android has gained popularity among smartphone users. This study's objective is to develop an Android app that will be helpful for tracking all graduates based on the data from their social media accounts utilizing online APIs. All this information will be stored in the database or server and it will be visible to the admin in charge. This study will be tracking the location of alumni by Global Positioning System (GPS), if internet is not available the Location Based Services (LBS) will be used and the location will be plotted on Google Maps. Alumni to alumni messaging facility (chatting module) is provided through Google Cloud Messaging (GCM) technology.

This study is also supported by (Gabriel et, al.2016) with his concept of the “Gathering Alumni Information from a Web Social Network”, in this paper, undergraduate programs must prepare its students for the major needs of the labor market. One of the main ways to identify what are the demands to be met is creating a manner to manage information of its alumni. This consists of gathering data from program’s alumni and finding out what are their main areas of employment on the labor market or which are their main fields of research in the academy. Usually, this data is obtained through available forms on the web or forwarded by mail or email; however, these methods, in addition to being laborious, do not present good feedback from the alumni. Thus, this work proposes a novel method to help teaching staffs of undergraduate programs to gather information on the desired population of alumni, semi automatically, on the web. Overall, by using a few alumni pages as an initial set of sample pages, the proposed method was capable of gathering information concerning a number of alumni twice as bigger than adopted conventional methods.

To address the challenge of tracking and gathering information on the employment status and careers of alumni, extensive research has been conducted. Based on the findings, it has been determined that a promising approach is to develop an "alumni tracking and social system." The main objective of this system is to collect and analyze data on the employment status of alumni, generating comprehensive statistical reports that can aid in decision-making processes for the university. Furthermore, the social networking component of the system can promote alumni communication and collaboration, leading to networking opportunities, mentorship relationships, and even job referrals. By offering a platform for alumni to connect with each other and with the university, the system can foster a stronger sense of community among graduates, promote engagement with the institution, and ultimately enhance the reputation of the university.

Figure 1. below shows the research paradigm of the study.

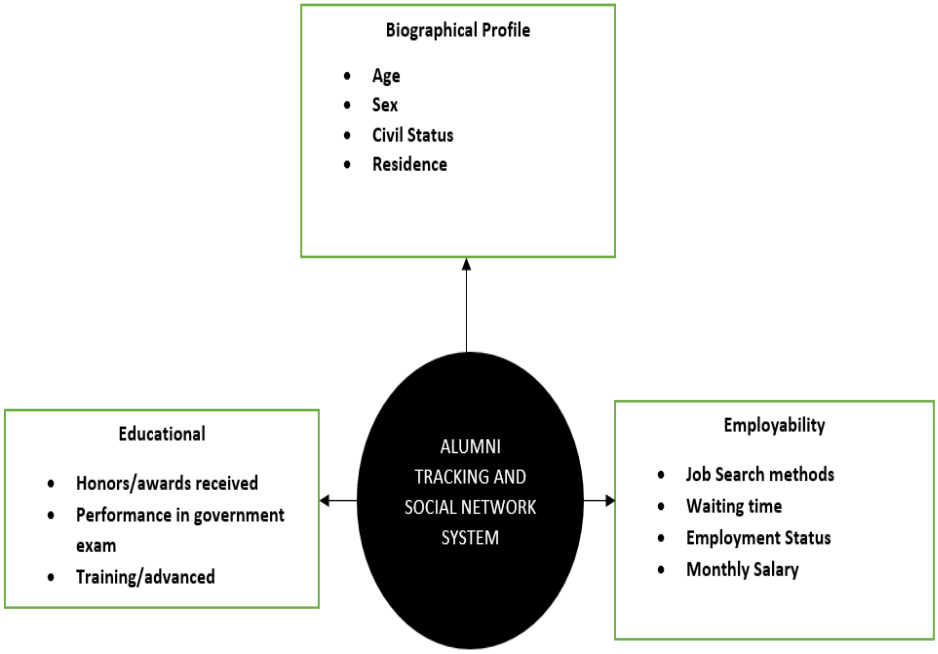


Figure 1. Research paradigm

Schema of the Study

This study aims to determine if graduates are employed or jobless, as well as whether their professions and occupations are appropriate for their field of study.

The system's input is contained in the first box. It depicts the process of developing alumni tracking and social networks. The inputs specified in this study are essential components of an alumni tracking and social networking system. Firstly, a computer is required, as it is the primary device used for developing and running the system. The use of MySQL as a database management system is crucial in storing and managing the data of the alumni, such as their personal information, employment status, and program information. PHP Laravel is a web application framework that enables developers to create efficient and maintainable web applications. It is commonly used for developing database-driven web applications, making it a suitable choice for this study. JavaScript is a programming language that is widely used for creating interactive and dynamic web pages. It is an essential input in developing the user interface of the alumni tracking and social network system, allowing for user-friendly and visually appealing web pages. Creating an account is an important input, as it enables alumni to log in to the system and access their profiles and employment information. This feature is also beneficial for tracking and updating alumni information. Employment information and program information are necessary inputs, as they provide essential data for tracking alumni's employment status and their alignment with their program of study. This information can help in identifying the effectiveness of the university's curriculum and areas for improvement.

The second box depicts the process by which the researchers conducted the study and collected data using modern technology. This is followed by Data gathering involves collecting information from various sources, such as alumni records, social media platforms, and employment databases, to create a

comprehensive database of alumni information. Requirements analysis is the phase where the team identifies the features and functionalities that the system should have to meet the objectives of the study. This phase also involves identifying the technical requirements and limitations, as well as the user requirements and expectations. Coding is the phase where the actual programming of the system takes place using the required programming languages such as PHP, Laravel, MySQL, and JavaScript. Implementation is the phase where the developed system is deployed and tested to ensure that it meets the system requirements, works as expected, and is user-friendly. Documentation involves creating user manuals, system documentation, and technical documentation to aid users and developers in using and maintaining the system.

Finally, the third frame explains the study's output and specific output, as well as its results. The alumni tracking system collects and stores data related to the employment status of graduates. This information includes the alumni's profile, such as their name, contact details, employment status, company name, job title, job description, and other relevant data. This data will be used to generate statistical reports that will help the university administration make informed decisions and improve their academic programs. The statistical reports generated by the system provide an overview of the employment status of the alumni of Jose Rizal Memorial State University. The reports include graphs and tables representing various data such as the number of graduates employed, the percentage of employed graduates, the percentage of unemployed graduates, and the percentage of graduates employed in their fields of study. These reports also include information on the average salary of employed graduates, which helps the university assess the value of its programs and improve its curriculum to meet the demands of the job market.

In summary, the output of the alumni tracking and social network system provides valuable information to the university administration about the employment status of its graduates, which can be used to improve the quality of education offered to students. The statistical reports generated by the system can help the university make informed decisions regarding curriculum development and adjust its programs to meet the demands of the job market. The schematic diagram of the study is presented on the next page.

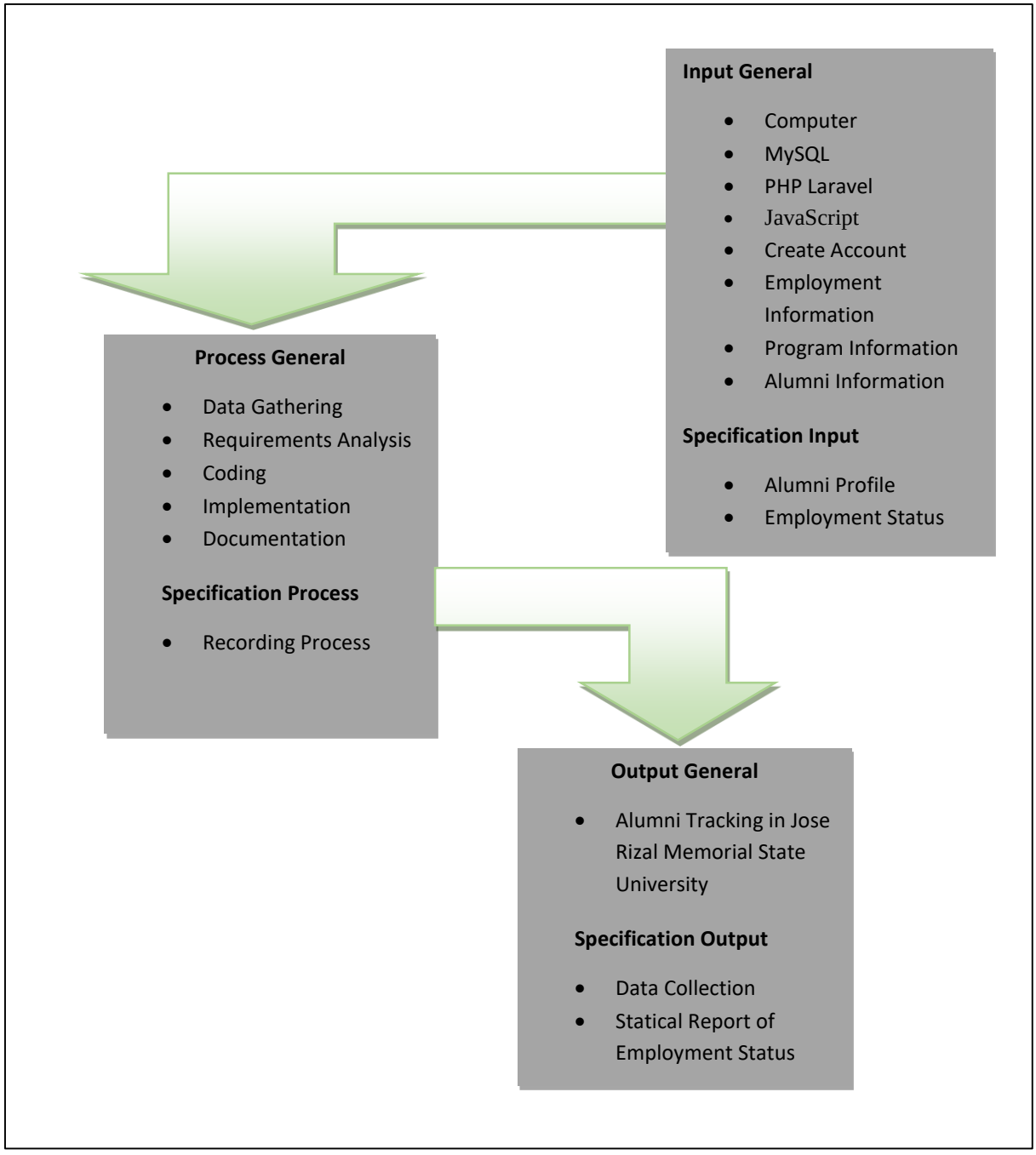


Figure 2. Schema of the study

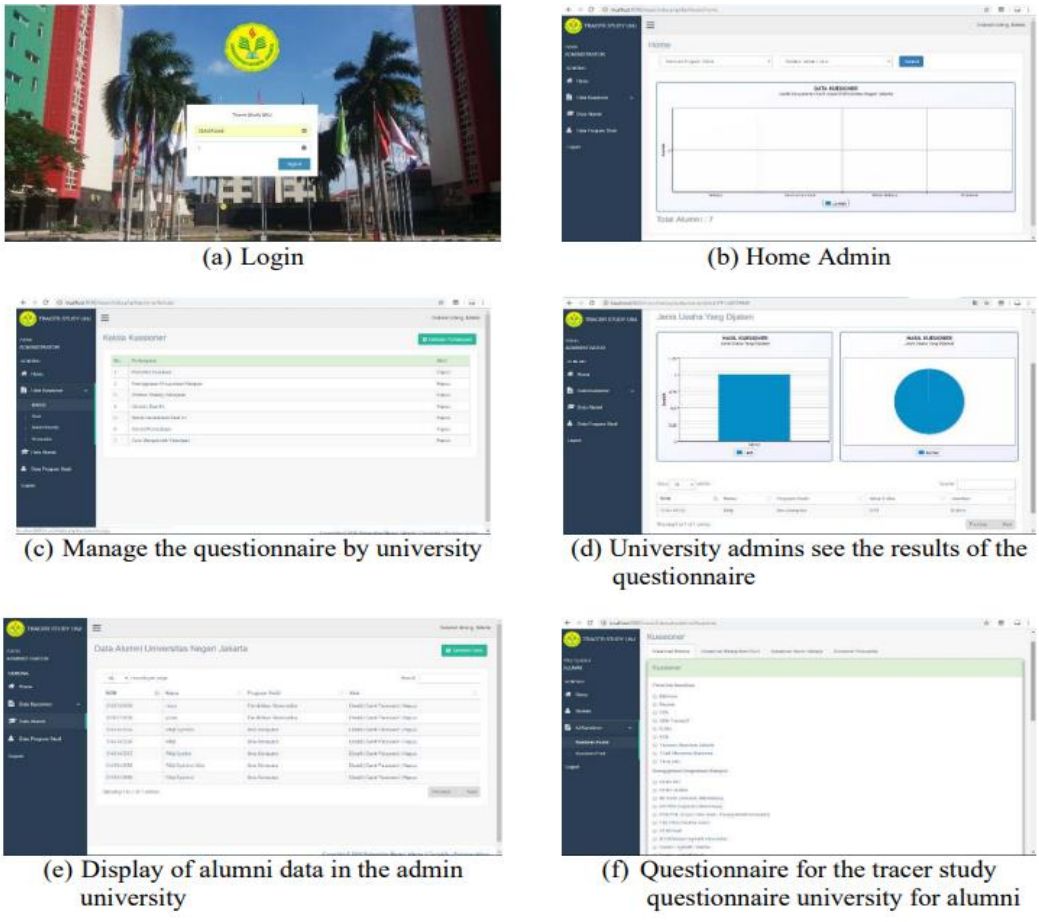
2. REVIEW OF RELATED LITERATURE

This chapter presents the different literatures, which are related to the concept and theory Alumni Tracking and Social Network in Jose Rizal Memorial State University. The researchers have mostly gathered the data from the internet, which provides them more ideas and principles for the improvement/development of the study.

Local Studies

In a tracer study of Rizal Technological University (RTU) graduates by Ramirez, et. Al (2014), the system for graduates by Ramirez, et. Al (23014) the system for graduation tracer to determine if the field of specialization in the different colleges of RTU graduates and their academics-acquired skills and competencies are related to their present occupations. The main study instrument is quantitative data., and they also used a face-to-face interview to support the gathered data. Chi-square goodness of fit proved that there is a significant relationship between the graduates and specialization their occupation after graduation. The result of this study RTU produces marketable and appropriately trained graduates with the majority landing course-related jobs within a short period after graduation.

As stated by Toba, et. al. in their Alumni Tracer Study Database which is a valuable information source for the development of a university. Alumni databases tend to be incomplete. It is always possible for phone numbers and home or email addresses to change. In this study, the authors propose an information collection strategy by gathering information spread across the internet through search engines. The research is focused on the development of efficiency factors during the name disambiguation process. The authors suggest a combination of reduction and supervised query strategies, which improve the efficiency of the disambiguation. The experiment results show that the approach for the case university's requirements to support an alumni tracer study to find people automatically, especially for people with ordinary names.



(a) Login (b) Home Admin

(c) Manage the questionnaire by university (d) University admins see the results of the questionnaire

(e) Display of alumni data in the admin university (f) Questionnaire for the tracer study questionnaire university for alumni

Figure 3. Examples of some of the results of the development of the tracer study information system.

Moreover, tracer studies according to Garcia (2003) as cited by Gines (2004) pointed out that tracer studies are an important source of information to know what happened to graduates of academic programs in Higher Education Institutions (HEIs). Further findings of tracer studies can be used to define/redefine HEIs mission and market niche and show how academic programs and course offering can be adjusted to reflect institutional goals. Findings can also be used by stakeholders in deciding where to look for skills. Lastly, the evaluation shall provide a basis for further improving existing and or developing a new teacher education curriculum and implementation process. It is in this context that after the approval of the curriculum in April 2005 and its implementation in June of the same year, a tracer study was conducted to these undergraduate batches of graduates (2009, 2010 and 2011) to provide data for the review and evaluation of the curricular programs of PNU.

Aquino et, al. (2015) state that institutions primarily aim of producing competent and highly qualified graduates employable here and abroad. Tracer studies on graduates can appropriately provide valuable information for evaluating the results of the educations and training of a specific institutions of higher education. The main objective of this study was to trace the employment profile of the graduates after they obtained their teacher education degree. The descriptive survey method of research was applied to this research with survey questionnaire as the main data gathering instrument.

The Study of Macatangay(2013), determined the employability status of the Computer Science graduates local/abroad, and determined the employment status of BS Computer Science Graduates of LPU from 2004-2009 . The study assessed the effectives and the relevance of BSCS curricula, knowledge, skills and word values acquired by the graduates to their employment; identify the personal and professional characteristics and job placement of Computer Science graduates and the school related factors associated with the employment of the alumni. The finding served to improve, update or enhance the curricula of BSCS program and make more responsive to the needs of the fast-changing technology and employment demands.

Foreign Studies

This work is carried in 2015 by Silvia Quarteroni and Suresh Manandhar. Interactive question answering (QA) systems, where a dialogue interface enables followup and clarification questions, are a recent field of research. We report our experience on the design, implementation and evaluation of a chatbot-based dialogue interface for our open-domain QA system, showing that chatbots can be effective in supporting interactive QA.

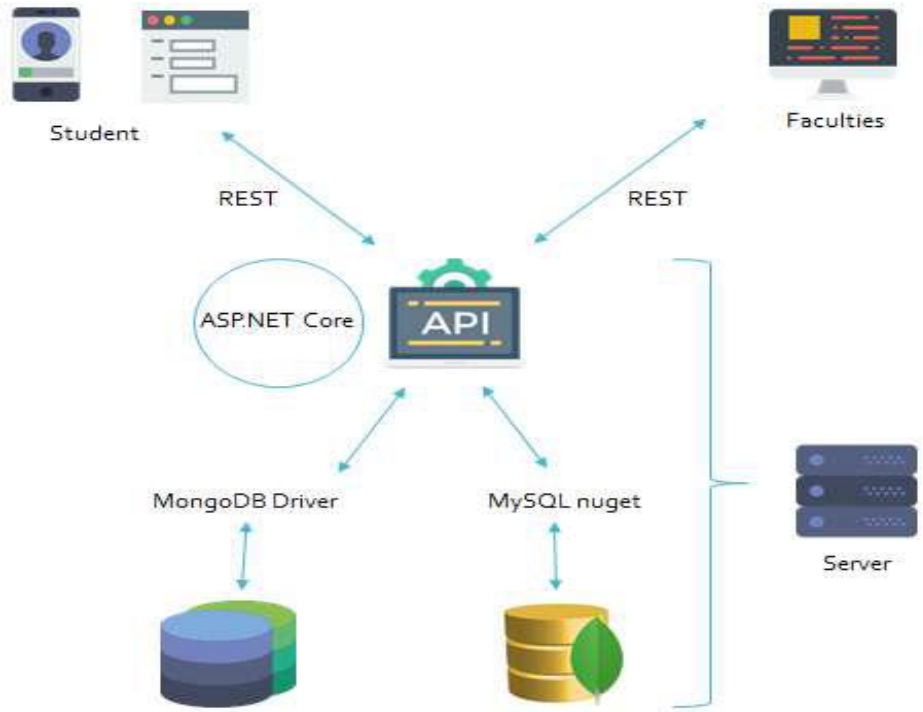


Figure 4. System Block Diagram

Harald Schomburg defines that tracer study is an approach that enables higher education institutions to obtain information about possible deficiencies in the education process and learning process and can be the basis for planning activities for future improvement. Information provided by graduates who are successful in their profession is required for example information about relevant knowledge and performance (the relationship between knowledge of skills and job demands, area of work, professional positions). In addition, graduates can also be asked to assess the conditions of study they experienced during the education and learning process. Alumni tracking can also be used as an activity to find information about stakeholder needs for alumni.

Alumni portals act as common platform to serve the cause of integrating all the stakeholders of educational institutes such as alumni, college students and faculties to avail the guidance and knowledge sharing on various domains in many colleges and universities. Mijic, Jankovic discuss a possible solution to information system for tracking information about alumni, and its possible contribution to improvement and innovation of study programs. Bakioglu et al. held a survey among 142 volunteers of all graduates of Marmara University Ataturk Education Faculty. ¨The data acquired from the survey indicated that the graduates needed the tracking system, career planning center and alumni association and were positive to be approached via web and pointed out that former graduates providing employment opportunities to the newly graduates as well as sharing job experiences and career guidance will bring up more efficient results. Some alumni portals and organizations, both outside and inside Nepal are discussed in this section.

Harvard University Alumni portal allows alumni to login to connect with other alumni or students, along with search functionality. The portal also provides information about recent and upcoming events

and programs, such as but not limited to networking events, career webinars. Alumni can get to know about the clubs and shared interest groups. The alumni portal also acts as a portal for volunteer fundraising for the university. The alumni portal of IIT Kanpur Alumni Association has an alumnus mentoring and buddy system which pairs alumni and students, with the alumni mentoring the students and helping them meet their career goals. The portal also provides access to the number of alumni charters and city ambassadors. The portal also has a dedicated career opportunities section where jobs can be listed and applied from.

Society of Ex-Budhanilkantha Students (SEBS) was incepted in the year 1982 as an alumni association of Budhanilkantha School. SEBS has an online portal [5], with information about the school, about recent and upcoming news, and announcements. It also acts as platforms for different donation programs. The portal provides access to different charters of SEBS like SEBS-North America, SEBS-UK. The portal also has discussion forums with options like general forums, batch message board, archive and advanced search and resources and links for the students to help with their education, chat room and feedback options.

Baibhav Bista et al. held a survey about "An Alumni Portal and Tracking System" Alumni tracking is a difficult task for any institution that has been running for a long time. The existing information about the alumni of the department is unmanaged and out of date. This paper presents a web-based system to integrate data of alumni into a well-managed database, and to act as a portal where alumni can update their current status and view online alumni yearbooks. This work aims to make the task of alumni tracking easier and simpler for the department. The web-based portal has been accessed by many alumni of the department starting from the earliest batches to update their information and see the whereabouts of others.

