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**Chapter I**

**INTRODUCTION**

**Background of the Study**

Artificial Intelligence (AI) has brought about significant changes to various aspects of our lives, including the job market. The integration of AI algorithms in the development of the Alumni Tracker with Job Matching system has enabled job seekers to find personalized job recommendations based on their skills and qualifications. The objective of this research is to develop an AI-based Alumni Tracker with Job Matching system that will support alumni of the Northern Negros State College of Science and Technology (NONESCOST) in finding job opportunities that are a good fit for their skills and qualifications.

The Alumni Tracker with Job Matching system will collect and analyze data on alumni's education, work experience, skills, and preferences to provide personalized job recommendations. This system will help alumni stay informed about the latest trends in the job market by providing up-to-date information on job openings and the skills and qualifications required to succeed in those roles. Using AI algorithms, the system will match alumni with job openings that are a good fit, enabling employers to find qualified candidates for their job openings.

The development of the Alumni Tracker with Job Matching system using AI highlights the commitment of NONESCOST to support its alumni in achieving success in their chosen careers. This system's innovative approach sets it apart from other alumni tracker systems that may rely on manual processes or limited data analysis. The personalized job recommendations and up-to-date information on job openings provided by the system are crucial features that will help alumni navigate the competitive job market and find opportunities that match their profile.

**Objectives of the Study**

**General Objective**

This study aims to develop an Alumni Tracker with Job Matching using AI Integration.

**Specifically, it aims to**

1. Design a system that manage data of NONESCOST Alumni that includes their education, work experience, skills, and job preferences.
2. Design a system with an AI-based job matching algorithm that can analyze alumni data and provide personalized job recommendations that match their profile.
3. Generate the following reports
   1. Alumni Report
   2. Employability Report
   3. Graphical Report
   4. Statistical Report
   5. Job Posting Report
4. Determine the quality of the developed system based on **ISO/IEC 25010:2011** Systems and Software Quality Requirements and Evaluation (SQuaRE) Quality Model

**Scope and Limitation**

The scope of this study is to develop an Alumni Tracker with Job Matching system using artificial intelligence (AI) to support the alumni of the Northern Negros State College of Science and Technology (NONESCOST) in finding job opportunities that match their skills and qualifications. The system will collect data on alumni's education, work experience, skills, and preferences to provide personalized job recommendations. The system will also integrate job postings to match alumni with job openings that are a good fit. The system's primary goal is to help alumni achieve success in their chosen careers by connecting them with job opportunities that meet their needs and qualifications.

The Alumni Tracker with Job Matching system has a few limitations that should be taken into account. Firstly, the system is dependent on the data provided by alumni, and if alumni do not provide accurate or up-to-date information, the system's effectiveness may be compromised. Secondly, the system's matching algorithms may not always provide perfect job matches, and it is the responsibility of the job seeker to evaluate the job opportunities presented by the system. Additionally, the system's effectiveness may be limited by the availability of job postings in the database, and it may not be able to capture all job opportunities in the job market. Finally, the system's effectiveness may be limited to the specific region or job market in which it is deployed, and its scalability to a wider range of job markets may require further research and development.

**Significance of the Study**

The NONESCOST Alumni Tracker with Job Matching using AI Integration system is designed to benefit several stakeholders, including NONESCOST alumni, employers, and the academic institution itself.

**NONESCOST Alumni**. The primary beneficiaries of the system are the alumni of the institution. The system will provide personalized job recommendations that match the alumni's education level, work experience, skills, and job preferences. The system will help alumni find job opportunities that align with their career goals, increasing their chances of finding employment that matches their interests and skillset.

**Employers.** The system will benefit employers by providing a pool of qualified job applicants who match their job requirements. Employers will benefit from a more efficient recruitment process, reducing the time and resources required to find suitable candidates. The system will help employers find qualified applicants who match their job requirements, increasing the likelihood of successful job placements.