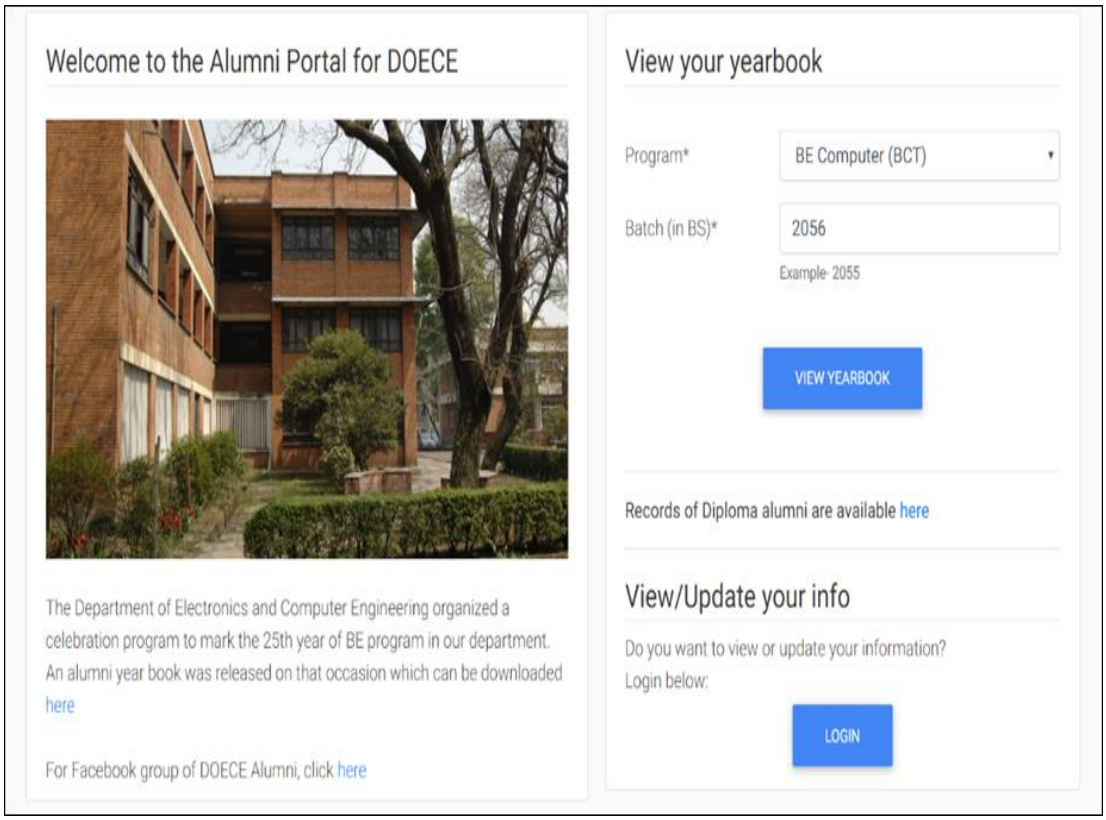
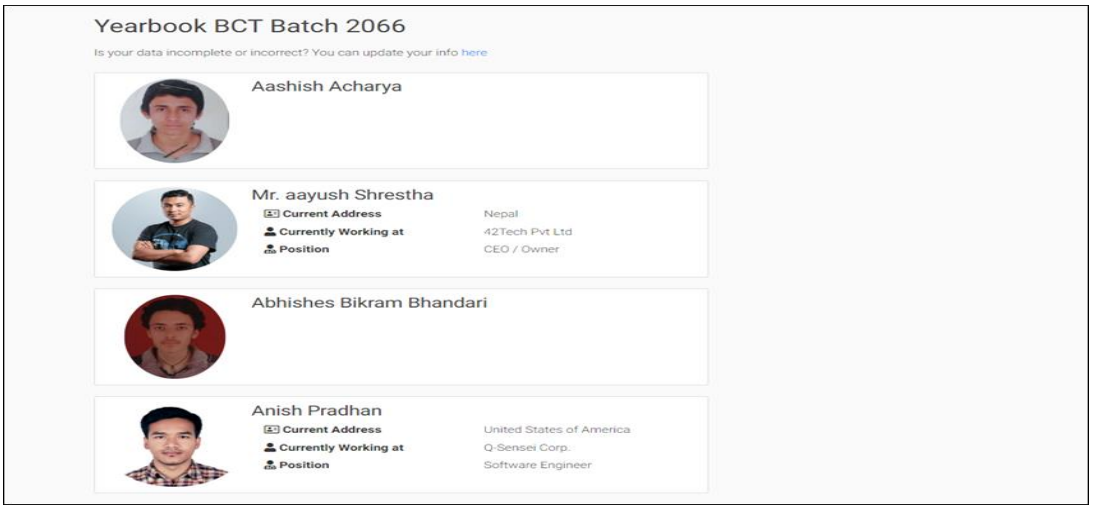


Figure 5: Screenshot of Home Screen

Figure 6: Screenshot of Sample Yearbook

Figure 7: Admin Panel Screenshot: Faceted searching, filtering using common attributes like program name, batch (here:search phrase= 'test', program name= BCT, batch = 2055)



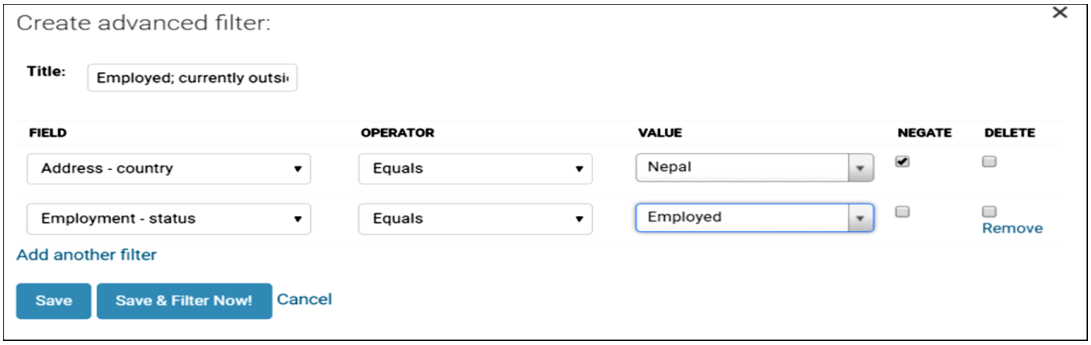


Figure 8: Admin Panel - Custom filters (here: a filter for alumni that are employed and currently living outside Nepal)

The study titled "Alumni Tracking Using Google Map API and social media based on GPS and LBS" by Nikita Mithapelli, et. Al (2016) In current scenario, the database of Alumni is maintained by college which is static. Due to this reason the real time information of Alumni is not present on any central platform. So, there is a need of an application which can keep track of all the alumni in real time. They are developing

an android application which will be useful to track all the alumni and their social media information. All the Alumni will use this application to make their network strong. We will be tracking the alumni based on his/her android smart phone location. We will be extracting his/ Facebook; LinkedIn details based on his/her privacy settings. All the updated information from social networking sites will be forwarded by web server and this information of alumni is stored in database or server depending on the amount of information to be stored. Aim of their project is to develop an android application which will be useful to track all the alumni by their social media account information using web API's. All this information will be stored in the database or server and it will be visible to the admin or professor in charge. They will be tracking the location of alumni by GPS (Global Positioning System), if internet is not available the LBS Location Based Services will be used and the location will be plotted on Google Maps. Alumni to alumni messaging facility (chatting module) is provided through GCM (Google Cloud Messaging) technology. The Alumni can track his/her friend's position that is nearby to the user by starting the Friend tracker option in the developed application. The user's friend location can be detected by the application.

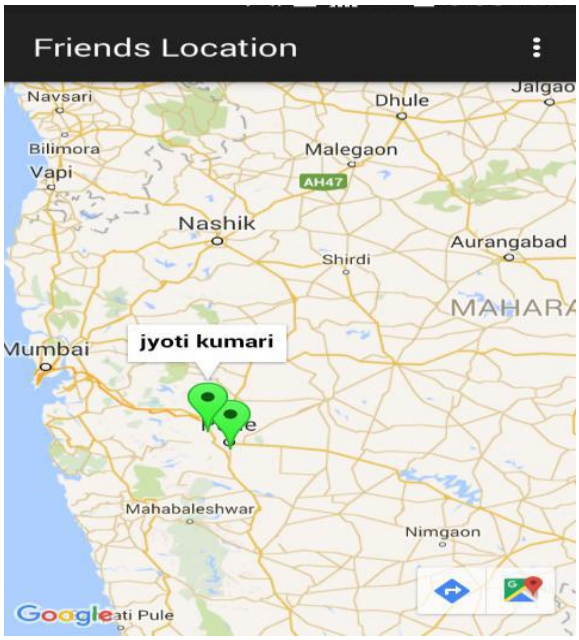


Figure 9: Location Tracking

Chatting module is used mainly to implement word communication among friends. For chatting, user can search for the friends available online. The information about the friends who are online can be retrieved using getOnlineFriends (). The user can chat with his friends who are online using send Message () and recieveMessage().

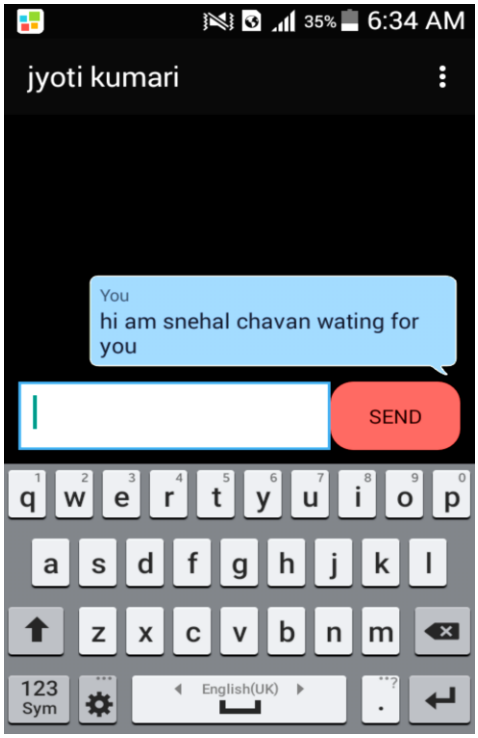


Figure 10: Chatting

Institute of Engineering Alumni Association (IOEAA) was initially established in 2009. IOE and IOEAA have agreed to work together in academic as well as networking of its graduates. Campus alumni association is currently collecting information from the alumni members through web forms. It is working on initiating to publish the annual report of the Campus and link the Education Management Information System (EMIS) and alumni portal with the public domain (Website).

This work was carried out in 2016 by NikitaMithapelli, SnehalChavan, JyotiKumari. Development of mobile internet technology and wide usage of Smart Phones is increasing rapidly, so more focus has been given to network access techniques and interactive applications through mobile phones. Android, an open-source platform has become popular in smart phone and used more by people. Aim of our project is to develop an android application which will be useful to track all the alumni by their social media account information using web API's. All this information will be stored in the database or
server and it will be visible to the admin or professor in charge. We will be tracking the location of alumni by GPS (Global Positioning System), if internet is not available the LBS Location Based Services will be used and the location will be plotted on Google Maps. Alumni to alumni messaging facility (chatting module) is provided through GCM(Google Cloud Messaging) technology.

It was carried in 2016 Gabriel ResendeGonc¸alves; Anderson A. Ferreira; Guilherme Tavares. In this paper we study an undergraduate program must prepare its students for the major needs of the labor market. One of the main ways to identify what are the demands to be met is creating a manner to manage information of its alumni. This consists of gathering data from program's alumni and finding out what are their main areas of employment on the labor market or which are their main fields of research in the academy. Usually, this data is obtained through available forms on the Web or forwarded by mail or email; however, these methods, in addition to being laborious, do not present good feedback from the alumni.

Thus, this work proposes a novel method to help teaching staffs of undergraduate programs to gather information on the desired population of alumni, semi automatically, on the Web. Overall, by using a few alumni pages as an initial set of sample pages, the proposed method was capable of gathering information concerning a number of alumni twice as bigger than adopted conventional methods

The benefits mentioned in the foreign and local related studies about Alumni Tracking and Social Network System in JRMSU are indeed common and widely acknowledged by educational institutions around the world. By implementing an alumni tracking and social network, educational institutions can: By obtaining feedback from alumni about their learning experiences, educational institutions can evaluate their performance and identify areas for improvement. This information can be used to enhance the quality of education and services offered by the institution, and ultimately improve the satisfaction of current and future students. Alumni feedback can also serve as a foundation for institutional development. Information about the competitiveness, quality, and working experiences of graduates can be used to identify opportunities and overcome potential future threats. This can help institutions to stay relevant and competitive in an ever-changing educational landscape. An alumni portal can also be used to strengthen the relationship between graduates and their alma mater. This can result in increased alumni engagement, participation in alumni events, and greater recognition of the achievements of graduates in the community. Strong alumni ties can also benefit the institution through increased fundraising and donations, and enhanced reputation in the community. An Alumni Tracking and Social Network system is a valuable tool for educational institutions to improve their performance, stay relevant and competitive, and strengthen relationships with their alumni. The newly developed system, the "Alumni Tracking and Social Network System in JRMSU", may be evaluated in light of these existing studies. It considers how the system addresses some of the challenges identified in local studies, and how it compares to existing systems in terms of functionality, user experience, and scalability. Additionally, we want to highlight the unique features of our system and how it contributes to the goals of alumni tracking and fostering alumni engagement and social networking.

3. RESEARCH METHODOLOGY

This chapter is the presentation of the methodology of the study. It involves the discussion of the research method that is being used by the researchers, the research environment, and the project development process. In this part, the researchers include the following to get an exact result: data gathering, requirements analysis, system design or software architecture, coding, testing and evaluation, implementation, documentation, and lastly, maintenance. These parts also involve the discussion of the respondents to the study, sampling design and techniques, statistical tools, and a calendar of activities.

The Design

The researchers used the developmental research method, defined as the systematic study of designing, developing, and evaluating programs and processes, and gathering data that must meet the criteria of internal reliability, usability, and functionality. The purpose of this research was to introduce the computer environment to each user and how the researchers developed an essential way of configuring data, such as in this study "Alumni Tracking and Social Network System". This method was examined and analyzed in order to produce an accurate and complete output.

Research Setting

The researchers conducted this study titled "Alumni Tracking and Social Network System", where the respondents were the alumni students who graduated from Jose Rizal Memorial State University.

Higher education is offered at Jose Rizal Memorial State University (JRMSU). It supports both human and holistic development. In Zamboanga del Norte, it is the only state university. Republic Act 9852 gave rise to its creation. JRMSU is situated in Sta. Cruz, city of Dapitan. It has a well-equipped faculty with post-graduate studies, and the institution adopts and promotes linkages to other state universities and colleges. As part of the vision of JRMSU towards internalization, this study will be another spearhead of computer-related courses, marking the innovations of the program and the university.

Respondents of the Study

The respondents of this study are the IT professionals who graduated a baccalaureate/masters/doctorate degree in computer studies (computer science, information technology and information systems including multimedia as well as library and information science) and alumni in the multidisciplinary courses are part as well. Moreover, faculty in JRMSU is also a respondent of this study.

Table 1. Respondents of the study

RESPONDENTS	FREQUENCY	PERCENTAGE
Alumni Students	5	**38.46**
IT Professionals	3	**23.08**
Faculty/Instructors	5	**38.46**
Total	13	**100%**

The table shows the respondents to the study, the quantity of each respondent, and their respective percentages. In relation to this, the research has 13 random evaluators: five (5), or 38.46%; for alumni students, three (3), or 23.08%; and five (5), or 38.46.7%, from the faculty or instructors, in order to derive from their respective percentages. The respondents were given an evaluation sheet for them to provide information about the intended software quality as it is developed.

Research Instruments

The research instrument used a standard evaluation sheet developed by ISO/IEC 9126 to determine the quality of the software that is going to be developed. There are three factors of software quality measures that are being used: functionality, reliability, and usability. There were also ten items in each of the software quality factors. Functionality measures the set of attributes of the software that will be developed that bear on the existence of a set of functions and their specified properties. While the reliability factor measures the ability of a system to perform its required function under stated conditions whenever required—having a long mean time between failures—and lastly, usability measures the attributes that bear on the effort needed for use and on the individual assessment of such use by a stated or implied set of users.

Validation of Instruments

Validation of the research instrument tells whether an instrument measures or describes what it is supposed to measure or describe. It means that whatever scores were obtained from the instrument should make sense, be meaningful, and enable the researcher to draw conclusions from the sample of the 59 population under investigation (Creswell, 2008). The test validity of an instrument could involve construct validity, content validity, and criterion validity (Creswell, 2008). In this study, content validity was chosen to validate the test instrument (a conceptual knowledge exercise). The purpose was to determine whether the test covered the content of the domain that it was supposed to measure. The instrument was meant to assess the subject matter content knowledge in statistics (the domain) that the selected alumni students possessed, which, it was assumed, enabled them to develop an alumni tracking and social network system. The other instruments, such as the concept map exercise and semi-structured interview schedule, were validated as follows:

The reliability test was conducted to prove its validity, and the evaluation sheet was distributed to the respondents for their actual rating of the developed system. The questions were revised multiple times to better capture the purpose of the questions. The researcher tried it out on 13 respondents to know the depth of the reliability of the instrument, and using Cronbach's alpha with a value of 0.73, the range of 0.70–0.90 is considered reliable, showing the evaluation sheet is reliable.

FORMULA:

Cronbach's Alpha:

$$\alpha = \left(\frac{k}{k-1}\right)\left(\frac{s_y^2 - \sum s_i^2}{s_y^2}\right)$$

Table 2: Cronbach's Alpha

VARIABLES	DESCRIPTION	VALUES	INTERNAL CONSITENCY
K	# of items	14	ACCEPTABLE
S^2y	Variance of total score	41	
ΣSi^2	Sum of the item variance	13.9	
a	Cronbach's Alpha	0.73	

To further the content validation, the validity of its content which determines the level of functionality, reliability, and usability follows the ISO standard. The weighted mean was used to measure the functionality, reliability and usability of the Alumni Tracking and Social Network System.

Scoring Procedure

In order to make a quantitative interpretation of the result the research used five-point Likert scale and range of score is used. Each respondent rated the study according to the criterion created by the researchers.

To obtain the quantitative description, they were interpreted following the range of values of Likert's 5-point scale:

Table 3. Scoring Procedure

SCALE	RANGE OF MEAN	DESCRIPTIVE RATING	RESULT
5	4.21 – 5.00	Very much Functional/Reliable/Usable	Processing takes approximately 5 seconds and systems response inquiry of the end-user automatically
4	3.41 – 4.20	Much Functional/Reliable/Usable	Processing takes approximately 10 seconds and system responds inquiry of the end-user and it satisfies the end user.
3	2.61 – 3.40	Functional/Reliable/Usable	Processing takes approximately 15 seconds and system responds inquiry of the end-user and it moderately satisfies the end user.
2	1.81 – 2.60	Less Functional/Reliable/Usable	Processing takes approximately 1 minute and system responds inquiry of the end-user but it does not satisfy the end user
1	1.00 – 1.80	Not Functional/Reliable/Usable	Processing does not generate to response to the end-user bear on the effort needed to make specified.

Data Gathering Procedure

The researchers first requested permission and approval from the Head of Jose Rizal Memorial State University, Main Campus, to distribute the evaluation sheet to the IT professionals and alumni students, including the faculty, in order to collect data from the respondents and evaluators of the software that developed. Following approval, the researchers send a second letter to the direct respondents and/or evaluators, asking them to complete an evaluation form and test the upcoming software to ensure that it meets their standards for usability, functionality, and reliability.

Statistical Treatment of Data

The following statistical tools are employed namely the Frequency and Percentage, it is applied to identify the evaluators or the numbers of IT professionals, Alumni Students and Faculty in testing the data gathered in the study. The Mean used to determine the extent of functionality, reliability and usability of the software that is

Formula: $$\text{Weighted Mean} = \frac{\Sigma WiXi}{N}$$

Σ: This symbol denotes the sum of a series of numbers. In this case, it represents the sum of the products of the weights and frequencies.

Wi: This represents the corresponding weight for each frequency. The weight indicates the importance or significance of each frequency in the calculation of the weighted mean.

Xi: This represents the ith frequency. It is the number of times a particular value occurs in the data set.

N: This represents the total number of respondents or observations in the data set.
To calculate the weighted mean, it multiplies each frequency by its corresponding weight, add up the products, and then divide the sum by the total number of respondents. The resulting value is the weighted mean

Project Development Process

The project development process takes a transportation improvement from concept through the construction. It covers a range of activities extending to early planning, public outreach, and evaluation so that project needs, goals and objectives, issues, and impacts can be identified before the significant resources are expended. The project development process takes a lot of improvement from concept through construction. It can be defined both with a project life cycle and system development life cycle, in which different activities occur. The Project Life Cycle refers to a four-step process that can be followed when moving through stages of project completion known as Initiation (starting the project), Planning (Organizing and Preparing), Execution (Carrying out the work), and Closure (Closing the project). The System Development Life Cycle is a process for planning, creating, testing, and deploying an information system also it is used to improve and maintain Information Systems. It focuses on the software engineering phases, processes, tools and techniques for constructing and/or implementing the IT solution.

The figure in the next page presents the Project Development Life Cycle. Each process is connected to each other sequentially by an arrow and is numbered from 1 to 7. It starts with Data Gathering followed by Requirements Analysis; Designing; Coding; Testing and Evaluation; Implementation; and, Documentation. First, the researchers gathered data and information sources from the internet. The requirements analysis sets and designs the software and hardware requirements needed by the users. After having all the desired information requirements gathered and analyzed, the researchers designed the system.

While in the designing process, they started the program coding using PHP Laravel programming language and MySQL for the database. Finally, testing and evaluation of the system are done. Each step and process were verified by the researchers for the correctness of the output and its functionality performance by the software. When errors are found, it goes to the previous process for another software verification procedure to be considered. It gives information to everyone who uses this study for their proposal method and can help them verify the good procedure and the process of the system "Alumni Tracking and Social Network System".

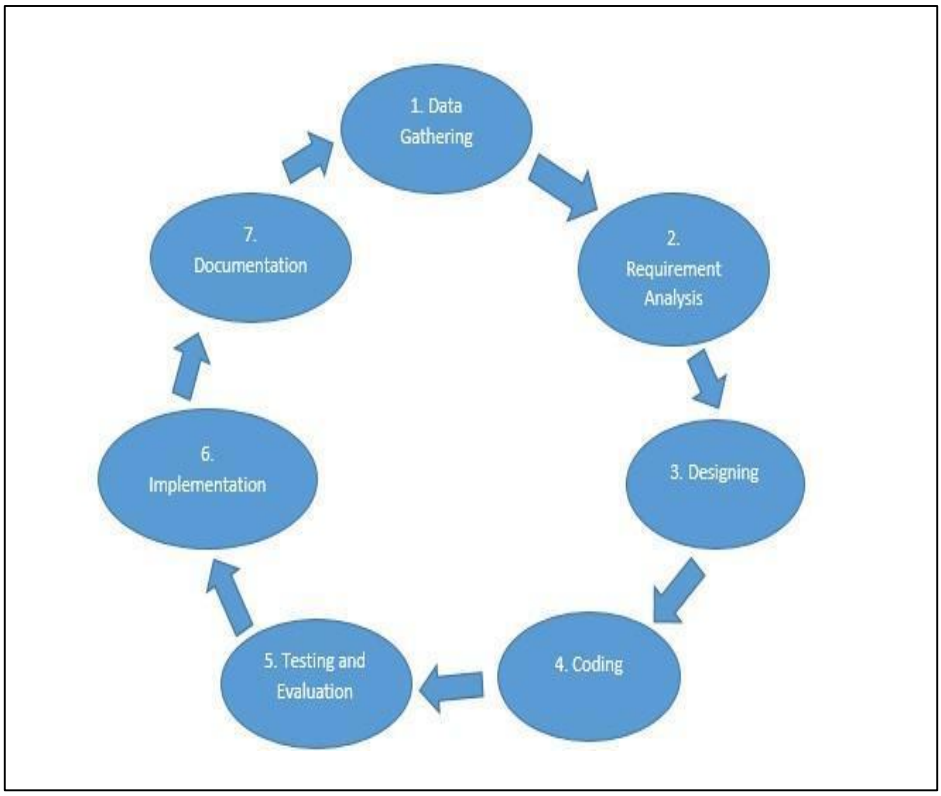


Figure 11. Project Development Life Cycle

Requirement Analysis

After gathering all the needed information and requirements for the study, the researcher made a thorough analysis of the requirements and proceeded directly on designing the project. This involved problem analysis and the algorithm properly solve the current problems of the study. The following hardware and software requirements below served as the tools in project development.

Table 4. System Requirements

SUPPORTED PLATFORMS
Windows 7 – 32 / 64 bit Windows 8 -32 bit / 64 bit Windows 10 – 32 bit / 64 bit Linux – 32 bit / 64 bit

COMPONENT	MINIMUM	RECOMMENDED
RAM	4 GB	8 GB2
Processor	Intel Core 2 DuoAMD A6	Intel Core i3 AMD A8
Graphics Display	Built-in	
Hard Disk Space	250 GB	1TB+

System Designing

System Architectural Design

The researchers start with making a registration user system for which they have developed a new architecture, which they like to call a 3-tier user architecture. After making a user registration system, it starts working on layout and physics for different users and trying to enrich it with the best possible features available right now. During the user registration system, it has an email verification module that verifies the user's email address for the sake of authenticity. Along with user email validation, there is phone number validation, ERN no validation, and username validation so that every user should have a unique value stored in the database. The login system accepts an email ID and password, and then it detects user type and redirects to the concerned system, which is the alumni, admin, or super-admin system. From there, every user has different functionality to access. Below is the use architectural design which give brief how the portal looks for different user paragraph.

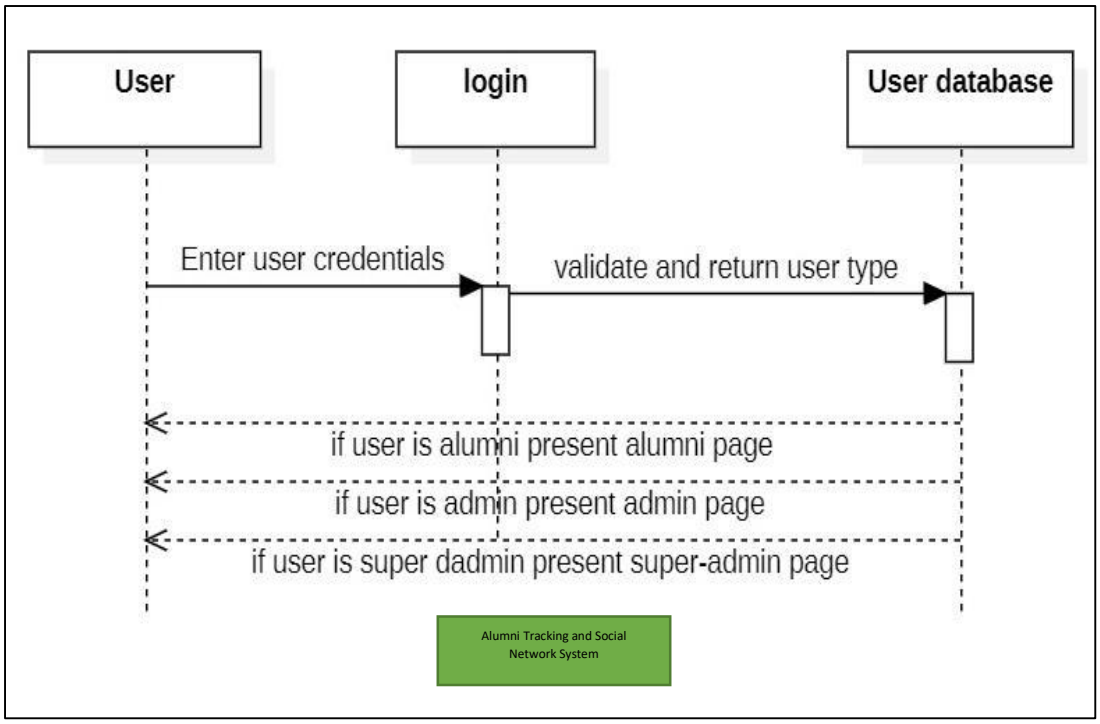


Figure 12. System architectural design.

Hierarchical Input Process Output

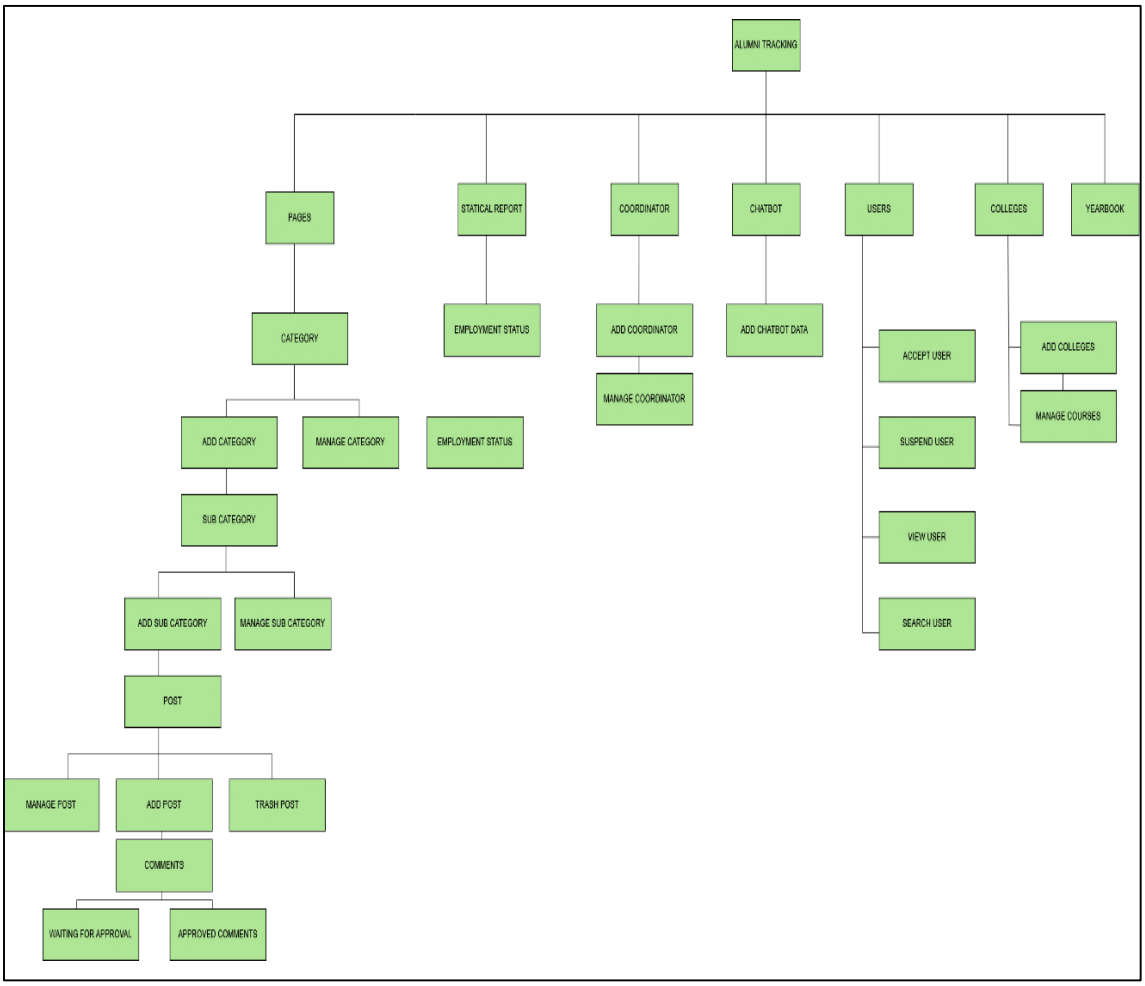


Figure 13. Hierarchical Input Process Output Diagram

The HIPO of the (Hierarchical Input Process Output) diagram is a combination of two organized method to analyze the system and provide the means of documentation. It was used to develop requirements, construct the design, and support implementation of an expert system to demonstrate automated rendezvous. Verification was the conducted systematically because of the method of design and implementation. HIPO model was developed by IBM in year 1970. HIPO diagram represent the hierarchy of modules in the software system. Analyst uses HIPO diagram in order to obtain high-level view of system functions. It decomposes function into sub-functions in a hierarchical manner. It depicts the functions performed by system. HIPO diagrams are good for documentation purpose. Their graphical representation makes it easier for designer and managers to get the pictorial idea of the structure. In contrast to HIPO (Input Process Output) diagram, which depicts the flow of control and data in module, HIPO does not provide any information about data flow or control flow. The overall design of the system is documented using HIPO charts or structure charts. The structure chart is similar in appearance to an organizational chart, but has been modified to show additional detail.

Use case Diagram

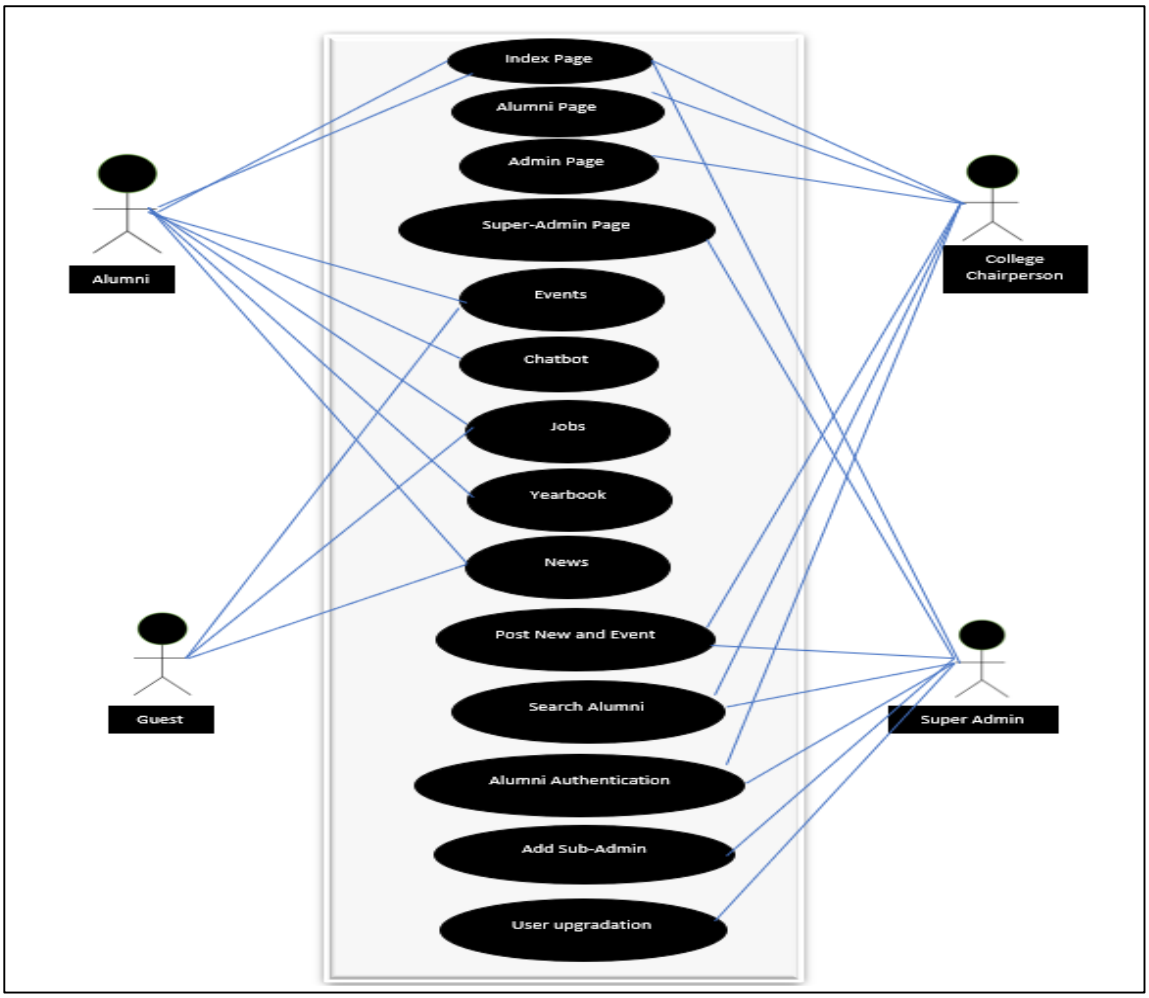


Figure 14. Use case diagram.

The figures 14 represents the user can update their details anytime. The researchers design the database system through which a smooth function of data happen among each other.

An admin can publish an event and news and even delete them, and all this happens because of the database system. An admin can verify users, and this also happens because of the database system. A super admin can change user type; it also happens due to the database system. Below is the ER diagram, through which the researchers can understand all the key things.

Data flow Diagram

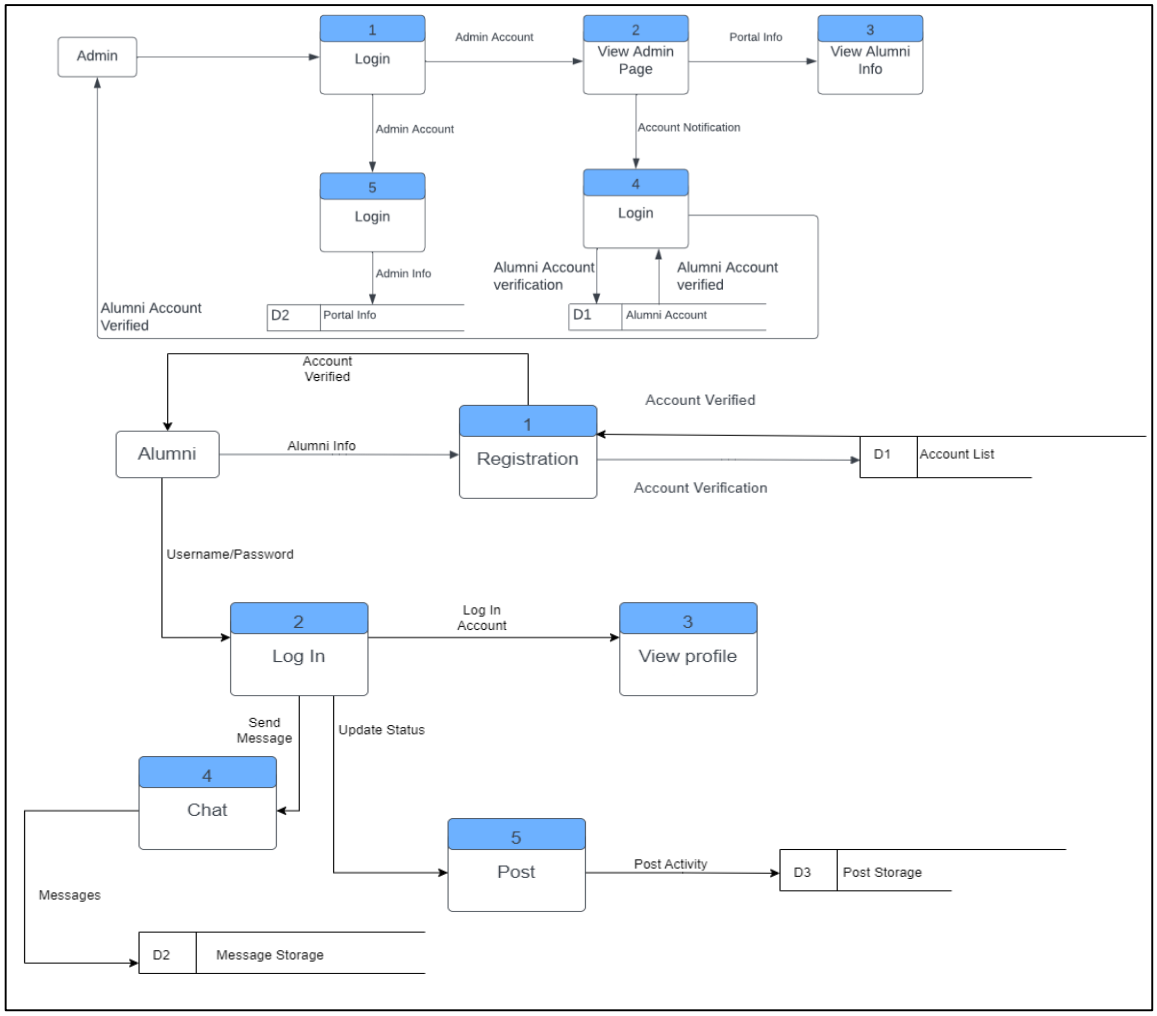


Figure 15: Data flow diagram

The diagram shows three main entities in the system: alumni, users, and databases. Alumni are the former students who have graduated from the institution and have provided their information to the system. Users are the individuals who are accessing the system to search for alumni, view their profiles, and receive updates. The database stores all the information about alumni, such as their personal details, academic achievements, and employment history, as well as their social network activities.

The data flow starts with the user viewing alumni profiles and updates, which are stored in the database. The user can also search for alumni based on various criteria, such as name, year of graduation, and major. The database stores all the alumni information and updates received from them and provides data for analytics and report generation. The analytics can be used to gain insights into the alumni network and their activities, and the reports can be used to communicate these insights to stakeholders.

Class Diagram

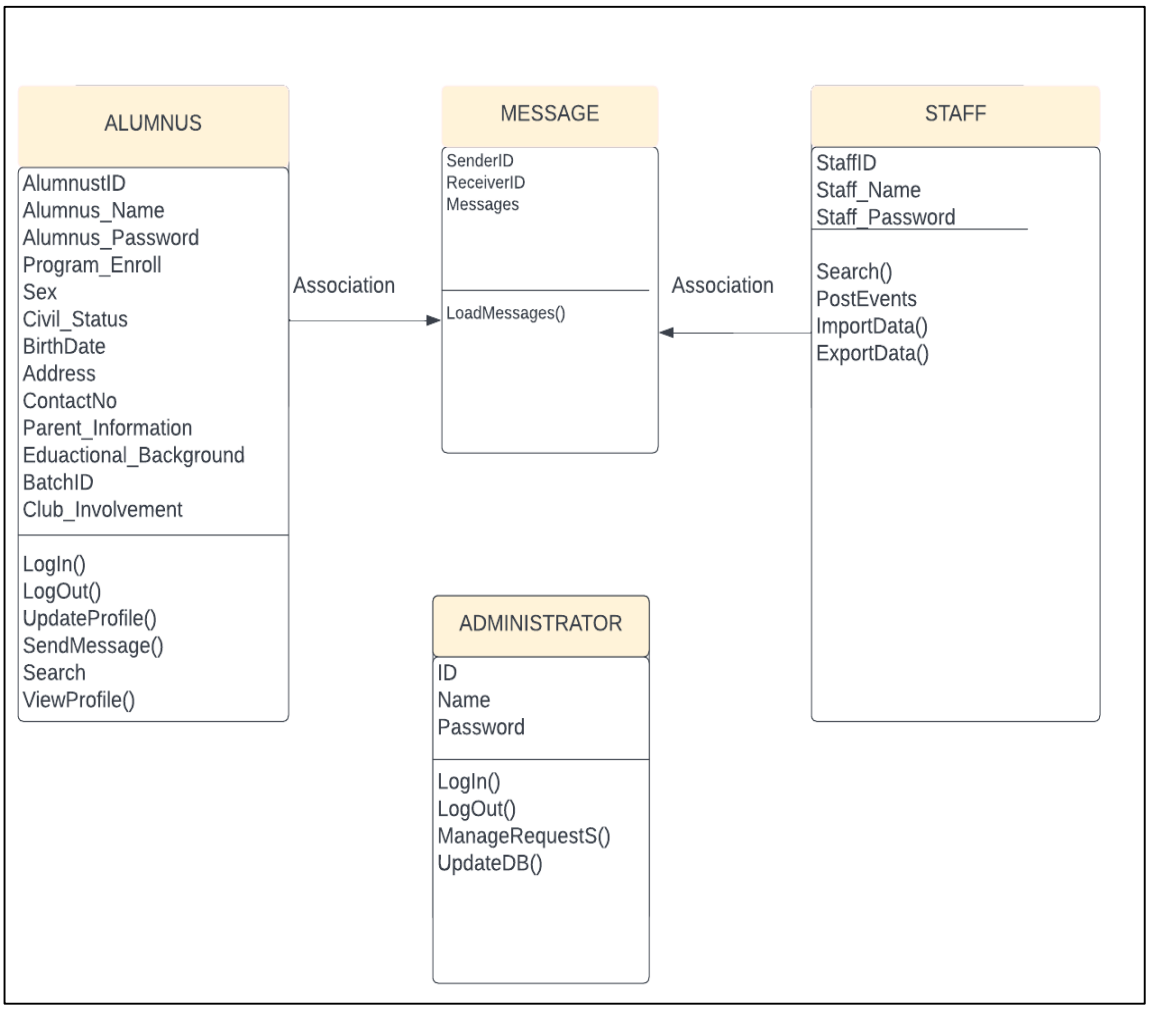


Figure 16. Class diagram

The class diagram in Figure 16 serves as a comprehensive representation of the structural components of the system, showcasing its key attributes and operations. It provides a clear visualization of how these components are interconnected and how they work together to enable the smooth functioning of the application. By referring to this diagram, developers and stakeholders can gain a deeper

understanding of the system's underlying architecture and make informed decisions regarding its design and implementation.

Object Diagram

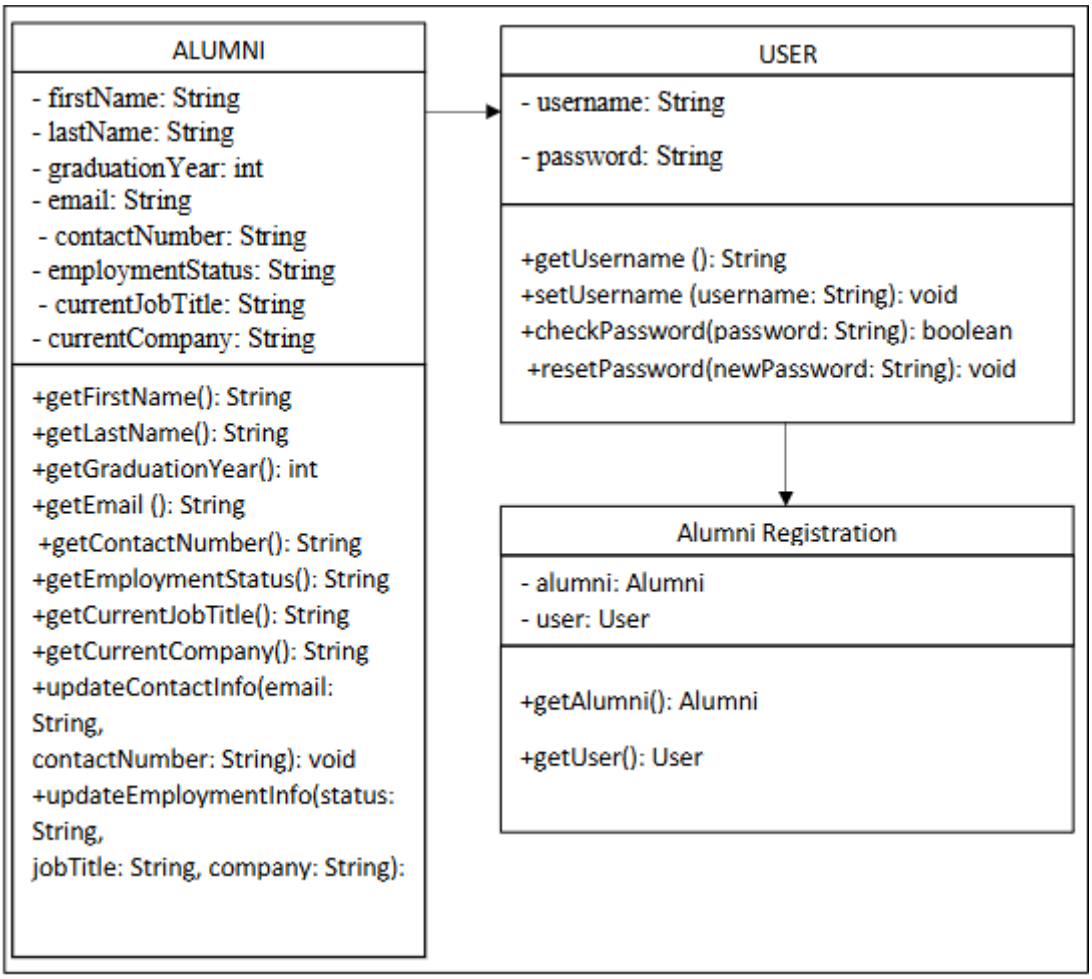


Figure 17, Object Diagram

Figure 17 represents an alumni member with attributes such as first name, last name, graduation year, email, contact number, employment status, current job title, and current company. It also includes getter methods for retrieving the alumni information and methods for updating contact and employment information. User of the alumni tracking and social network system. It has attributes like username and password. It includes getter and setter methods for the username, a method for password verification, and a method for resetting the password.

Alumni Registration is the association between an alumni and a user. It has references to an instance of Alumni and User classes. It provides methods to retrieve the alumni and user objects.