**Academic Institution.** The system will benefit the academic institution by improving its alumni engagement and support services. By providing a job matching service for alumni, the institution can enhance its reputation and improve its relationships with alumni. The system will also provide valuable data on alumni employment trends, which can be used to improve the institution's academic programs and curriculum.

**Future Researchers.** The project may serve as a reference for future researchers.

**Definition of Terms**

**AI Integration**: Conceptually, AI integration refers to the use of artificial intelligence algorithms and techniques to enhance the performance and capabilities of a system. Operationally, AI integration in the NONESCOST Alumni Tracker system refers to the use of machine learning algorithms to analyze alumni data and provide personalized job recommendations.

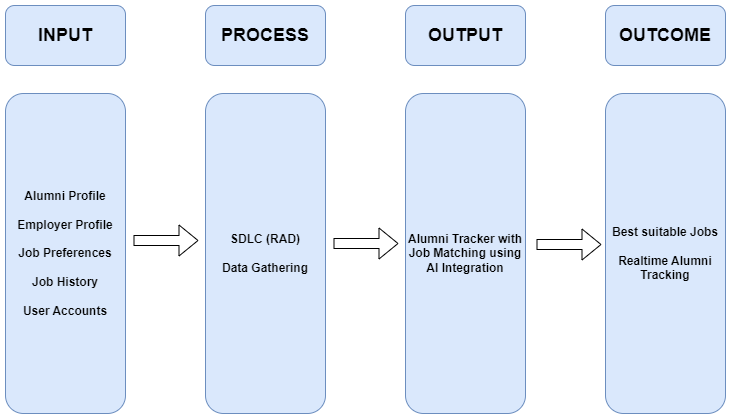
**Job Matching**: Conceptually, job matching refers to the process of matching job seekers with suitable job opportunities based on their skills, education, work experience, and job preferences. Operationally, job matching in the NONESCOST Alumni Tracker system refers to the algorithmic process of analyzing alumni data and employer job requirements to identify suitable job opportunities for alumni.

**Alumni Tracker:** Conceptually, an alumni tracker refers to a system that tracks the academic and employment progress of alumni. Operationally, the Alumni Tracker in the NONESCOST system refers to the database and user interface that enables alumni to input and update their personal and employment information, which is used by the job matching algorithm to provide personalized job recommendations.

**Data Analytics:** Conceptually, data analytics refers to the process of analyzing and interpreting data to derive insights and make informed decisions. Operationally, data analytics in the NONESCOST Alumni Tracker system refers to the use of machine learning algorithms to analyze alumni data and employer job requirements to provide personalized job recommendations.

**Personalized Job Recommendations:** Conceptually, personalized job recommendations refer to job opportunities that match the job seeker's skills, education, work experience, and job preferences. Operationally, personalized job recommendations in the NONESCOST Alumni Tracker system refer to the algorithmic process of analyzing alumni data and employer job requirements to identify suitable job opportunities for alumni.

**Conceptual Framework**



**Figure 1. Conceptual Framework of the Study**

Figure 1 shows the NONESCOST Alumni Tracker with Job Matching system that uses AI integration to match alumni with job openings. The system is based on the IPOO model and enables employers to find qualified candidates for their job openings while also providing real-time tracking of NONESCOST alumni. In summary, it is a tool that simplifies the job matching process and enhances the tracking of alumni.

**Chapter II**

**RELATED LITERATURE AND PRIOR ARTS SEARCH**

**Related Literatures**

**ALUMNI TRACKING SYSTEM [1]**

The Alumni Tracking System is an online-based application that aims to enhance the current tracking process of college graduates. It is a web portal that provides a centralized platform for the management of alumni data and facilitates communication between alumni and the institution. The system allows alumni to update their information easily and provides a flexible and automated approach to managing alumni data. The proposed system offers great advantages to the alumni, such as eliminating the need for a group of alumni to manage the alumni forum and reducing maintenance effort. The system provides an all-in-one solution for collecting and managing alumni data, enabling effective communication between alumni and the institution, and offers great flexibility in keeping track of the data. In summary, the Alumni Tracking System is an innovative and useful application that can significantly improve the management of alumni data and benefit both the alumni and the institution.