Sequence Diagram

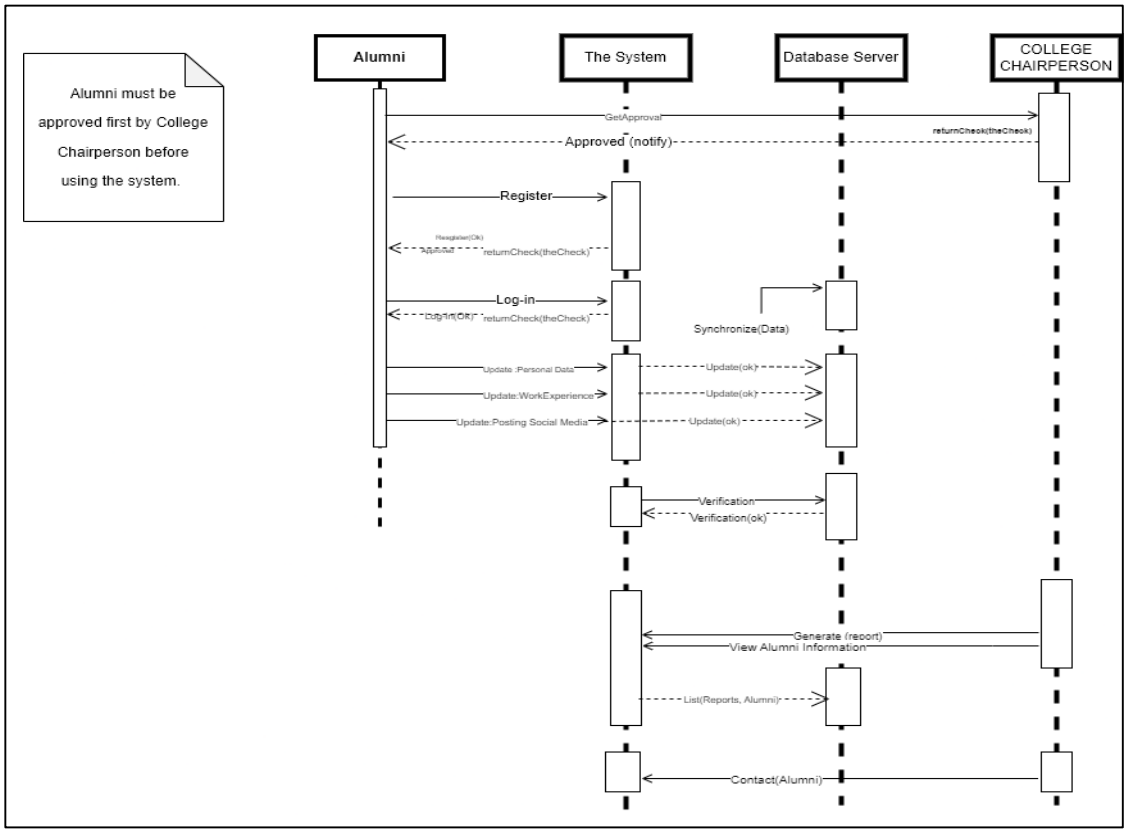


Figure 18. Sequence diagram

Figure 17 represents the sequence diagram for the Web portal module. This module is able to be accessed using a browser and connected with back-end services. This portal sends HTTP requests to backend services to request data processing. To be able to access services, users must enter a username and password. These credentials are then processed by the authentication module, and access is granted. Upon receiving the data from services, the web portal will display the data in the proper format.

Swimlane Activity Diagram

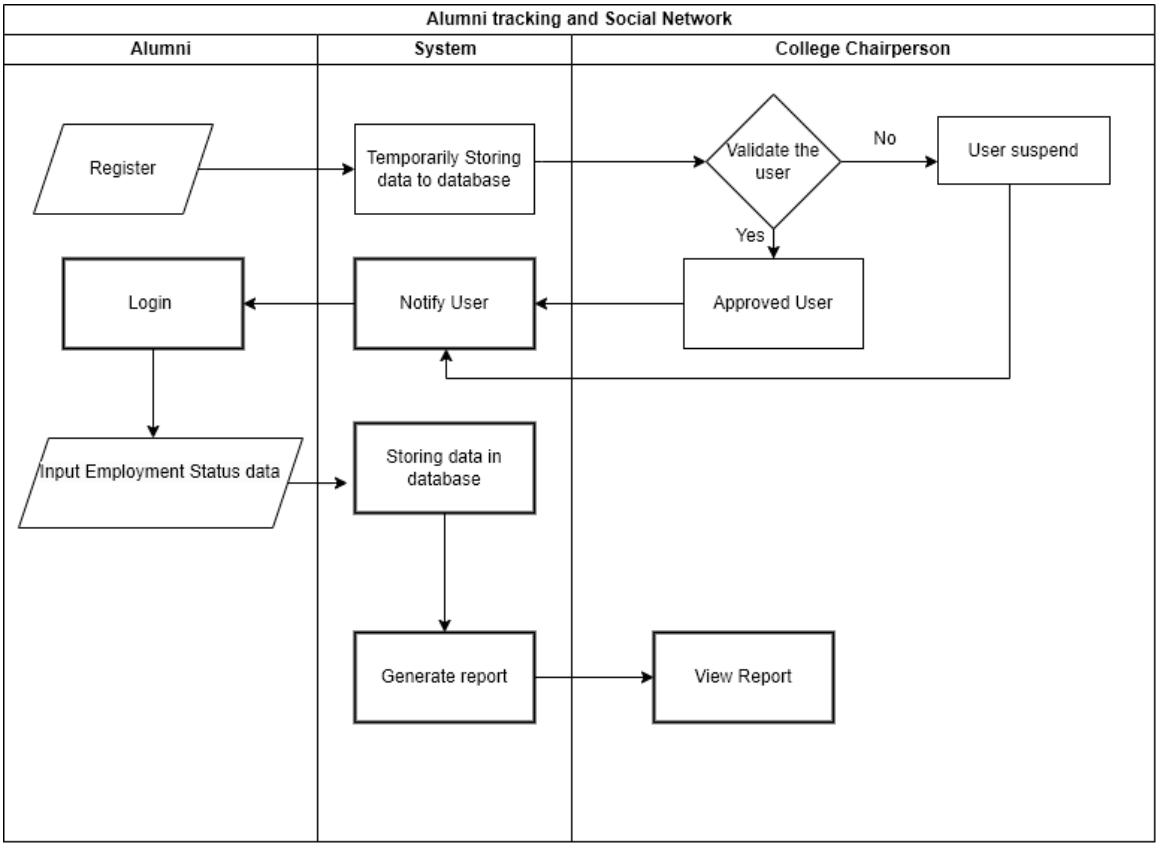


Figure 19. Swimlane activity diagram.

The Swimlane diagram shows the system with different important functions being a sender data, evaluate data, load data and display data. In GUI section, the send data function sends the information to alumni officer section; the alumni officer section receives the data and evaluates it, after evaluating the data, it is once again sent to the administrator.

In the Database section, it receives data from the administrator and saves it, and it can also be loaded in which the request comes from the GUI, finally, the GUI renders or displays the data received from the database.

Entity Relationship Diagram

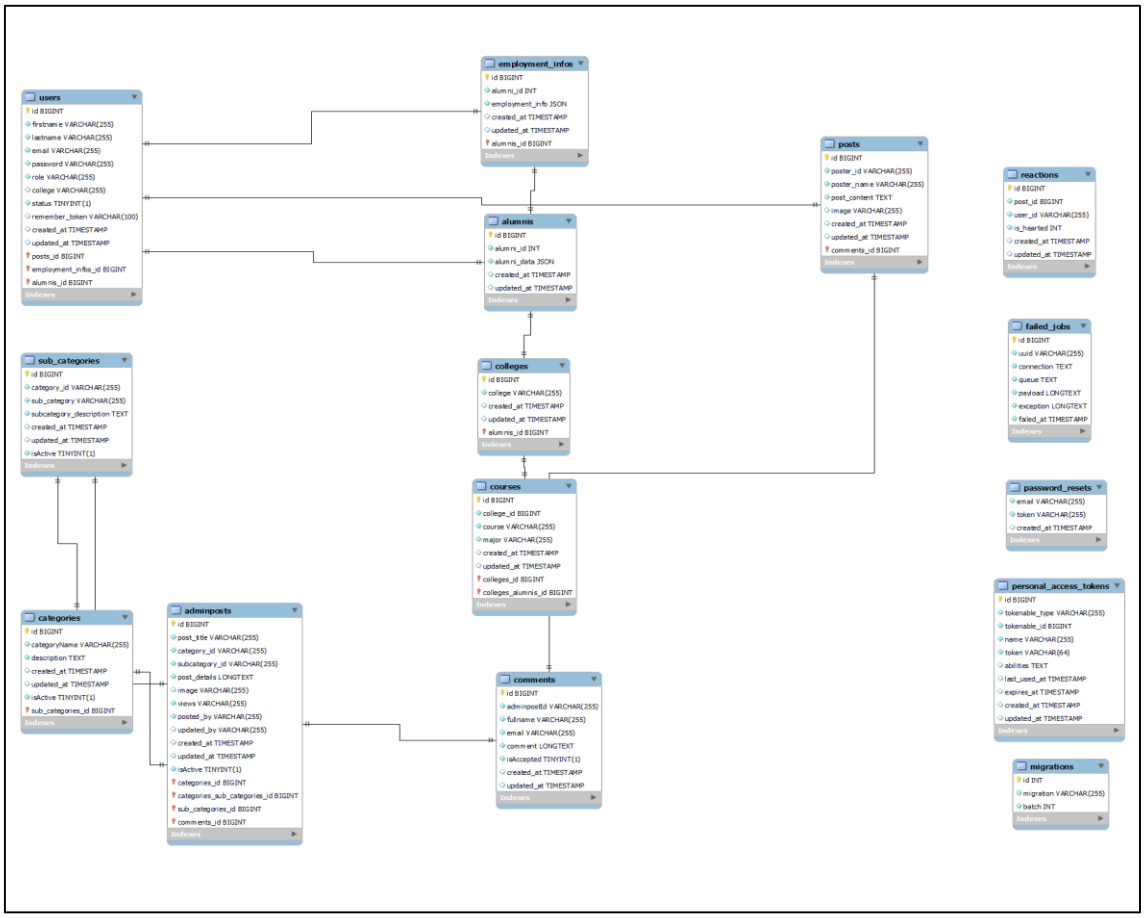


Figure 20. Entity Relationship Diagram

The researchers design the database system through which a smooth function of data will happen among each other. An admin can publish an event and news and even delete and all this happen as of database system. An admin can verify user and this also happen because of database system. A super admin can change user type it also happens because of database system above is the ER diagram through which we can understand all the key things.

Coding

```
// Collapsible
function getLevenshteinDistance(str1, str2) {
 // Create a 2D array to store the distances between substrings
 const distances = [];
 for (let i = 0; i <= str1.length; i++) {
  distances[i] = [i];
 }
 for (let j = 0; j <= str2.length; j++) {
  distances[0][j] = j;
 }

 // Calculate the distances between substrings
 for (let i = 1; i <= str1.length; i++) {
  for (let j = 1; j <= str2.length; j++) {
   const cost = str1[i - 1] === str2[j - 1] ? 0 : 1;
   distances[i][j] = Math.min(
    distances[i - 1][j] + 1, // deletion
    distances[i][j - 1] + 1, // insertion
    distances[i - 1][j - 1] + cost // substitution
   );
  }
 }

 // Return the Levenshtein distance between the two strings
 return distances[str1.length][str2.length];
}
```

```
function getLevenshteinSimilarity(str1, str2) {
 const distance = getLevenshteinDistance(str1, str2);
 const maxLength = Math.max(str1.length, str2.length);
 return (1 - distance / maxLength) * 100; // Calculate the similarity as a percentage
}

function jaroWinklerDistance(str1, str2) {
 // Calculate Jaro distance
 const m = str1.length;
 const n = str2.length;
 const maxDistance = Math.floor(Math.max(m, n) / 2) - 1;
 let matches = 0;
 let transpositions = 0;
 let i, j;
 for (i = 0; i < m; i++) {
  const start = Math.max(0, i - maxDistance);
  const end = Math.min(i + maxDistance + 1, n);
  for (j = start; j < end; j++) {
   if (str1[i] === str2[j]) {
    matches++;
    if (i !== j) {
     transpositions++;
    }
    break;
   }
  }
 }
 if (matches === 0) {
  return 0;
```

```
    if (ngrams2.indexOf(ngrams1[i]) >= 0) {
      intersection++;
    }
  }
  var union = ngrams1.length + ngrams2.length - intersection;
  var similarity = intersection / union;

  return similarity * 100;
}

function getNgrams(s, n) {
  var ngrams = [];
  for (var i = 0; i < s.length - n + 1; i++)
{
ngrams.push(s.substring(i, i + n));
}
return ngrams;
}
var coll = document.getElementsByClassName("collapsible");

for (let i = 0; i < coll.length; i++) {
  coll[i].addEventListener("click", function () {
    this.classList.toggle("active");

    var content = this.nextElementSibling;

    if (content.style.maxHeight) {
      content.style.maxHeight = null;
    } else {
```

```
            content.style.maxHeight = content.scrollHeight + "px";
        }

    });
}

function getTime() {
    let today = new Date();
    hours = today.getHours();
    minutes = today.getMinutes();

    if(hours == 24){
        hours = "00"
    }

    if (hours < 10) {
        hours = "0" + hours;
    }

    if( hours > 12 ){
        hours = hours - 12;
    }

    if (minutes < 10) {
        minutes = "0" + minutes;
    }

    let time = hours + ":" + minutes;
    return time;
```

```
}


// Gets the first message
function firstBotMessage() {
  let firstMessage = "How's it going?"
  document.getElementById("botStarterMessage").innerHTML = '<p class="botText"><span>' +
firstMessage + '</span></p>';

  let time = getTime();

  $("#chat-timestamp").append(time);
  document.getElementById("userInput").scrollIntoView(false);
}
setTimeout(() =>{
  firstBotMessage();
}, 5000);

const chatLog = document.querySelector('#chat-bar-bottom');
const userInput = document.querySelector('#user-input');
const sendBtn = document.querySelector('#send-btn');

// Read the pattern-response pairs from the JSON file
fetch('/data.json')
 .then(response => response.json())
 .then(data => {
  // Function to generate a response based on user input
  function generateResponse(input) {
   const cleanInput = input.toUpperCase().replace(/[^\w\s]/gi, "");
   let bestMatch = { similarity: 0 };
```

```
    for (const pair of data) {
      if (Array.isArray(pair.pattern)) {
        // If pattern is an array, find the highest similarity among all the elements
        for (const pattern of pair.pattern) {
          const similarity = (compareSentences(cleanInput, pattern.toUpperCase(), 2) +
getLevenshteinSimilarity(cleanInput, pattern.toUpperCase()) + jaroWinklerDistance(cleanInput,
pattern.toUpperCase()))/3;
          if (similarity > 78 && similarity > bestMatch.similarity) {
            bestMatch = { pair, similarity };
          }
        }
      }
    }
    const response = bestMatch.pair
      ? bestMatch.pair.responses[0]
      : "I'm sorry, I don't understand. Can you please rephrase your question?";
    // If the response contains a random element, parse it as HTML
    if (response.includes("<random>")) {
      const parser = new DOMParser();
      const html = parser.parseFromString(response, "text/html");
      const randomElements = html.querySelectorAll("li");
      return randomElements[
        Math.floor(Math.random() * randomElements.length)
      ].textContent;
    }
    return response;
  }

  function sendMessage() {
```

```
const userInputText = userInput.value.trim();
if (!userInputText) {
  return;
}

// Add the user's message to the chat log
const userMessageElement = document.createElement('div');
userMessageElement.textContent = userInputText;
let userHtml = '<p class="userText"><span>' +userInputText + '</span></p>';
$("#textInput").val("");
$("#chatbox").append(userHtml);
document.getElementById("chat-bar-bottom").scrollIntoView(true);
userInput.value = '';

// Generate the chat bot's response and add it to the chat log
setTimeout(() => {
  const chatBotResponse = generateResponse(userInputText);
  let botHtml = '<p class="botText"><span>' +chatBotResponse + '</span></p>';
  $("#chatbox").append(botHtml);

  document.getElementById("chat-bar-bottom").scrollIntoView(true);
}, 1000)
 // Clear the user input field

}

sendBtn.addEventListener('click', sendMessage);
userInput.addEventListener('keyup', event => {
 if (event.key === 'Enter') {
```

```
    sendMessage();
  }
 });
})
.catch(error => console.error(error));
```

In this code, the Algorithms that provided in JavaScript code appears to be implementing several functions related to text similarity and string distance calculations. Here is a brief overview of each function: getLevenshteinDistance(str1, str2): This function calculates the Levenshtein distance (also known as edit distance) between two input strings str1 and str2. It creates a 2D array to store the distances between substrings, and then iterates through the substrings to calculate the minimum number of operations (insertions, deletions, and substitutions) required to transform str1 into str2. The Levenshtein distance is returned as the result. getLevenshteinSimilarity(str1, str2): This function calculates the similarity between two input strings str1 and str2 using the Levenshtein distance. It calls the getLevenshteinDistance function to get the Levenshtein distance between the two strings, and then divides it by the maximum length of the strings to get a similarity score. The similarity score is then multiplied by 100 to get the result as a percentage. jaroWinklerDistance(str1, str2): This function calculates the Jaro-Winkler distance between two input strings str1 and str2. It first calculates the Jaro distance, which is a measure of string similarity, by counting the number of matching characters and transpositions between the two strings. It then calculates the Jaro-Winkler distance, which is a modification of the Jaro distance that gives higher weight to matching characters at the beginning of the strings. The Jaro-Winkler distance is returned as the result. compareSentences(s1, s2, n): This function compares the similarity between two input sentences s1 and s2 using n-grams. It first converts the sentences to lowercase and removes all non-alphanumeric characters. Then, it splits the sentences into arrays of n-grams using the getNgrams function. It calculates the Jaccard similarity coefficient, which is the ratio of the size of the intersection of the n-grams to the size of the union of the n-grams. The Jaccard similarity coefficient is returned as the similarity score, multiplied by 100 to get the result as a percentage. getNgrams(s, n): This function generates n-grams (contiguous sequences of n characters) from an input string s. It iterates through the input string and extracts substrings of length n, and stores them in an array. The array of n-grams is returned as the result. getTime(): This function gets the current time in hours and minutes, and formats it as a string in the format "HH:MM" (24-hour clock or 12-hour clock with AM/PM). The formatted time string is returned as the result. The remaining code appears to be related to handling collapsible elements in a web page interface, and setting up event listeners for user interactions with the interface. By using AI to automate and streamline these processes, institutions can save time, increase efficiency, and improve the accuracy of their alumni tracking efforts. Additionally, by using AI to gain a more complete picture of alumni behavior and preferences, institutions can better tailor their engagement efforts to the needs and interests of individual alumni.

Testing and Evaluation

System Testing Procedure

The testing method was adopted while making the program software. Both manual and computerized procedure will be running and will be observed its accuracy through its different method and strategies. The procedure for this individual event will be referred to the procedure in its diagram.

Alpha Testing Procedure:

1. Testing method of both manual and computerized
2. Collaborate the manual and computerized into the newly developed system
3. Then observed the accuracy and the efficiency of event in the system.
4. Check the data that are used in the system if it is necessary.

5. Set up the system if it is working properly.
6. Use similar software testing procedures as the integration test.
7. Confirm that system test achieves system test objectives.
8. After checking the study.

System Evaluation

The proponents believe that all software cannot be implemented without proper research, testing, and evaluation before operation. The process can help the researchers attain their goals for the exact output. The respondents of the system study were evaluated for the selected respondents, including computer course professionals and some selected respondents who are considered professional evaluators as well as users. Each respondent rated the study according to the criteria created by the researchers.

Functionality. This is a set of attributes that bear on the existence of a set of functions and their specified properties. The functions are those that satisfy state or implied set of users.

Numerical Rating	Ranges of Mean	Description
5	4.21 – 5.00	Very Much Functional
4	3.41 – 4.20	Much Functional
3	2.61 – 3.40	Functional
2	1.81 – 2.60	Less Functional
1	1.00 – 1.80	Not Functional

Reliability. Is the ability of a system to perform its required function under stated condition whenever required-having a long mean time between failures.

Numerical Rating	Ranges of Mean	Description
5	4.21 – 5.00	Very Much Reliable
4	3.41 – 4.20	Much Reliable
3	2.61 – 3.40	Reliable
2	1.81 – 2.60	Less Reliable
1	1.00 – 1.80	Not Reliable

Usability. A set of attributes that bear on the effort needed for use, and on the individual assessment of such use, by a stated or implied set of users.

Numerical Rating	Ranges of Mean	Description
5	4.21 – 5.00	Very Much Usable
4	3.41 – 4.20	Much Usable
3	2.61 – 3.40	Usable
2	1.81 – 2.60	Less Usable
1	1.00 – 1.80	Not Usable

Range of Mean	Descriptive Rating
4.21 – 5.0	Very Much Functional/Reliable/Usable. Processing takes approximately 5 seconds and systems response inquiry of the end-user automatically.
3.41 – 4.20	Much Functional/Reliable/ Usable. Processing takes approximately10 seconds and system responds inquiry of the end-user and it satisfies the end-user.

2.61 – 3.40	Functional/Reliable/ Usable. Processing takes approximately 15 seconds and system respond inquiry of the end-user and it moderately satisfies the end-user.
1.81 – 2.60	Less Functional/Reliable/ Usable. Processing takes approximately 1 minute and system responds inquiry of the end-user but it does not satisfy the end-user.
1.00 – 1.80	Not Functional/Reliable/ Usable. Processing does not generate response to the end-user bear on the effort needed to make specified modifications.

System Implementation

System implementation is the process that turns strategies and plans into actions in order to accomplish strategic objectives and goals. Implementing a strategic plan is as important, or even more important, than strategy. Also known as the development stage, which focuses on the translation of data from the design stage into a machine-readable form. According to this method, it cannot be represented without paying attention to the steps before the actual conversion, namely the construction of a conversion scenario and the identification and testing of all the requirements of a system. In order to reduce the risk, the old and the new approaches run simultaneously for some period of time, after which, if the criteria for the new system are met, the traditional way is eliminated.

With the realization of a technical specification or algorithm as a program, software component or other computer system is done through programming and development. It gives benefits to the user's involvement and management support in designing and operating the system –Alumni Tracking and Social Network system. The application implementation has its several positive results. First, the user is heavily involved in system's design; secondly, it offers opportunities to mold the system according to their priorities and business requirements and more opportunities to control the outcome and third, they are more likely to react positively to the change process.

Documentation and Maintenance

The system provides its documentary evidence for the user's guide and process a documenting knowledge of the researchers who implement this kind of study. The system-Alumni Tracking and Social Network System provides product documentation such as software documentation. Idea, knowledge and enhancement for their skills in studying online. In this way, it will teach them to know the documentary of the research study visualize the input and output of the system. In other words, this is a guidelines for the online and offline research study.