**An Alumni Portal and Tracking System [2]**

The system aims to integrate the existing unmanaged and outdated alumni data into a well-managed database and act as a portal where alumni can update their information and view online yearbooks. The paper provides insights from the collected alumni responses, including the job positions and employers of alumni, their current location, and the favored choice for further education. The system has been effective in collecting and managing alumni data and has been accessed by many alumni. Overall, the paper highlights the importance of an efficient alumni tracking system and how a web-based platform can make it easier for institutions to manage alumni data.

**Design and Development of Alumni Tracking Information System [3]**

The study aimed to develop a web-based alumni tracking information system at SMKN 1 Garut, test it based on functional aspects, and evaluate user responses. The system was developed using a waterfall model and was tested using blackbox testing and expert validation. The feature completeness matrix was used to calculate the results, and user responses were collected using a Likert scale questionnaire from ten alumni of SMKN 1 Garut. The study found that the web-based alumni tracking information system at SMKN 1 Garut is feasible in terms of functional aspects and received a "very positive" response from users. The study highlights the importance of an efficient alumni tracking system and how a web-based platform can make it easier for institutions to manage alumni data.

**Design and Development of Alumni Tracking System for Public and Private HEIs [4]**

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 to 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 tool in finding out important information about them like their employment status and in identifying which skills are essentials in their present work. This information in return can help the HEI determines the improvement that they need to do with the existing curriculum. It can also generate comprehensive reports which are necessary for planning, program implementation and any decision-making purposes.

**Centralized Alumni Management System (CAMS) - A Prototype Proposal [5]**

This paper proposes a centralized system for alumni management which is institution independent and concentrates on alumni network pan organizations. The fundamental incentive of the system lies in the mentorship process in the institution as well as organization verticals. The system recognizes as an alumni not only graduates but also those individuals who are presently in the institution/organization, thereby facilitating network among the professionals and the students of the institutions from where the professional had graduated. Apart from the alumni, the institutes/organizations also enjoy a comprehensive list of benefits. The minimum age for registration for alumni has been mandated to be 15 years. Hence, the system takes into account those institutions also from where a certain individual has passed the 10th examinations. Hence, the system defines the list of alma mater those institution which serve degrees for 10th, 12th, graduation, post-graduation, doctoral and working organizations. Literature comparison has been done with an existing proposal and our system exhibits better features.

**Alumni Social Networking Site [6]**

A social networking site is an online platform that allows users to create a public profile and interact with other users. In this constantly updating world, there’s a need of a network that helps the institution to keep track of their alumnae and vice versa. And also, there might be a need of a friendly guidance to the students regarding their career. The main objective of this project is to build an alumni website and social networking site that establishes a link between the present students and the alumnae of the institute. This helps the institution keep a record of their old students. Also, it does not have much staff involvement and thus, will cleanly act as a bridge between the alumnae and the present students. This website provides a user-friendly interface that facilitates the user to understand the working of the site easily. The user will be able to register or sign up and log in to their timelines and interact with other users. The user can share ideas, digital photos and videos, posts, personally chat, and inform others about online or real-world activities and events.

**Alumni Database Management System [7]**

The main aim of the project is to build an interaction between alumni, admin and the students; a system that will be able to manage alumni data of a college and provide easy access to the same. The alumni will also be interested to maintain relations with their institutions. Alumni can communicate to the students regarding job opportunities and the students can share the department technology activities to the alumni. The alumni and the student can communicate only through the admin permission. A system that will be able to manage alumni data of a college and provide easy access to the system. Final year students will be initially given a student login ID. Access to the system can help them in building connections to their projects or for placements. The system will automatically list all Alumni information (name, passing year, company currently working in, ) and their status will be transferred from the student module to the alumni module.

**Alumni Interactive System Using Mining [8]**

Alumni are one of the most important assets to any university. They are the people who represent the university in the real world.University alumni systems exist to promote active and ongoing relationships between graduates and their alma mater. Alumni are a platform that serves old Students, faculty members and other employees of the college to be in touch with each other when they leave the college after their graduation. It paves way for the students to interact with other people to help in terms of careers, business and much more. However, it is a big challenge how to enhance mentoring between alumni and current students. This proposes features of data mining into alumni systems to boost mentoring between alumni and students. Basic data mining algorithms are used to make it interactive and user friendly.

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**The Alumni Information Management Model Based on "Internet +". [9]**

"Internet+" has been integrated deeply into various industries, which also inspires the innovation of the alumni management work. There are many problems existing in alumni management work, such as the fragmentation of alumni information and time, the delay of information transmission and the simplification of management system function. In view of these deficiencies, this paper analyses and designs an intelligent integrated alumni information management system framework based on the combination of online and offline. This framework includes three modules: "Alumni Social Network", "Intelligent Data Acquisition and Storage" and "Data Mining and Decision-Making Support". The system aims at building social platform to firm alumni network by using intelligent technology to collect and store massive alumni data and datamining technology to improve the decision-making of talent training scheme.

**Designing Mobile Alumni Tracer Study System Using Waterfall Method: an Android Based. [10]**

The industrial revolution 4.0 has become a paradigm that is being widely discussed both in the industrial sector as well as in the field of education and currently the development of technology has become increasingly rapid with almost everyone currently having a handphone with an android operating system. This opportunity needs to be utilized for institutional development in the Industrial Engineering Department UPN Veteran Yogyakarta (IE UPNVY) especially for alumni searches. The data of alumni currently owned has not been systematically compiled and the alumni data entering the department is still very minimal. This study will develop an android application for tracking alumni of the IE UPNVY Study Program. The research methodology used is qualitative descriptive with a prototyping system development method and data collection techniques through interviews and observation. The tools used in designing Android applications to search IEUPNVY alumni are using Java JDK, Android SDK, Eclipse IDE, Android ADT. The expected results of this study are in the form of an android application for alumni search and analysis of alumni data obtained. Analysis in the form of a description of the graduates' profile and the relevance of the Industrial Engineering Study Program curriculum through a survey approach. The variable profile of graduates includes: 1) the waiting period for graduates, 2) the percentage of graduates who have worked, and 3) the first income earned.

**ATS ANALYSIS, DESIGN AND DEVELOPMENT OF THE ALUMNI TRACKING SYSTEM OF THE LICERIO ANTIPORDA SR. NATIONAL HIGH SCHOOL-DALAYA EXTENSION [11]**

Technologically, alumni tracking system is one example software platform used to track alumni. It eliminates the need to track graduates using pen and paper or having to gather in person, the need to manually track alumni in the school. The purpose of the study was to analyze, design and develop a system a sytem that aids in improving the existing tracking strategy where all the alumni can easily access relevant informartion about LASNHS-Dalaya Extension, a portal where persistent records of all graduates can be updates including their current job status, feedback towards inproving the school processes and more. Through the software development (SDLC) methodology, the steps were carefully implemented. The problems, issues, and challenges in the tracking processes, and management of the alumni tracking were identified. The study was conducted at Licerio Antiporda Sr. National High School- Dalaya Extension.The problems and challenges include but not limited to timeliness in the provision of immediate, accurate, and reliable data of alumni; the process involved is time-consuming and requires more manpower to track alumni; issues on safety of teachers in tracking alumni. The manual processes were systematically improved with the implemented system. The system was made available online in a secured hosting facility making it accessible across different web browser and media or devices. The researcher invested in the domain and hosting registration. The site is accessible online thru www.lashnhsdalaya.org. In conclusion, the developed Alumni Tracking System is a potential technological tool in tracking instead of using the manual process. It shows that has a great impact to the learners and teachers in terms of tracking, data collection and therefore a contributing technology to the school. Hence, it is recommended to continually utilized and updated for the purposes of management program development while reflecting from the status of its alumni.