Calendar of Activities

Table 5: Calendar of Activities

Milestone Description	Assigned to	Date Start	Due Date	Days	Verified by	February (by week)				March (by week)				April (by week)			
						1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Prototyping and Coding																	
Application Screen Design	Arman Doyogan Jay Fuego Emmanuel Mendoza	2/13/2023	3/13/2023	29													
Database Design	Arman Doyogan Jay Fuego Emmanuel Mendoza	2/13/2023	3/20/2023	33													
Modules																	
Login/Registration	Arman Doyogan Jay Fuego Emmanuel Mendoza	2/20/2023	3/20/2023	29													
Statical Report of Alumni employment	Arman Doyogan Jay S. Fuego	2/20/2023	3/20/2023	29													
Event Management	Arman Doyogan Jay Fuego Emmanuel Mendoza	2/20/2023	3/20/2023	29													
Social media Posting	Arman Doyogan Jay Fuego Emmanuel Mendoza	2/20/2023	3/20/2023	29													
Student Profile	Arman Doyogan Jay Fuego Emmanuel Mendoza	2/20/2023	3/20/2023	29													
Job Board	Arman Doyogan Jay Fuego Emmanuel Mendoza	2/20/2023	3/20/2023	29													
Yearbook	Arman Doyogan Jay Fuego Emmanuel Mendoza	2/20/2023	3/20/2023	29													
Chatbot	Arman Doyogan Jay Fuego Emmanuel Mendoza	2/27/2023	3/27/2023	29													
Alumni Messaging	Arman Doyogan Jay Fuego Emmanuel Mendoza	2/27/2023	3/27/2023	29													
Testing																	
Alpha Test	Arman Doyogan Jay Fuego Emmanuel Mendoza	3/24/2023	4/05/2023	13													
- First Evaluation Result	Arman Doyogan Jay Fuego Emmanuel Mendoza	3/24/2023	4/05/2023	13													
Beta Test	Arman Doyogan Jay Fuego Emmanuel Mendoza	3/24/2023	4/05/2023	13													
- Second Evaluation Result	Arman Doyogan Jay Fuego Emmanuel Mendoza	3/24/2023	4/05/2023	13													
Thesis Documents																	
Chapter 1-3	Arman Doyogan Jay Fuego Emmanuel Mendoza	3/24/2023	4/05/2023	13													
Chapter 4	Arman Doyogan Jay Fuego Emmanuel Mendoza	4/01/2023	4/14/2023	14													
Chapter 5	Arman Doyogan Jay Fuego Emmanuel Mendoza	4/01/2023	4/14/2023	14													
Complete Thesis Documents	Arman Doyogan Jay Fuego Emmanuel Mendoza	4/08/2023	4/18/2023	10													
Thesis Presentation		4/24/2023	4/28/2023	5													

This is a table that outlines the milestones and tasks for the "Alumni tracking and social network system" project. The table is divided into four columns: "Milestone Description," "Assigned to," "Date Start," and "Due Date," and 12 rows, each corresponding to a month of the project timeline.The first milestone, "Prototyping and Coding," includes tasks such as application screen design and database design. February 13, 2023, and ends on March 20, 2023, taking 29 days to complete. The next set of tasks are related to the various modules of the system, including Login/Registration, Statistical Report of Alumni Employment, Event Management, Social Media Posting, Student Profile, Job Board, Yearbook, Chatbot, and Alumni Messaging. These tasks must be completed on March 20, 2023. The testing phase, which includes Alpha and Beta tests, is assigned to the same team and starts on March 24, 2023, and ends on April 5, 2023, taking 13 days to complete. The first evaluation result is expected on the same day as the Alpha test. The final phase of the project involves the creation of the thesis documents, including Chapters 1-5 and the complete thesis document. This is also assigned to the same team and is due to be completed on April 18, 2023. The final milestone, the Thesis Presentation, is due to take place on April 24-28, 2023, taking 5 days to complete.

4. RESULT AND DISCUSSION

This chapter presents the answers and detailed discussion of the main and specific problem of the study as presented on the statement of the problem. Specifically, the researchers sought to answer the following questions:

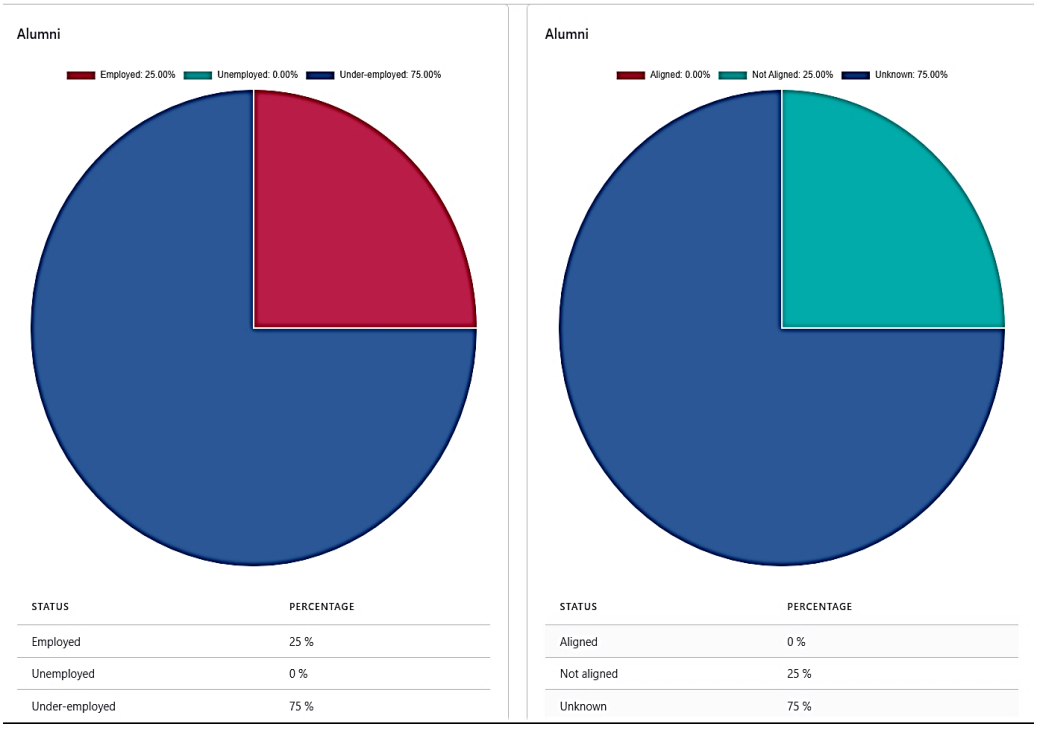
Problem 1. What is the current status of Alumni Tracking and Social Network System for JRMSU?

Currently, the university being surveyed relies on a manual approach to tracking down its alumni. The Alumni Office is in charge of this endeavor. In general, alumni searches are conducted by colleges. Alumni tracing is now done manually, which is labor- and time-intensive. Homecoming activities are held as a way of connecting with alumni and determining the relevance of the curriculum in the industry, and it is up to the alumni office of each institution to lead the initiative. For graduates working overseas, data collection is also carried out through Google Forms.

While this approach has some benefits, such as personal interactions during homecoming activities, it also has limitations. The manual system can be inefficient, as it requires significant effort to track and update alumni information. It may also result in incomplete or outdated data, as alumni contact information may change over time. Relying solely on homecoming activities may also exclude alumni who are unable to attend due to various reasons, such as distance or scheduling conflicts. Additionally, using Google Forms for data collection may have limitations, as it may not reach all alumni, especially those who may not have internet access or may not be actively using Google services.

Problem 2. What are the features of newly developed Alumni Tracking and Social Network System for JRMSU?

On the other hand, the suggested system was created to automate the collection of alumni data. It is possible for all alumni to access the web-based alumni tracking system. It can also serve as a website or other platform for graduates and the alumni coordinators at their individual colleges to keep in touch. Through this portal, key information from alumni is requested. These data, especially those pertaining to their work status, can be utilized as a basis for strategic choices, such as curriculum improvement, research agenda formulation, and future extension initiatives, among other things. College grads can update their current work status and other information by visiting the website, which is accessible via computers, tablets, and mobile devices. The server aiming to store all of the acquired data.



STATUS	PERCENTAGE
Employed	25 %
Unemployed	0 %
Under-employed	75 %

STATUS	PERCENTAGE
Aligned	0 %
Not aligned	25 %
Unknown	75 %

Figure 21. Statical Report for employment status of alumni

The Statical report should provide a breakdown of alumni employment status, including the number of alumni who are employed, unemployed, under-employed, or pursuing further education. This information provide an overall understanding of the employment landscape for alumni and help identify areas where the system can be improved to better serve their needs.

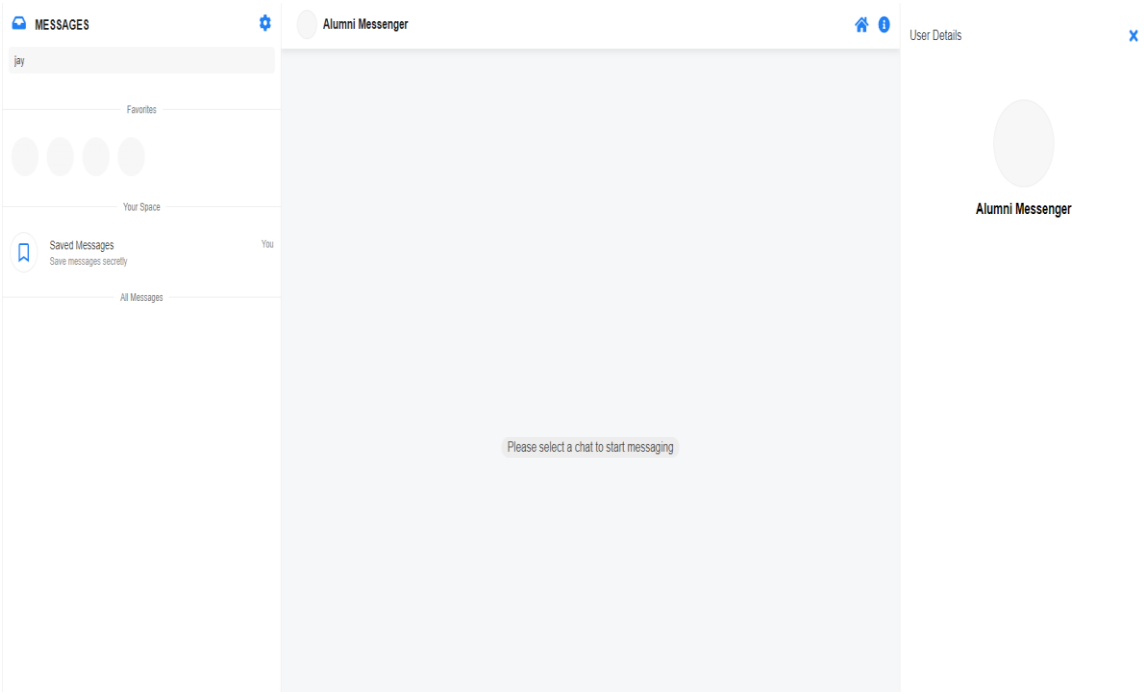


Figure 22: Alumni Messenger

The purpose of an alumni messenger in an alumni tracking and social networking system is to facilitate communication between alumni members and alumni batchmates. An alumni messenger is a tool that allows alumni to send and receive messages within the platform, making it easier for them to connect and stay in touch with one another. With an alumni messenger, alumni members can send private messages to other members, create group chats for discussions related to specific topics or events, and receive notifications when they receive new messages. This can be particularly helpful for alumni who may be spread out across different locations or who have busy schedules that make it difficult to connect in person. In addition, an alumni messenger can also be a useful tool for networking and career development. Members can use the messaging feature to reach out to other alumni who work in their desired industry or who have expertise in a particular field. They can also use group chats to connect with alumni who are interested in similar career paths or professional development opportunities.

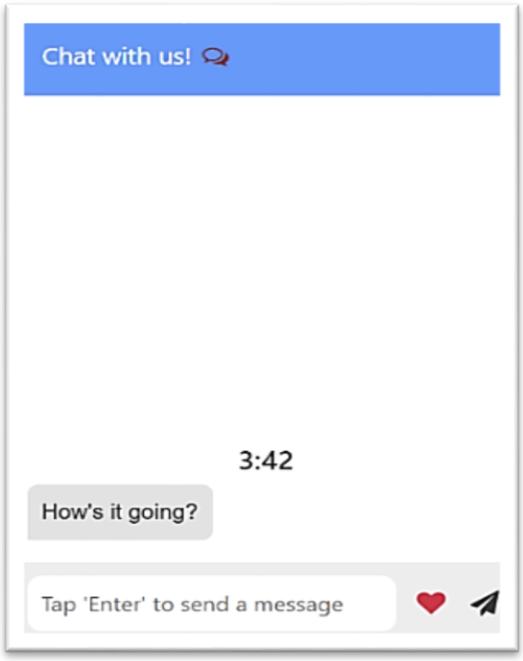


Figure 23. Chatbot

Chatbots can be designed to engage with alumni, answer their questions, provide recommendations, and even complete transactions or bookings. The main benefits of chatbots on a website are that they can provide immediate and personalized assistance to Alumni queries or guest, without the need for them to navigate through menus or search for information. Chatbots can also provide 24/7 availability, which can improve Alumni satisfaction and reduce the workload for Alumni Staff.

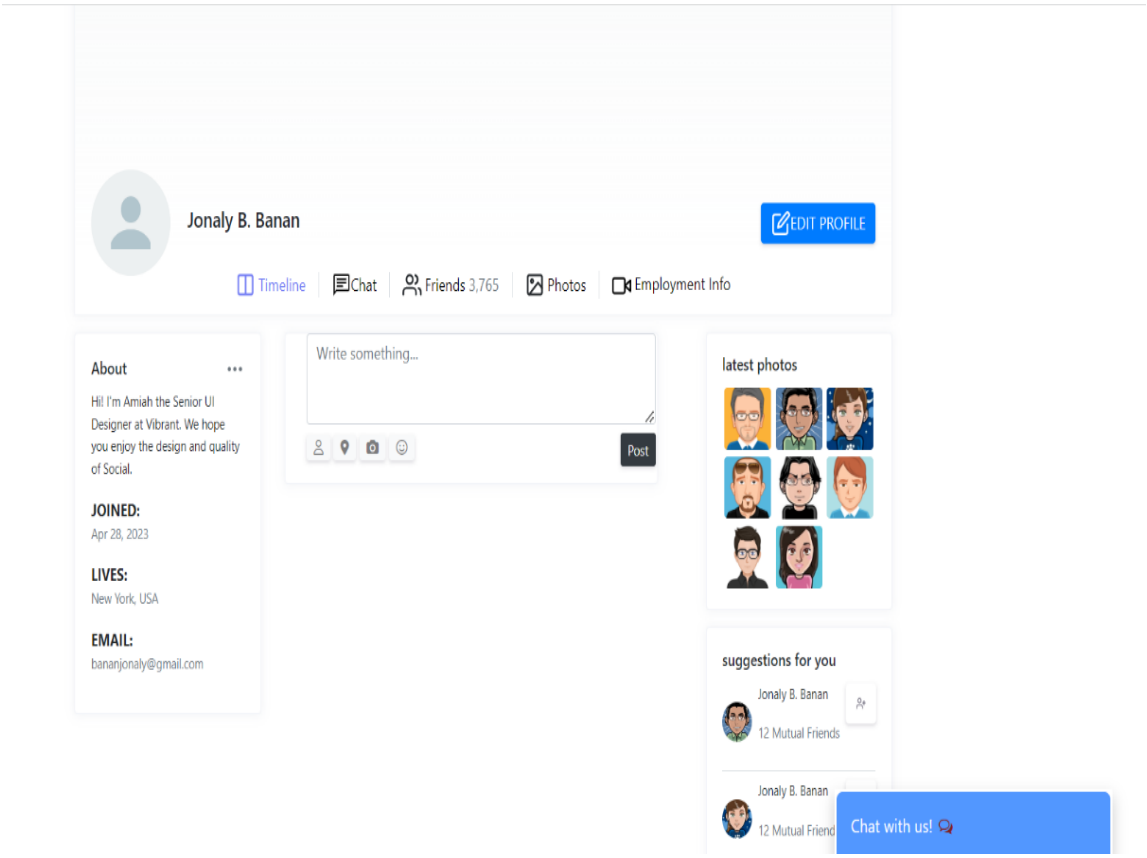


Figure 24: Alumni Profile

An alumni profile is a collection of information about an individual's educational background, work experience, and personal details. In the context of an alumni tracking and social network system, an alumni profile is a digital representation of an individual's professional and personal identity. A well-designed alumnus tracking and social network system should allow alumni to create and manage their profiles, including updating their contact information, education and work history, skills, interests, and other personal details. Alumni can also use the system to post news, updates, and photos related to their personal and professional lives. Posting on an alumni tracking and social network system can help alumni stay connected with their alma mater and with each other. It can also help alumni find new opportunities, including job openings and networking events, and share their expertise and knowledge with other members of the community

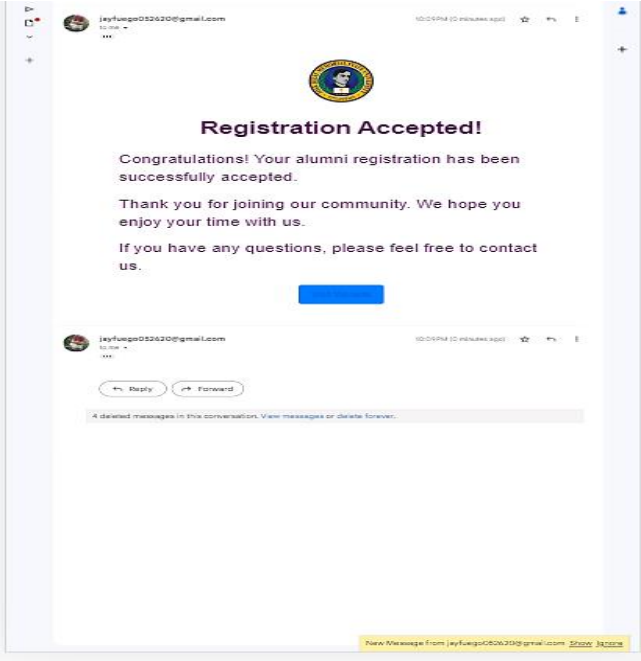


Figure 25: Registration Confirmation

When the user submits the registration form, we use an API to automatically send an email to the user's Gmail address notifying them that their registration has been accepted or declined. In the email, we include necessary details about their registration, such as a confirmation link.

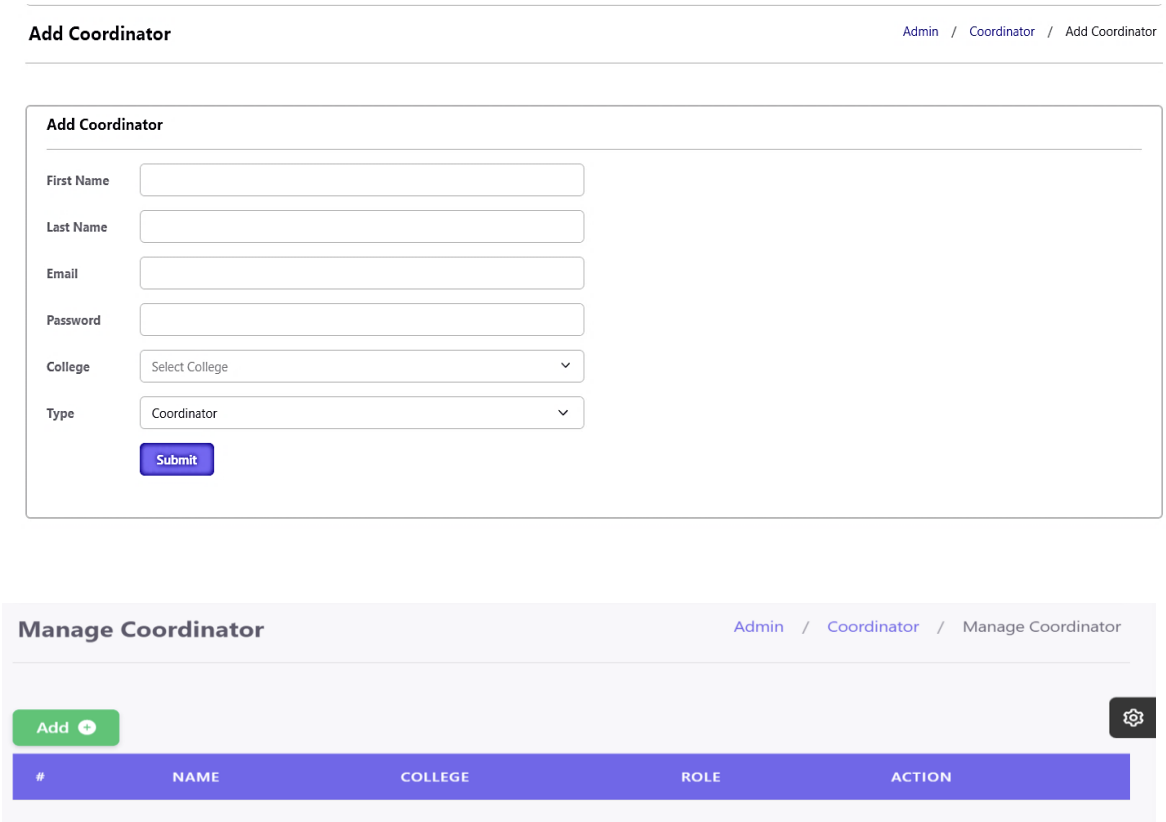


Figure 26: Adding coordinator

Adding a coordinator to an alumni tracking and social network system can help to distribute workload and improve the efficiency of the system. It can also provide more personalized support and engagement for alumni, which can lead to increased satisfaction and participation.

Problem 3. How does the Artificial Intelligence (Chatbot) for Alumni Tracking and Social Network System can be Implemented?

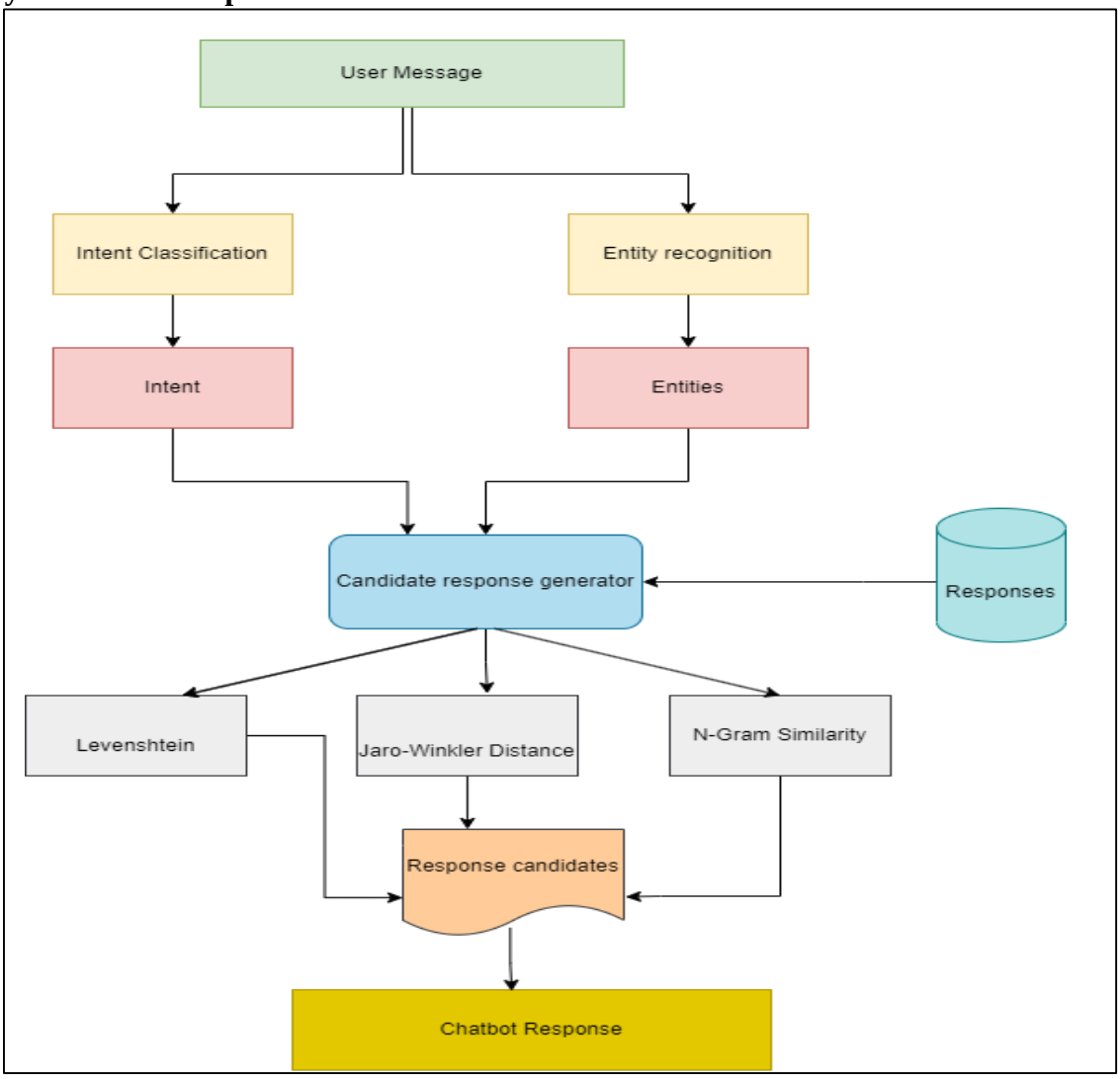


Figure 27: Chatbot

Algorithms

Levenshtein Distance: This algorithm calculates the minimum number of insertions, deletions, or substitutions required to transform one string into another. The getLevenshteinDistance function in the code implements this algorithm.

Jaro-Winkler Distance: This algorithm is a measure of similarity between two strings that takes into account the number of matching characters and the number of transpositions (i.e., the number of

matching characters that are not in the same position in both strings). The jaroWinklerDistance function in the code implements this algorithm.

N-Gram Similarity: This algorithm splits two strings into n-grams (substrings of length n), calculates the Jaccard similarity coefficient between the two sets of n-grams, and returns the result as a percentage. The compareSentences function in the code implements this algorithm.

This is a JavaScript code that implements a simple chatbot interface. The code defines several functions that perform various tasks required for chatbot communication. The chatbot can initiate a conversation by asking "How's it going?". The code also includes a function compareSentences that computes the similarity between two sentences by calculating the Jaccard similarity coefficient. The similarity score is returned as a percentage.

Additionally, the code defines two more functions getLevenshteinSimilarity and jaroWinklerDistance that compute the similarity between two strings using the Levenshtein distance and Jaro-Winkler distance algorithms, respectively. These algorithms are commonly used for string matching and measure the edit distance between two strings. The similarity score is also returned as a percentage.

The code also includes a collapsible interface that allows users to expand or collapse chatbot messages. The function getTime returns the current time and is used to display the time of each chat message. Finally, the function firstBotMessage initiates the conversation with the user by displaying the chatbot's first message on the screen.

Problem 4. How does the Alumni Tracking and Social Network System be measure in terms of:

a. functionality:
b. reliability; and
c. usability

It is based on the software's functionality, reliability and usability and it must be subjective to an evaluator's inquiry for the functions that correspond to the desired outcome. The result of tabulation of the above-mentioned factors are presented on the next page. Five (5) Alumni Students, five (5) Faculty/Instructor and three (3) IT Professionals served as evaluators among the respondents. Each respondents rated the study according to the criteria created by the researchers:

The means would be interpreted by the following ranges plotted below:

Numerical Rating	Ranges	Descriptive Rating
5	4.21 – 5.0	Very Much Functional, Reliable, Usable
4	3.41 – 4.20	Much Functional, Reliable, Usable
3	2.62 – 3.40	Functional, Reliable, Usable
2	1.81 – 2.60	Fairly Functional, Reliable, Usable
1	1.0 – 1.80	Nott Functional, Reliable, Usable

Functionality

Table 6. Perceived Rating of Respondents in terms of Functionality:

Functionality Criterion:	Weighted Mean	Descriptions
Intended use of a software	4.63	Very Much Functional
Data manipulation	4.57	Very Much Functional
Compliance of end-user needs	4.57	Very Much Functional
Security of system data	4.47	Very Much Functional
Provide a useful, time saving and acceptably accurate	4.63	Very Much Functional
Average weighted mean	**4.59**	**Very Much Functional**

Table 6 shows the perception of respondents in terms of the systems functionality. As shown in the table, all of the items are rated among the respondents as very much functional. Item number 1 "intended use of a software" and item number 5 "provide a useful, time saving and acceptably accurate" got the highest weighted mean value of 4.63 which was described as very much functional. This means that the software is intended purpose of tracking alumni and facilitating communication and networking among them. It also demonstrates that the system is able to manipulate data accurately and securely, while meeting the needs and preferences of its end-users. In addition, the software is also accurate and not time consuming for the alumni. Further, this indicates that the system satisfies the end-users.

The Impact of Electronic Communication on Alumni Giving: A Study of University Advancement" by Vida Maralani, Yuting Zhang, and Saeideh Ziaei (2019). This article examines the impact of electronic communication on alumni giving in university advancement. The authors analyze the functionality of electronic communication platforms for tracking and networking purposes, as well as their impact on alumni engagement and giving behavior.

Reliability

Table 7. Perceived Rating of Respondents in terms of Reliability

Reliability Criterion:	Weighted Mean	Description
Process performed by the system	4.50	Very Much Reliable
Stability of the system	4.37	Very Much Reliable
Accuracy of data capture	4.60	Very Much Reliable
Error tolerance	4.10	Very Much Reliable
Process performed by the system	4.60	Very Much Reliable
Average weighted mean	**4.34**	**Very Much Reliable**

Table 7 shows the perception of respondents in terms of system's reliability. As shown in the table, of all the items rated the highest weighted mean is 4.60 which described "accuracy of the data capture"

and processed performed by the systems". The system received high ratings for the reliability of the processes performed by the system, accuracy of data capture, and stability of the system. However, the system received a lower rating for error tolerance, indicating that there may be room for improvement in terms of handling errors and ensuring data integrity.

Measuring the Success of Alumni Social Networks: An Analysis of Engagement and Satisfaction" by Lisa Ho, Michelle L. Rodino-Colocino, and Sarah E. Nadelson (2016). This study examines the success of alumni social networks by analyzing their engagement and satisfaction levels. The authors also explore factors that contribute to the reliability and accuracy of these networks.

Usability

Table 8. Perceived Rating of Respondents in terms of Usability

Usability Criterion:	**Weighted Mean**	**Description**
User friendly program	4.73	Very Much Usable
Simple manipulation features		Very Much Usable
Wrong key input errors detection	4.23	Very Much Usable
Data Storage	4.57	Very Much Usable
Production of data output	4.70	Very Much Usable
Average weighed mean	**4.56**	**Very Much Usable**

Table 8. Shows the perception of respondents in terms of the systems usability. As shown in the table, all the items are rated very much usable and the highest weighted mean is 4.73 which described "user friendly program" and 4.70 "production of data output". This means that proposed system can guarantee the end-users that the program is easy to use and easy to understand and its output is accurate.

"Using Social Network Analysis to Measure the Effectiveness of Alumni Relations Programs" by Sherry L. S. Xie and F. Patrick Sheridan (2016). This study explores the use of social network analysis to measure the effectiveness of alumni relations programs. The authors analyze the usability of the tracking and networking platforms used in the study and discuss the potential for improving their usability

Table 9. Overall result of weighted mean.

Criteria	**Weighted Mean**	**Description**
Functionality	4.59	Very Much Functional
Reliability	4.34	Very Much Reliable
Usability	4.56	Very Much Usable
Average weighed mean	4.50	**Very Much Functional/Reliable/Usable.**

The table 9 presents the results of a weighted mean analysis of three criteria: functionality, reliability, and usability. The analysis was conducted using a scale of 1 to 5, with 5 being the highest score.

The weighted mean for functionality is 4.59, which indicates that the functionality of the product is very much functional. Similarly, the weighted mean for reliability is 4.34, indicating that the product is very much reliable. The weighted mean for usability is 4.56, which means that the product is very much usable. The overall average weighted mean for the three criteria is 4.50, which suggests that the system is very much functional, reliable, and usable. This is a positive assessment of the system performance across these three important criteria.

Alumni Networks and Career Outcomes: Evidence from a Top Business School" by Daniel Kim, Yoonseo Kang, and Lynn Wu (2019). This study investigates the relationship between alumni networks and career outcomes for graduates of a top business school. The authors analyze the functionality and reliability of the alumni network platform, as well as its usability for job-seeking and networking purposes.

These studies highlight the importance of functionality, reliability and usability in alumni tracking and social networking platforms, as well as the potential impact of user experience on alumni engagement. They also suggest potential areas for improvement in the functionality, reliability and usability of these platforms, such as the incorporation of mobile technology and social network analysis.

5. SUMMARY, FINDINGS, CONLUSION AND RECOMMENDATION

This chapter present the summary and conclusion of this study. It also includes the presentation of the findings, the inferences formed from the findings, and the recommendation made.

Summary

In this chapter the researchers aim to study Alumni Tracking and Social Network System sub problem in the problem. This was accomplished through a process which includes Data Gathering, Requirements and Analysis, Designing, Coding and Testing & Evaluation. The Alumni Tracking and Social Network System is a web-based system that is accessible to all alumni. It can also be used as a website/medium for graduates and their respective college alumni coordinators to stay in touch with each other. Important data from the alumni are solicited through this platform.
Answers to the following sub problems were being sought:

1. What is the current status of Alumni Tracking and Social Network System for JRMSU-Main Campus?
2. What are the features of newly developed Alumni Tracking and Social Network System for JRMSU-Main Campus?
3. How the Artificial Intelligence (Chatbot) for Alumni Tracking and Social Network System can be Implemented?
4. How the developed systems assist in terms of:
    a. functionality;
    b. reliability; and
    c. usability

This study applied a developmental research method defined as the systematic study in designing, developing, and evaluating program, process and in gathering data that must meet the criteria of the internal reliability, usability and functionality. Using thesis research in which data acquired from questionnaires and other sources was meticulously evaluated and analyzed in order to create the desire outcome and correct study output.

Findings

After all the necessary data of the study were treated accordingly, the following findings were discovered.

Problem 1. The current alumni tracking at JRMSU is done manually. Data is inaccessible from anywhere because it is not stored on a server. Tracking alumni manually can be a time-consuming and labor-intensive process. It may require dedicated staff to collect, update, and maintain alumni data, including contact information, career details, and other relevant information. This can be inefficient and may result in outdated or incomplete data. The system does not include social networking in any manner. The current system may not enable effective alumni engagement. It can be challenging to reach out to alumni, share updates, and facilitate networking opportunities without a centralized system in place. This can result in reduced alumni engagement and limited opportunities for alumni to connect with each other and with their alma mater. Data is not segregated in a broader context. Manual alumni tracking may not provide comprehensive data analysis capabilities. Analyzing alumni data for insights and decision-making may require significant effort and resources, including data consolidation, cleaning, and analysis. Manual tracking may not provide the necessary tools and capabilities to perform an in-depth data analysis.

Problem 2. The proposed system is stored on a server and can be accessed anywhere at any time. Social networking among alumni is one of the key features of the newly proposed system. The system may allow alumni to create and manage their profiles, including personal and contact information, education history, career details, and other relevant information. Alumni may also be able to update their profiles, upload a profile picture, and customize privacy settings. The system may provide networking and communication features that allow alumni to connect with each other. This may include an alumni directory, search functionality to find fellow alumni based on criteria such as location, industry, or profession, and the ability to send messages or connect through a messaging system within the platform. The system may enable alumni to view events and reunions organized by the educational institution or by fellow alumni. This can include class reunions, networking events, workshops, and other alumni-related activities. This can help alumni stay updated on the latest news and events happening at their alma mater. The system may include data analytics and reporting features that allow the educational institution to collect, analyze, and report on alumni data. This can provide insights into alumni demographics, career paths, engagement levels, and other relevant metrics, which can inform institutional decision-making. The system may be accessible through computers or mobile devices, including smartphones and tablets, to provide alumni with convenient access to the platform on the go.

Problem 3. A chatbot for alumni tracking and a social network system can be a powerful tool for institutions looking to improve alumni engagement and collect valuable data on their alumni network. With the right planning and implementation, it can provide a seamless and effective user experience for both alumni and institutional staff. Adding responses to common questions to a chatbot for alumni tracking

and social network systems requires a systematic and iterative process of gathering information, defining templates, creating responses, testing, monitoring, and optimizing. By providing accurate and helpful responses to common questions, the chatbot can enhance user engagement and satisfaction and reduce the workload of alumni association staff. The admin should identify the most frequently asked questions by alumni, such as "What is the date of the next alumni event?" or "How do I update my profile information?". The administrator should gather relevant information and resources to answer each question, such as event schedules, alumni directories, or profile management guides. The administrator should define response templates for each question, including the keywords or phrases that trigger each response and the format and content of the response. The admin should test the responses by interacting with the chatbot and verifying that the responses are accurate, relevant, and helpful. The administrator should monitor the responses regularly to ensure their accuracy and relevance. They should update the responses as needed to reflect changes in the alumni network, university events, or profile management procedures.

Problem 4. The software quality assurance of the software project in terms of functionality is described as very much functional, reliability has a descriptive rating of very much reliable and so with usability. The overall acceptability of the software project has 4.50 rating descripted as very much acceptable.

Conclusion

Admittedly, alumni are valuable assets for institutions of higher education. Thus, the more alumni communication is in place, the greater the opportunities for feedback and knowledge development. The current alumni tracking system at JRMSU-Main Campus can be time-consuming, prone to errors, limited in scalability, challenging for data analysis, and may result in missed opportunities for alumni engagement. Implementing an automated alumni tracking system can help overcome these challenges and enable educational institutions to better connect with their alumni community, leverage their expertise, and foster stronger alumni relationships.

The developers decided to create the Alumni Tracking and Social Network System to help the university track the alumni and gather their information through an online portal without hassle. Alumni can use their own computers and mobile devices to register, monitor, and update their current status. In view of the above, the developers would like to recommend that additional verification procedures be made to ensure that only bona fide alumni can register in the system. Main innovations encompass the inclusion of not only alumni but also current students who can visit the website for various purposes. Therefore, the link with the university is strengthened from the beginning, with a tendency to bolster the bond between the students (current and alumni) and the educational institution. An alumni tracking and social networking system can provide numerous benefits for both the alumni and the educational institution. It allows alumni to stay connected with their former classmates, professors, and the university, which can lead to opportunities for networking, career development, and personal growth. For the institution, it can help with fundraising efforts, student recruitment, and reputation management.

However, it is important to ensure that the system is user-friendly, secure, and respects the privacy of the alumni. It should also be regularly updated and maintained to ensure its effectiveness. Additionally, the success of such a system depends on the level of participation and engagement from the alumni, so the institution must actively promote and encourage alumni to use the platform.

Recommendations

The researchers would like to recommend the Alumni Tracking and Social Network system to be able to track the Alumni conveniently. It can provide a platform for alumni to connect with each other, share their achievements, and stay updated on events and activities happening at their alma mater. For future researchers wish to continue exploring the topic of alumni tracking and social network systems this can serve as a starting point for future research and can lead to a deeper understanding of alumni tracking and social network systems and their impact on universities and alumni engagement.

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Appendices

APPENDIX A
User's Manual

Alumni Side

Login Page: When you first open the Alumni Messenger app, you will be prompted to log in. If you are a new user, you will need to create an account first before you can log in. If you already have an account, enter your email and password to log in.

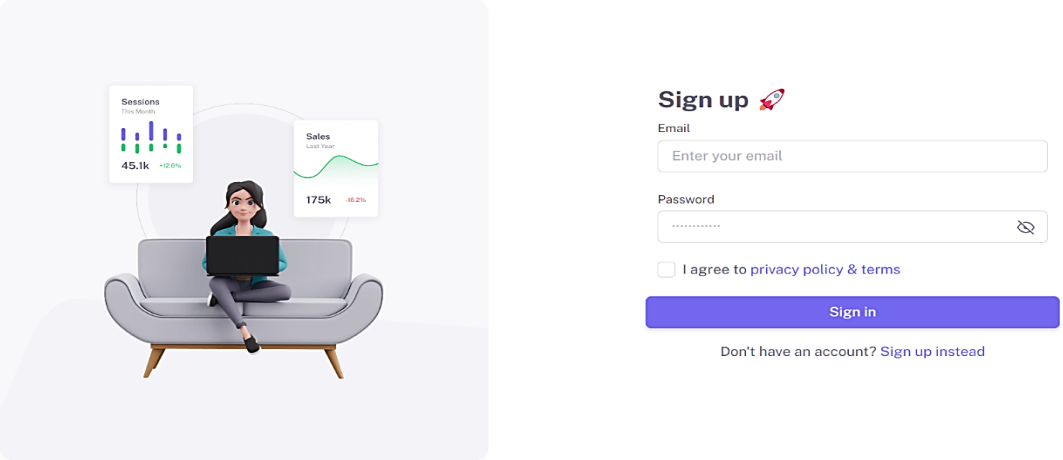


Figure 28: Login Page

Registration Page: If you are a new user, you will need to create an account before you can log in. To create an account, click on the "Sign up instead" button on the login page and fill out the required information. Once you have completed the registration form, click on the "Sign up" button to create your account.

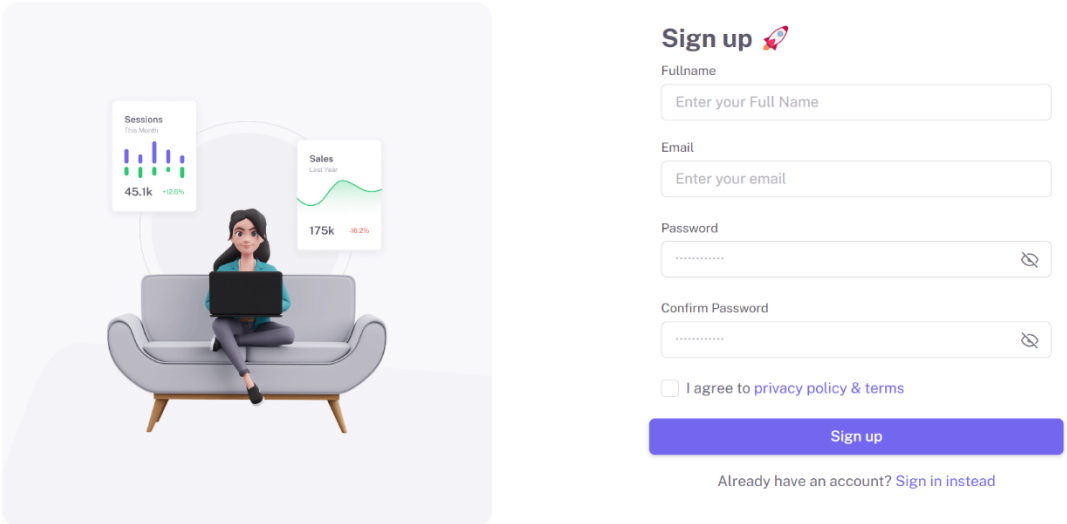


Figure 29: Registration Page

Alumni Registration Page: After you have created an account and logged in, you will be redirected to the alumni registration page. Here, you will be asked to provide your personal information such as your full name, birthdate, address, contact information, civil status, and gender. You will also need to provide information about your college such as the name of the college, your course, major, club, and batch. Lastly, you will need to upload a profile picture and agree to the terms and conditions.

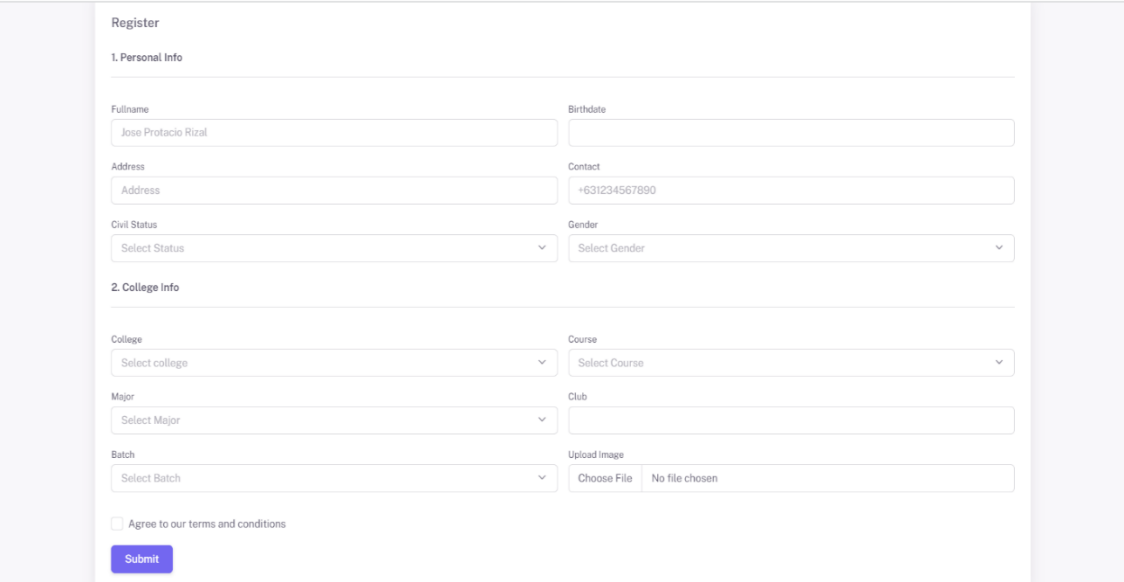


Figure 30. Alumni Registration Page

Profile Page: Once your registration has been accepted, you will be able to log in and access your profile page. On the profile page, you will be able to see your name, a cover photo, and some basic information about yourself. You will also be able to see options such as Timeline, Chat, Friends, Photos, and Employment Info. You can click on these options to view or edit your information.

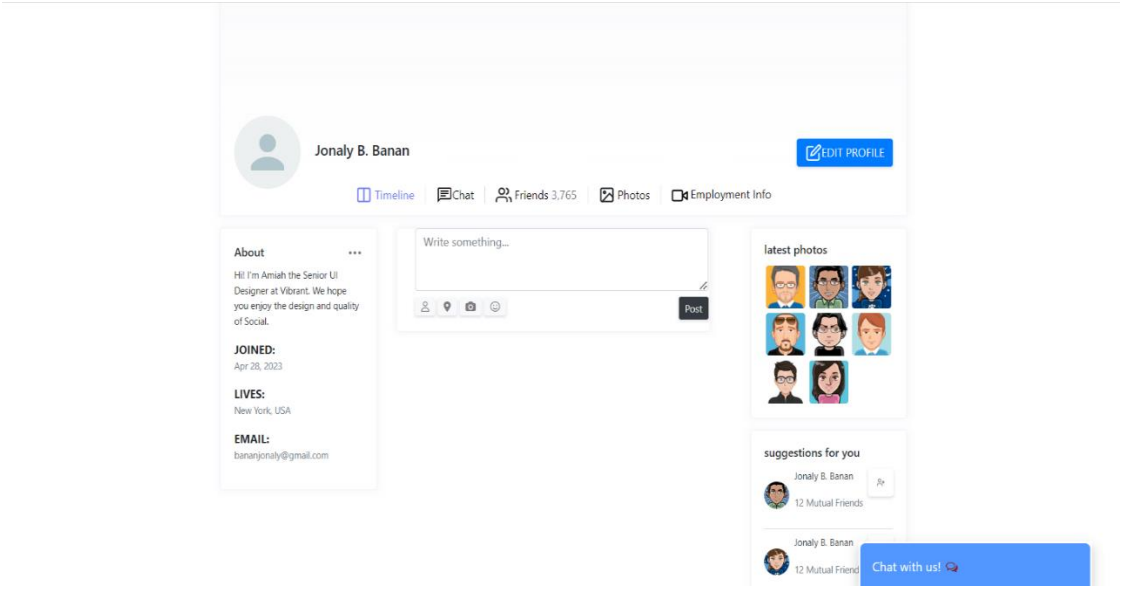


Figure 31. Profile Page

Chat: By clicking on the "Chat" option, you will be able to access the Alumni Messenger chat feature. Here, you can chat with other alumni who are also using the app. You can send text messages, photos, and videos to your friends.