**DIGITAL SKILL: OPTIMIZING THE UTILIZATION OF INFORMATION TECHNOLOGY BY PESANTREN UNIVERSITY IN ALUMNI TRACKING ACTIVITIES [12]**

Digital skill is the ability to discover, evaluate, use, share and create content using digital devices. The implementation of alumni tracing based on website is a form of implementing digital skills in educational communication. This research was conducted to determine the implementation of a tracer study at Universitas Darussalam (UNIDA) Gontor as a boarding school-based university by optimizing information technology according to design standards and methodologies set by the Directorate General of Belmawa Ristekdikti RI. This study uses a qualitative case study approach because the researcher wants to dig deeper into the phenomenon of optimizing information technology in Pesantren in carrying out alumni tracking. Collecting data through interviews and observations with the manager of the tracer study at the university level and the person in charge of the tracer study of the study program. The data analysis technique was carried out based on the theory of Milles and Huberman which consisted of data reduction, data presentation and drawing conclusions. Source and method triangulation was used as a technique for measuring the validity of the data in this study. The results showed that the implementation of the tracer study at Darussalam Gontor University had optimized the use of information technology in the form of a google form. In addition, a website-based alumni tracking system is currently being developed. This study uses the Theory of Planned Behavior as a research framework. With regard to technology adoption, there are 3 things that are extracted from the research subjects, namely abilities, knowledge, and resources owned by the implementer of the UNIDA Gontor tracer study, 3) the resources have been well prepared for the adjustment to the standards and methodology of the tracer study set by the Directorate General of Belmawa Ristekdikti. The recommendation given by the researcher is that there is a need to increase skills and knowledge for optimizing the use of a website-based alumni tracking system and providing appropriate resources.

**Prior Arts**

**A career counseling system based on intelligent matching algorithms.**

This paper describes a career counseling system that uses intelligent matching algorithms to help individuals find suitable job opportunities based on their skills and interests.

**A job matching system based on ontology and machine learning.**

This article presents a job matching system that uses ontology and machine learning to match job seekers with suitable job opportunities based on their skills and qualifications.

**A job recommendation system based on multi-criteria decision making**

This paper proposes a job recommendation system that uses multi-criteria decision making to recommend job opportunities based on the preferences and qualifications of job seekers.

**A method for using natural language processing to match job seekers with suitable job postings.**

This article describes a method for using natural language processing to match job seekers with suitable job postings based on their skills and qualifications.

**An intelligent job matching system based on deep learning.**

This paper proposes an intelligent job matching system that uses deep learning algorithms to match job seekers with suitable job opportunities based on their skills and qualifications.

**A hybrid approach for job recommendation using collaborative filtering and content-based filtering.**

This article presents a hybrid approach for job recommendation that combines collaborative filtering and content-based filtering to recommend job opportunities based on the preferences and qualifications of job seekers.

**A job matching model based on artificial neural network.**

This paper proposes a job matching model that uses artificial neural networks to match job seekers with suitable job opportunities based on their skills and qualifications.

**Job matching based on ontology and semantic matching.**

This article presents a job matching approach that uses ontology and semantic matching to match job seekers with suitable job opportunities based on their skills and qualifications.

**Job matching system based on personality traits and skills.**

This paper proposes a job matching system that uses personality traits and skills to match job seekers with suitable job opportunities.