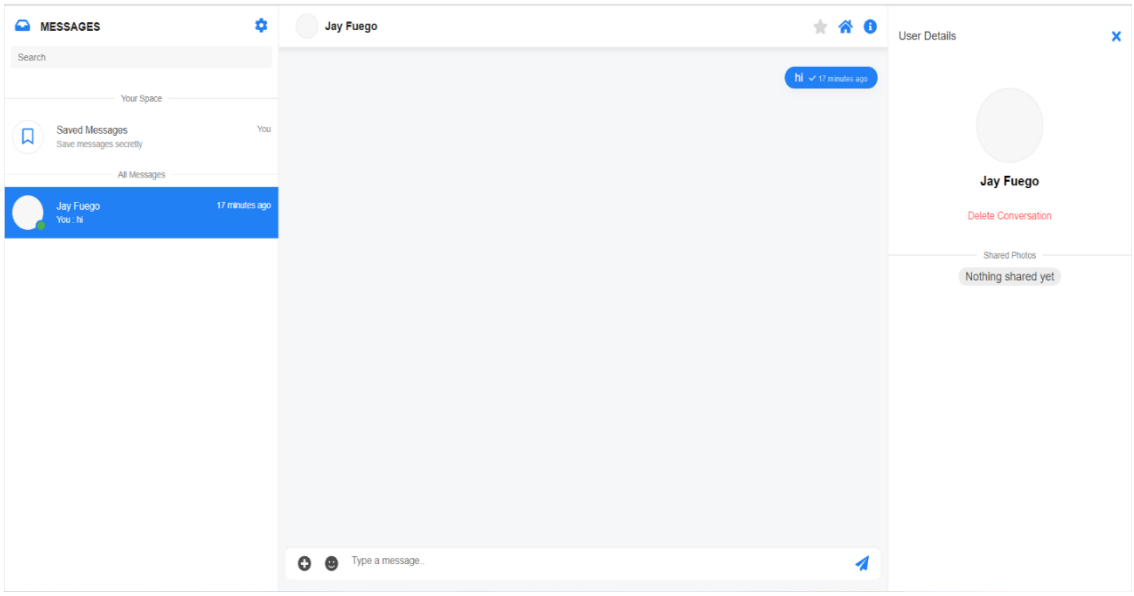
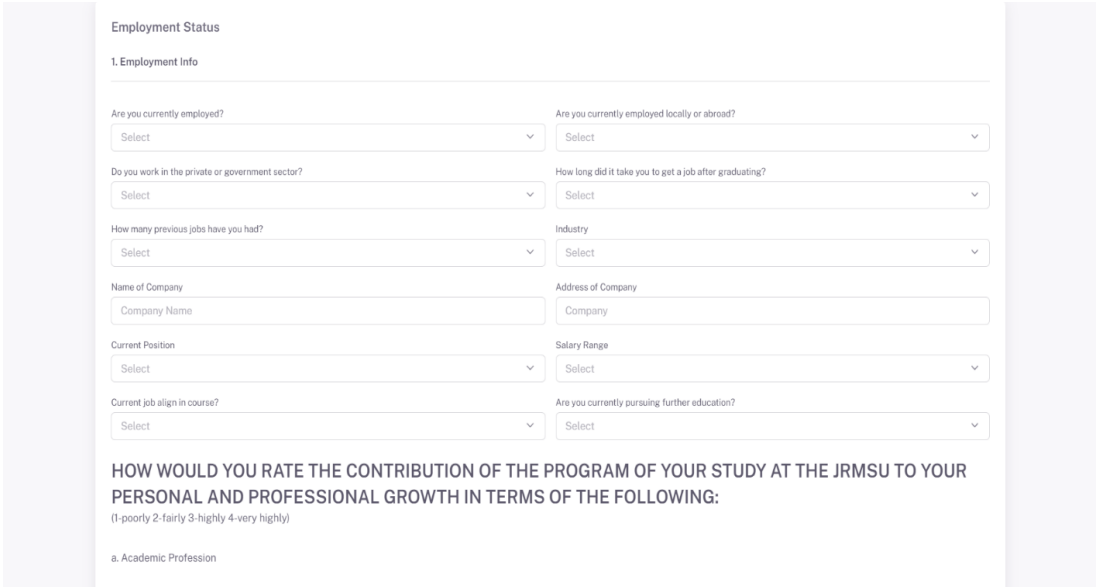
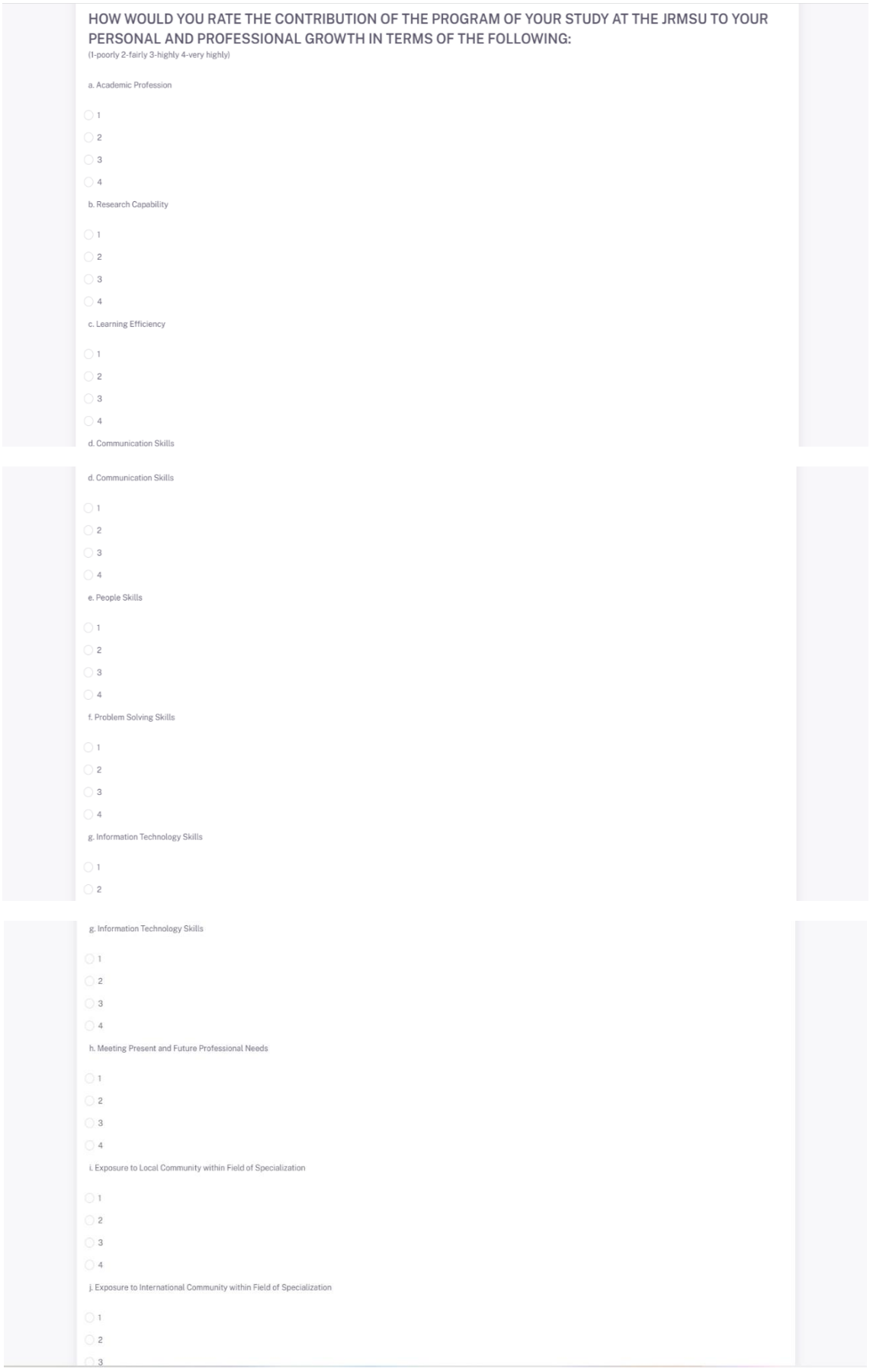
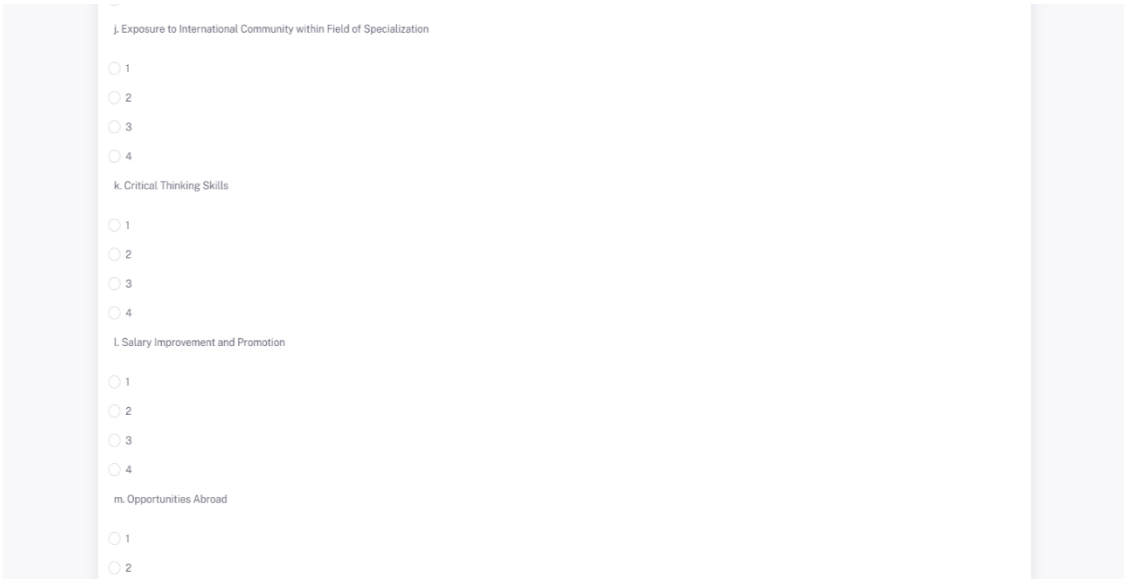


Figure 32. Chat

Employment Info: By clicking on the "Employment Info" option, you will be able to update your employment information. Here, you can add your job title, company name, and job description.




HOW WOULD YOU RATE THE CONTRIBUTION OF THE PROGRAM OF YOUR STUDY AT THE JRMSU TO YOUR PERSONAL AND PROFESSIONAL GROWTH IN TERMS OF THE FOLLOWING:
(1-poorly 2-fairly 3-highly 4-very highly)
a. Academic Profession
1
2
3
4
b. Research Capability
1
2
3
4
c. Learning Efficiency
1
2
3
4
d. Communication Skills
d. Communication Skills
1
2
3
4
e. People Skills
1
2
3
4
f. Problem Solving Skills
1
2
3
4
g. Information Technology Skills
1
2
g. Information Technology Skills
1
2
3
4
h. Meeting Present and Future Professional Needs
1
2
3
4
i. Exposure to Local Community within Field of Specialization
1
2
3
4
j. Exposure to International Community within Field of Specialization
1
2
3


j. Exposure to International Community within Field of Specialization

1
2
3
4

k. Critical Thinking Skills

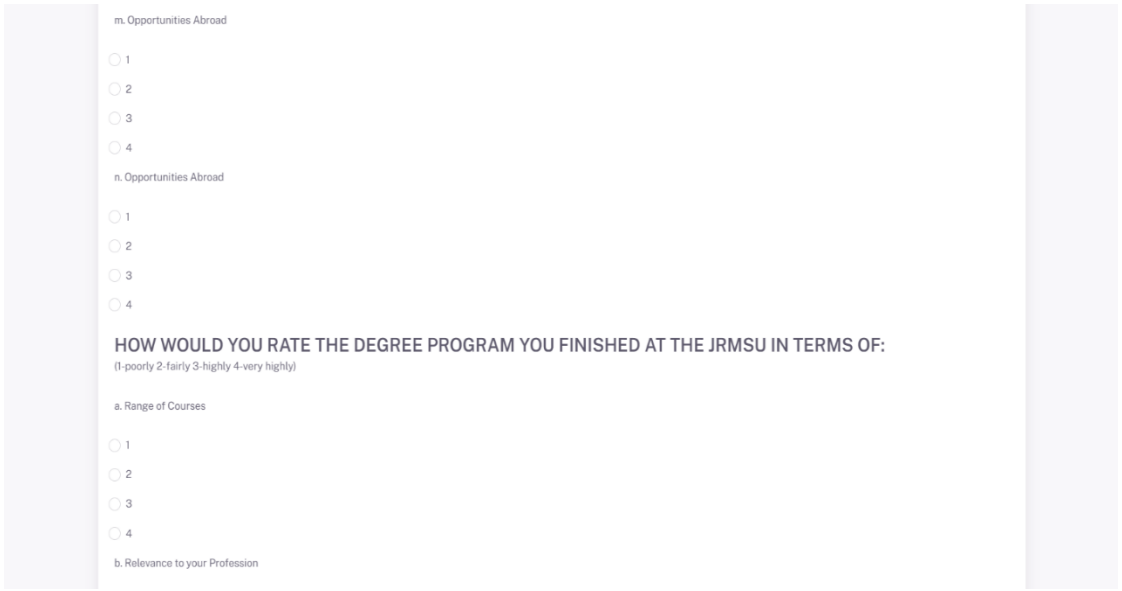
1
2
3
4

l. Salary Improvement and Promotion

1
2
3
4

m. Opportunities Abroad

1
2


m. Opportunities Abroad

1
2
3
4

n. Opportunities Abroad

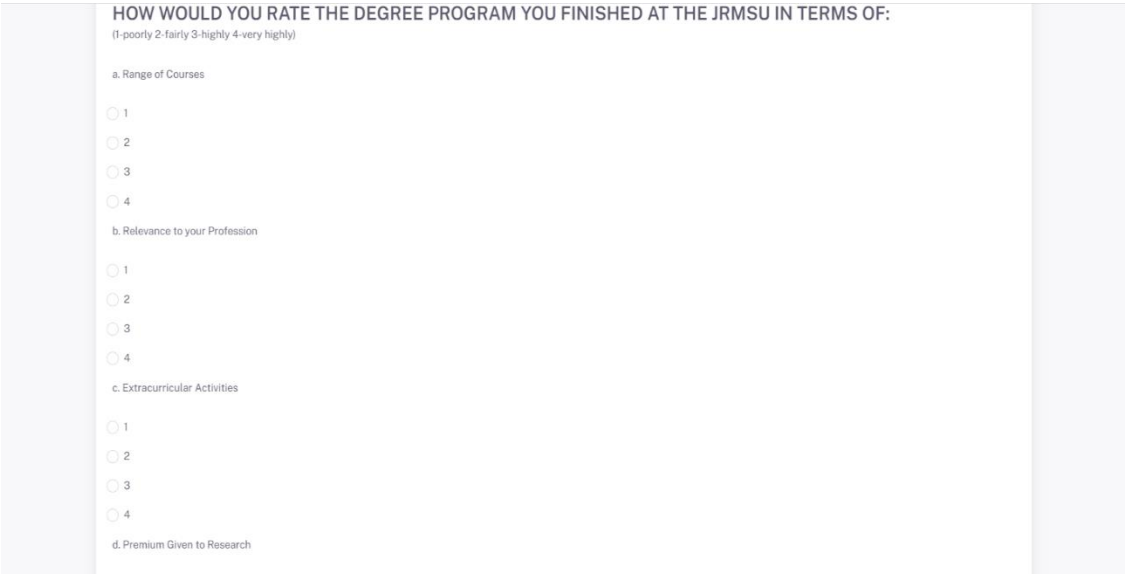
1
2
3
4

HOW WOULD YOU RATE THE DEGREE PROGRAM YOU FINISHED AT THE JRMSU IN TERMS OF:
(1-poorly 2-fairly 3-highly 4-very highly)

a. Range of Courses

1
2
3
4

b. Relevance to your Profession


HOW WOULD YOU RATE THE DEGREE PROGRAM YOU FINISHED AT THE JRMSU IN TERMS OF:
(1-poorly 2-fairly 3-highly 4-very highly)

a. Range of Courses

1
2
3
4

b. Relevance to your Profession

1
2
3
4

c. Extracurricular Activities

1
2
3
4

d. Premium Given to Research


d. Premium Given to Research
1
2
3
4
e. Interdisciplinary Learning
1
2
3
4
f. Teaching and Learning Environment
1
2
3
4
g. Quality of Instruction
1
2
3


g. Quality of Instruction
1
2
3
4
h. Teacher-Student Relationships
1
2
3
4
i. Library Resources
1
2
3
4
j. Laboratory Resources
1
2

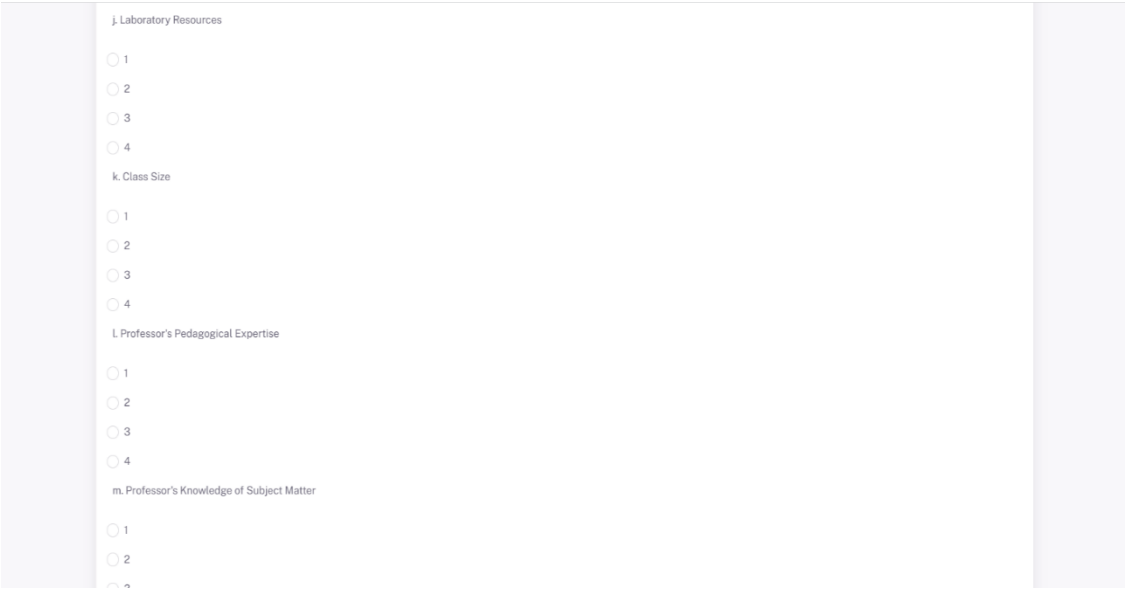
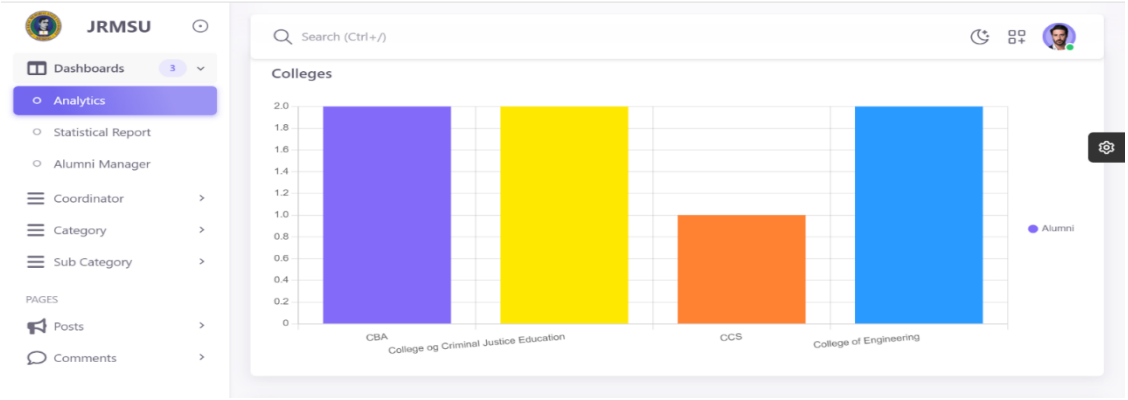

j. Laboratory Resources
1
2
3
4
k. Class Size
1
2
3
4
l. Professor's Pedagogical Expertise
1
2
3
4
m. Professor's Knowledge of Subject Matter
1
2

Figure 33: Employment Info

Admin Side

In the Analytics section of the user manual, you can view all the alumni of each college in your database.



You can also use the filter feature to display the alumni of a specific college and course. To view all the alumni, go to the Analytics section. This will display a table that shows the name, email, course, and college of each alumni in your database. To filter the alumni by college and course, use the filter feature located above the table. Select the college and course you want to filter by from the dropdown menus and click on the "Filter" button. The table will then display only the alumni who meet the filter criteria.

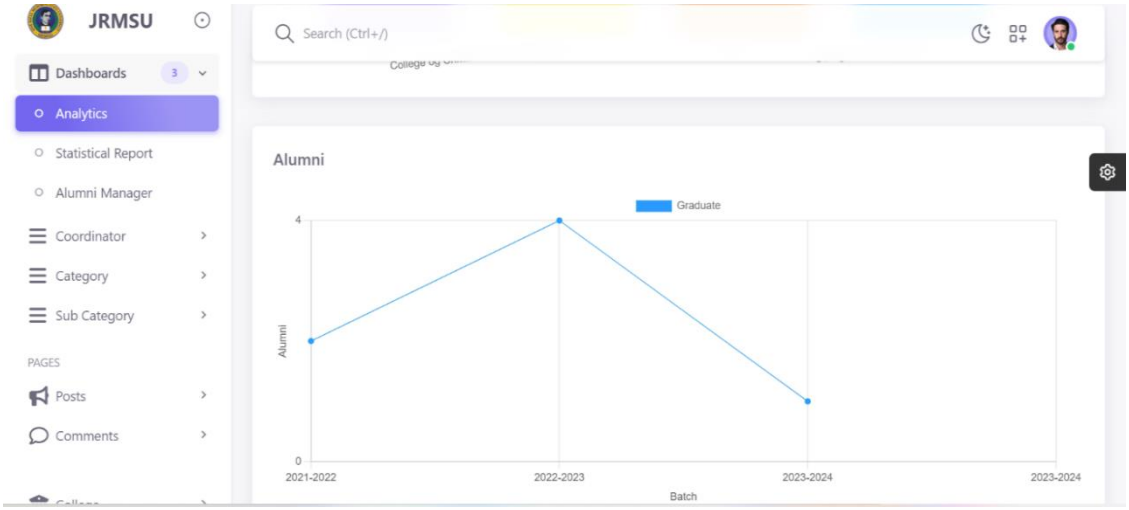
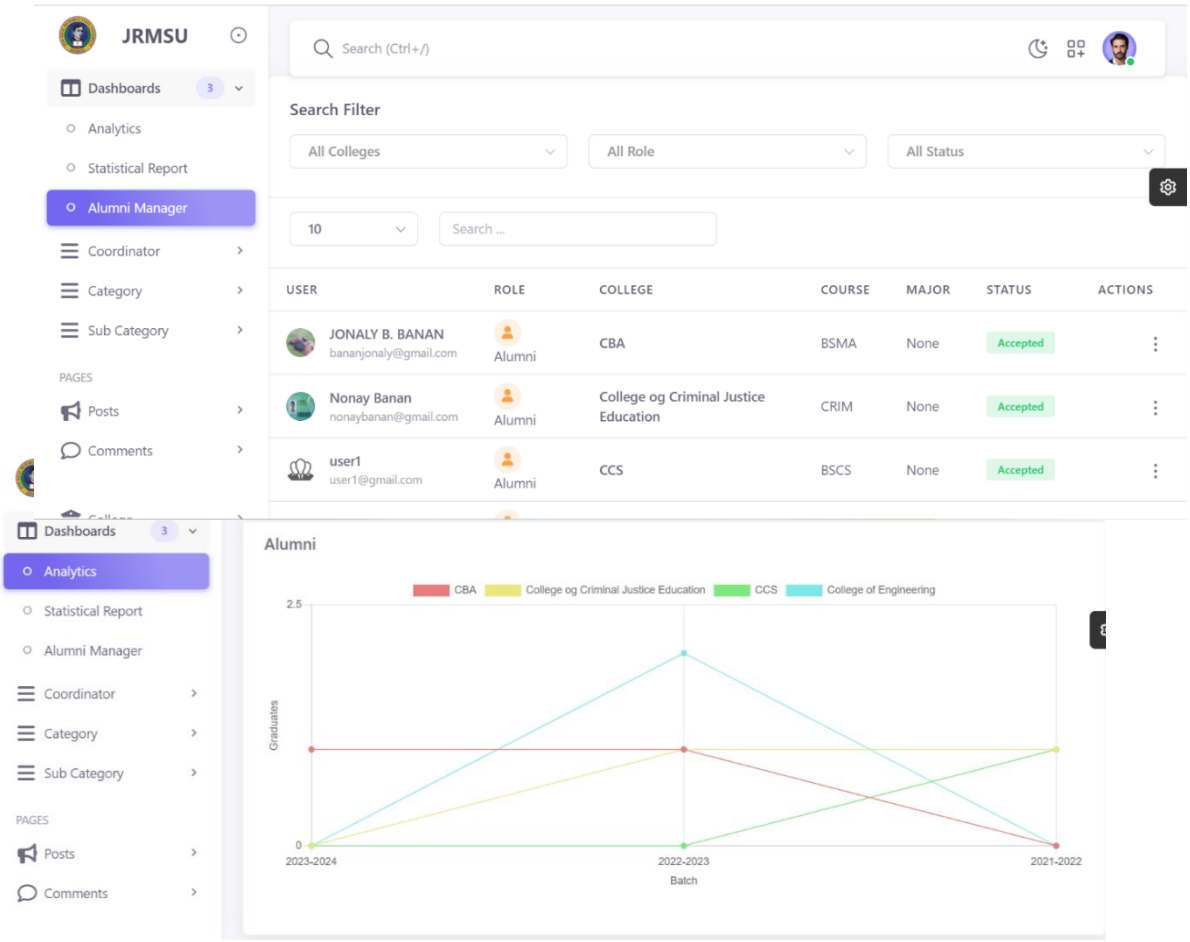
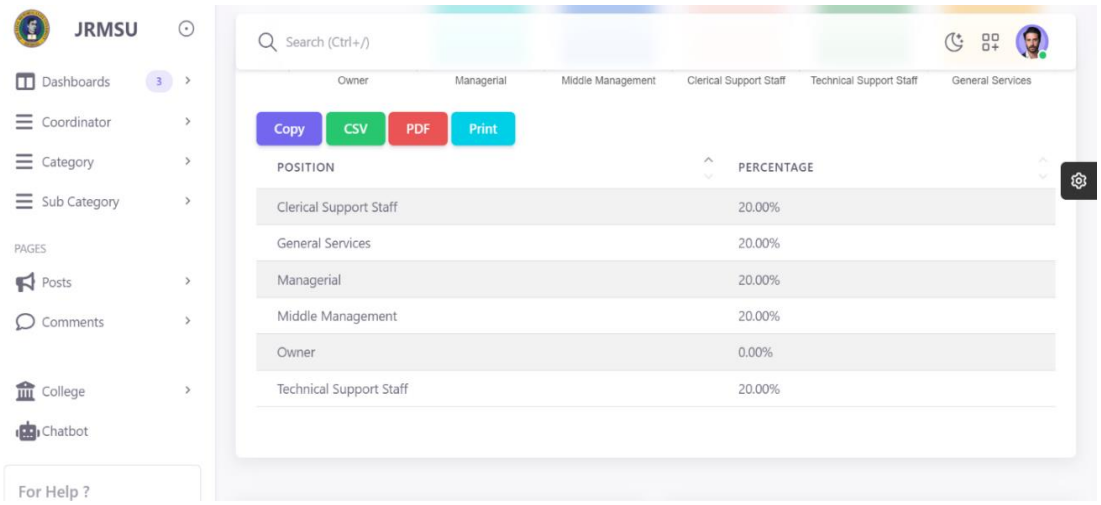


Figure 34. Statistical report

The Statistical Report feature of our application provides users with a graphical and tabular representation of employment information. This data is presented as a percentage, and users can filter the information by college. The graphical display will provide a visual representation of the data, while the tabular display will provide specific employment information.





Figure

35. Alumni Manager

Alumni Manager is a feature of the system that allows administrators to manage alumni accounts. With Alumni Manager, administrators can view all alumni accounts, accept or deny alumni requests, and filter alumni by various criteria. To manage alumni accounts, administrators can use the Alumni Manager interface to view a list of all alumni accounts. From this list, administrators can approve or reject alumni requests to join the system, update alumni account information, and delete alumni accounts if needed.

The Alumni Manager also provides filtering options that allow administrators to filter alumni by college, role, and status. This allows administrators to easily view and manage alumni accounts that meet specific criteria.

In Add coordinator you can add new coordinator in each college

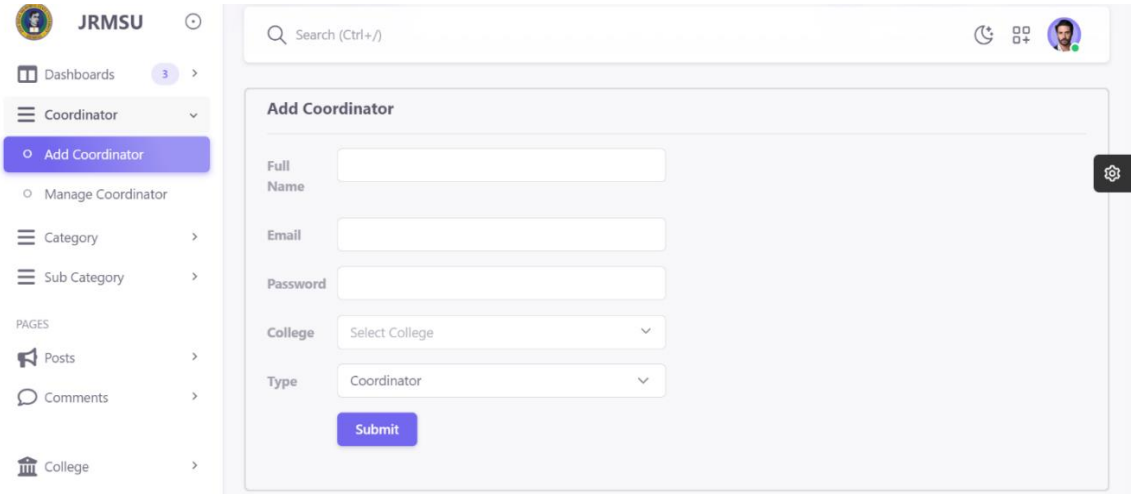


Figure 36. Add Coordinator

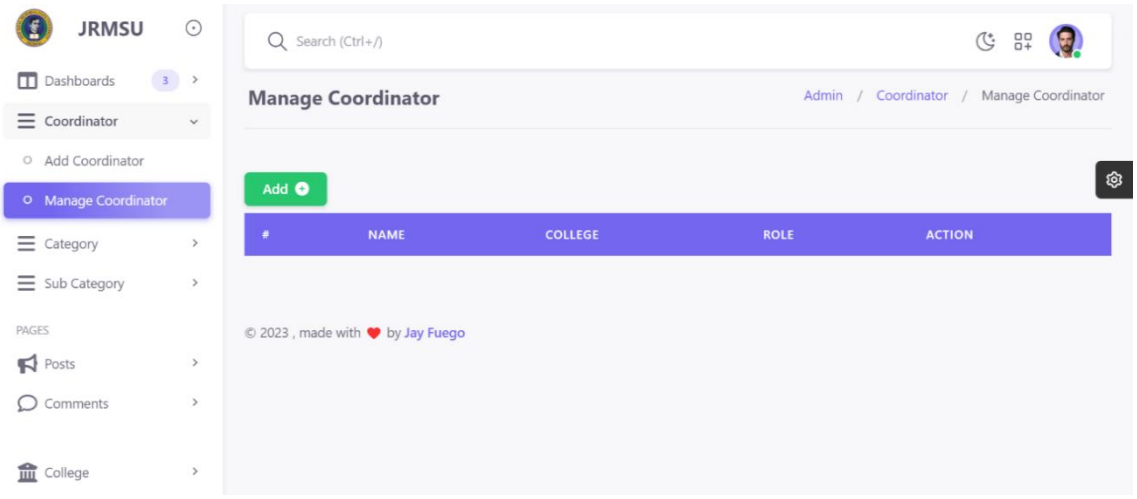


Figure 37. Manage Coordinator

In manage coordinator you can manage the coordinator; you can delete or edit coordinator In Add Category you can add new category and their description

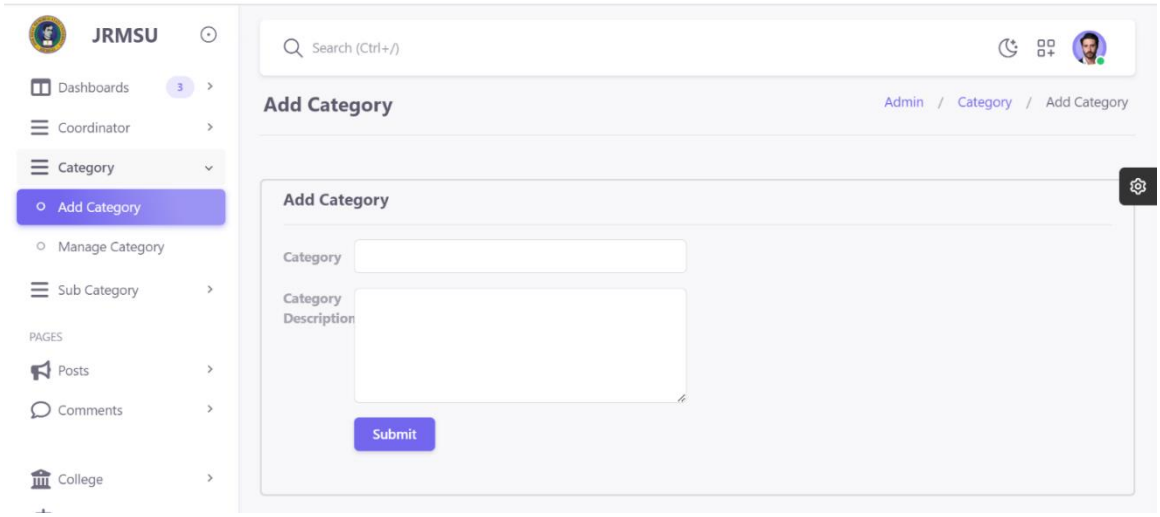


Figure 38. Add Category

In Manage Category you can manage category, you edit or delete

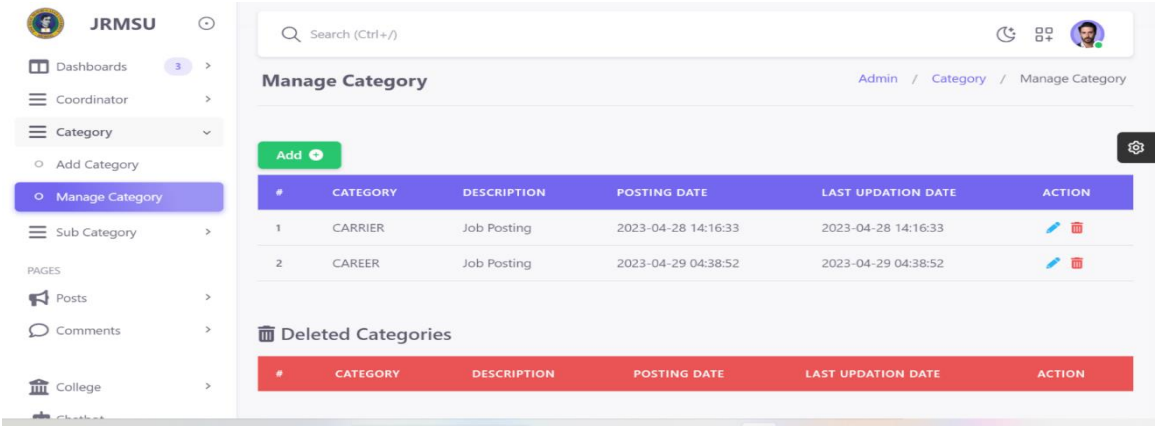


Figure 39. Manage Category

APPENDIX B
Source Code

Chatbot

```
// Collapsible
function getLevenshteinDistance(str1, str2) {
  // Create a 2D array to store the distances between substrings
  const distances = [];
  for (let i = 0; i <= str1.length; i++) {
    distances[i] = [i];
  }
  for (let j = 0; j <= str2.length; j++) {
    distances[0][j] = j;
  }

  // Calculate the distances between substrings
  for (let i = 1; i <= str1.length; i++) {
    for (let j = 1; j <= str2.length; j++) {
      const cost = str1[i - 1] === str2[j - 1] ? 0 : 1;
      distances[i][j] = Math.min(
        distances[i - 1][j] + 1, // deletion
        distances[i][j - 1] + 1, // insertion
        distances[i - 1][j - 1] + cost // substitution
      );
    }
  }

  // Return the Levenshtein distance between the two strings
  return distances[str1.length][str2.length];
}

function getLevenshteinSimilarity(str1, str2) {
  const distance = getLevenshteinDistance(str1, str2);
  const maxLength = Math.max(str1.length, str2.length);
  return (1 - distance / maxLength) * 100; // Calculate the similarity as a percentage
}

function jaroWinklerDistance(str1, str2) {
  // Calculate Jaro distance
  const m = str1.length;
  const n = str2.length;
  const maxDistance = Math.floor(Math.max(m, n) / 2) - 1;
  let matches = 0;
  let transpositions = 0;
  let i, j;
```

```
  for (i = 0; i < m; i++) {
    const start = Math.max(0, i - maxDistance);
    const end = Math.min(i + maxDistance + 1, n);
    for (j = start; j < end; j++) {
      if (str1[i] === str2[j]) {
        matches++;
        if (i !== j) {
          transpositions++;
        }
        break;
      }
    }
  }
  if (matches === 0) {
    return 0;
  }
  const jaro = (matches / m + matches / n + (matches - transpositions / 2) / matches) / 3;

  // Calculate Jaro-Winkler distance
  const prefix = 0.1;
  let commonPrefix = 0;
  for (i = 0; i < Math.min(m, n); i++) {
    if (str1[i] === str2[i]) {
      commonPrefix++;
    } else {
      break;
    }
  }
  const jaroWinkler = jaro + commonPrefix * prefix * (1 - jaro);

  return jaroWinkler * 100;
}
function compareSentences(s1, s2, n) {
  // Convert the sentences to lowercase and remove all non-alphanumeric characters
  s1 = s1.toLowerCase().replace(/[^a-z0-9 ]/g, '');
  s2 = s2.toLowerCase().replace(/[^a-z0-9 ]/g, '');

  // Split the sentences into arrays of n-grams
  var ngrams1 = getNgrams(s1, n);
  var ngrams2 = getNgrams(s2, n);

  // Calculate the Jaccard similarity coefficient
  var intersection = 0;
```

```
 for (var i = 0; i < ngrams1.length; i++) {
  if (ngrams2.indexOf(ngrams1[i]) >= 0) {
   intersection++;
  }
 }
 var union = ngrams1.length + ngrams2.length - intersection;
 var similarity = intersection / union;

 return similarity * 100;
}

function getNgrams(s, n) {
 var ngrams = [];
 for (var i = 0; i < s.length - n + 1; i++)
{
ngrams.push(s.substring(i, i + n));
}
return ngrams;
}
var coll = document.getElementsByClassName("collapsible");

for (let i = 0; i < coll.length; i++) {
   coll[i].addEventListener("click", function () {
      this.classList.toggle("active");

      var content = this.nextElementSibling;

      if (content.style.maxHeight) {
         content.style.maxHeight = null;
      } else {
         content.style.maxHeight = content.scrollHeight + "px";
      }

   });
}

function getTime() {
   let today = new Date();
   hours = today.getHours();
   minutes = today.getMinutes();

   if(hours == 24){
      hours = "00"
```

```
    }

    if (hours < 10) {
      hours = "0" + hours;
    }

    if( hours > 12 ){
      hours = hours - 12;
    }

    if (minutes < 10) {
      minutes = "0" + minutes;
    }

    let time = hours + ":" + minutes;
    return time;
}

// Gets the first message
function firstBotMessage() {
    let firstMessage = "How's it going?"
    document.getElementById("botStarterMessage").innerHTML = '<p
class="botText"><span>' + firstMessage + '</span></p>';

    let time = getTime();

    $("#chat-timestamp").append(time);
    document.getElementById("userInput").scrollIntoView(false);
}
setTimeout(() =>{
    firstBotMessage();
}, 5000);

const chatLog = document.querySelector('#chat-bar-bottom');
const userInput = document.querySelector('#user-input');
const sendBtn = document.querySelector('#send-btn');

// Read the pattern-response pairs from the JSON file
fetch('/data.json')
  .then(response => response.json())
  .then(data => {
    // Function to generate a response based on user input
    function generateResponse(input) {
```

```
    const cleanInput = input.toUpperCase().replace(/[^\w\s]/gi, "");
    let bestMatch = { similarity: 0 };
    for (const pair of data) {
      if (Array.isArray(pair.pattern)) {
        // If pattern is an array, find the highest similarity among all the elements
        for (const pattern of pair.pattern) {
          const similarity = (compareSentences(cleanInput, pattern.toUpperCase(), 2) +
getLevenshteinSimilarity(cleanInput, pattern.toUpperCase()) +
jaroWinklerDistance(cleanInput, pattern.toUpperCase()))/3;
          if (similarity > 78 && similarity > bestMatch.similarity) {
            bestMatch = { pair, similarity };
          }
        }
      }
    }
    const response = bestMatch.pair
      ? bestMatch.pair.responses[0]
      : "I'm sorry, I don't understand. Can you please rephrase your question?";
    // If the response contains a random element, parse it as HTML
    if (response.includes("<random>")) {
      const parser = new DOMParser();
      const html = parser.parseFromString(response, "text/html");
      const randomElements = html.querySelectorAll("li");
      return randomElements[
        Math.floor(Math.random() * randomElements.length)
      ].textContent;
    }
    return response;
  }

  function sendMessage() {
    const userInputText = userInput.value.trim();
    if (!userInputText) {
      return;
    }

    // Add the user's message to the chat log
    const userMessageElement = document.createElement('div');
    userMessageElement.textContent = userInputText;
    let userHtml = '<p class="userText"><span>' +userInputText + '</span></p>';
    $("#textInput").val("");
    $("#chatbox").append(userHtml);
    document.getElementById("chat-bar-bottom").scrollIntoView(true);
```

```
    userInput.value = '';

    // Generate the chat bot's response and add it to the chat log
    setTimeout(() => {
      const chatBotResponse = generateResponse(userInputText);
      let botHtml = '<p class="botText"><span>' +chatBotResponse + '</span></p>';
      $("#chatbox").append(botHtml);

      document.getElementById("chat-bar-bottom").scrollIntoView(true);
  }, 1000)
    // Clear the user input field

  }

  sendBtn.addEventListener('click', sendMessage);
  userInput.addEventListener('keyup', event => {
    if (event.key === 'Enter') {
      sendMessage();
    }
  });
})
.catch(error => console.error(error));
```

Admin post

```
<?php
namespace App\Models;

use Illuminate\Database\Eloquent\Factories\HasFactory;
use Illuminate\Database\Eloquent\Model;

class Adminpost extends Model
{
    use HasFactory;
    public $timestamps = true;
    protected $fillable = [
        'post_title',
        'category_id',
        'subcategory_id',
        'post_details',
        'views',
        'image',
```

```
        'posted_by',
        'updated_by',
        'isActive'
    ];
    public function category()
    {
        return $this->belongsTo(Category::class);
    }
    public function subcategory()
    {
        return $this->belongsTo(SubCategory::class);
    }
}
```

Add College:

```
<?php
namespace App\Models;

use Illuminate\Database\Eloquent\Factories\HasFactory;
use Illuminate\Database\Eloquent\Model;

class Alumni extends Model
{
   use HasFactory;
   public $timestamps = true;
   protected $fillable = [
      'alumni_data',
      'alumni_id'
   ];
   public function college()
   {
      return $this->belongsTo(College::class);
   }
}
```

APPENDIX C

Letters

Validation of Test Instrument

RESPONDENTS	QUESTIONS/ITEMS with 5 points likert Scale														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
1	3	5	4	5	4	4	5	4	4	5	4	4	4	4	59
2	4	4	3	4	4	3	4	4	5	4	4	5	4	5	57
3	5	3	4	2	2	4	4	4	4	4	1	2	4	4	47
4	4	4	4	5	4	5	5	5	4	5	4	5	5	4	63
5	4	5	4	4	5	4	4	4	5	4	5	4	4	5	61
6	3	4	5	4	4	4	4	1	5	4	4	4	3	4	53
7	4	4	4	4	4	5	4	5	4	4	4	5	4	4	59
8	5	4	2	3	5	4	4	4	5	5	5	4	4	4	58
9	4	4	3	4	4	4	4	5	4	4	4	4	4	5	57
10	1	5	4	4	4	5	5	5	4	5	5	4	4	4	59
11	5	2	5	3	4	1	4	1	5	4	4	3	5	4	50
12	4	5	4	4	4	4	4	3	4	5	5	4	4	4	58
13	3	1	1	5	3	3	4	4	2	5	4	3	1	1	40
Variance	1.192307692	1.474358974	1.25641	0.74359	0.576923	1.141026	0.192308	1.858974	0.692308	0.269231	1.076923	0.74359	0.974359	1	40.76923

Functionality

Functionality of an alumni tracking and social network system should meet the needs of its users, while also being scalable, secure, and sustainable. Indicate the functionality level of the system software by putting a check in the box fits your response. The numbers are coded as follows:

5-Very Much Functional
4-Much Functional
3-Functional
2-Fairly Functional
1-Not Functional

Functionality	5	4	3	2	1
Intended use of the software					
Data manipulation					
Compliance of end-user need					
Security of system data					
Provide a useful, time saving and acceptably accurate					

Reliability

Reliability refers to the ability of the Alumni Tracking and Social Network to consistently perform its intended or required function or mission on demand and without degradation or failure. Indicate the reliability level of the system software by putting a check box that fits your numbers are coded as follows:

5-Very Much Reliable
4-Much Reliable
3-Reliable

2-Fairly Reliable
1-Not Reliable

USABILITY

Usability pertains to the user's total satisfaction received from using the proposed Alumni Tracking and Social Network System. To determine also the usability level of the system software, put a check in the box that fits your response. The numbers are coded as follows:

5-Very Much Usable
4-Much Usable

Reliability	5	4	3	2	1
Process performed by the system					
Stability of the system					
Accuracy of data capture					
Error tolerance					

3-Usable
2-Fairly Usable
1-Not Usable

Usability	5	4	3	2	1
User friendly program					
Simple manipulation features					
Wrong key input errors detection					
Data storage					

Production of data output					

Cronbach Alpha: **0.73**

Functionality Criterion:	**Weighted Mean**	**Descriptions**
Intended use of a software	4.63	Very Much Functional
Data manipulation	4.57	Very Much Functional
Compliance of end-user needs	4.57	Very Much Functional
Security of system data	4.47	Very Much Functional
Provide a useful, time saving and acceptably accurate	4.63	Very Much Functional
Average weighted mean	**4.59**	**Very Much Functional**

Reliability

Reliability Criterion:	**Weighted Mean**	**Description**
Process performed by the system	4.50	Very Much Reliable
Stability of the system	4.37	Very Much Reliable
Accuracy of data capture	4.60	Very Much Reliable
Error tolerance	4.10	Very Much Reliable
Process performed by the system	4.60	Very Much Reliable
Average weighted mean	**4.34**	**Very Much Reliable**

Usability

Usability Criterion:	**Weighted Mean**	**Description**
User friendly program	4.73	Very Much Usable
Simple manipulation features		Very Much Usable
Wrong key input errors detection	4.23	Very Much Usable
Data Storage	4.57	Very Much Usable
Production of data output	4.70	Very Much Usable
Average weighed mean	**4.56**	**Very Much Usable**

Overall result of weighted mean.

Criteria	**Weighted Mean**	**Description**
Functionality	4.59	Very Much Functional
Reliability	4.34	Very Much Reliable

Usability	4.56	Very Much Usable
Average weighed mean	4.50	**Very Much Functional/Reliable/Usable.**