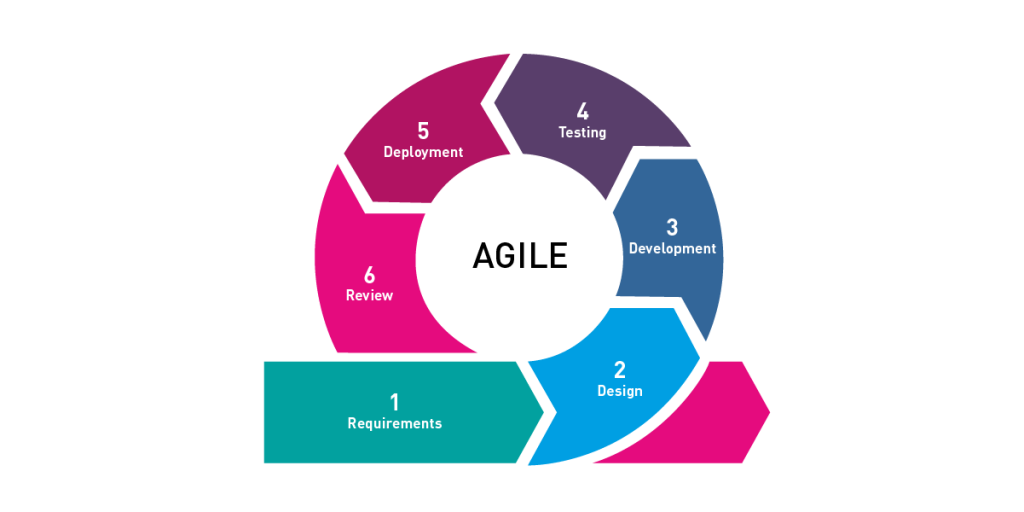
**Synthesis**

Based on the related literature and prior arts, it is evident that there is a growing need for job matching systems that can help alumni find suitable job opportunities based on their skills, qualifications, and preferences. These systems often use intelligent algorithms, such as machine learning and natural language processing, to match job seekers with job postings that meet their criteria.

**Chapter III**

**METHODOLOGY**

**System Design**



**Figure 2. Agile Software Development**

The **Agile** methodology is a software development approach that emphasizes collaboration, flexibility, and continuous improvement. It focuses on delivering value to end-users through rapid iteration and incremental development. The Agile methodology is based on the Agile Manifesto, a set of values and principles for software development that prioritize individuals and interactions, working software, customer collaboration, and responding to change.

**Software Life Cycle Model**

**Planning**: In this phase, the development team works with stakeholders to define the project scope, establish goals and objectives, identify risks and challenges, and determine the initial requirements for the system. The team creates a roadmap that outlines the development process, timelines, and milestones.

**Design**: In this phase, the development team creates a high-level design for the system, which includes the system architecture, technology stack, database design, and user interface. The team also defines the functionality of the system and how it will be implemented.

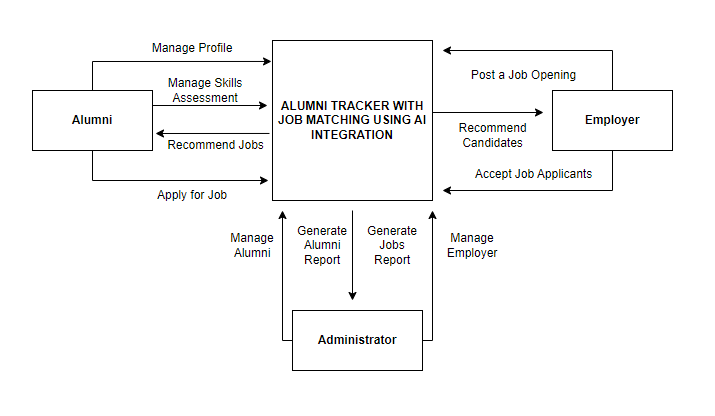
**Development**: In this phase, the development team begins building the system by creating software components, integrating them, and testing them. The team works in short iterations, which typically last 2-4 weeks, to deliver a working system incrementally.

**Testing**: In this phase, the development team tests the system to ensure that it meets the requirements and is functioning as expected. Testing is done throughout the development process, with each iteration being tested thoroughly before moving to the next one.

**Deployment**: In this phase, the development team deploys the system to a test environment or a staging server for further testing and feedback. Once the system is fully tested, it is deployed to the production environment.

**Maintenance**: In this phase, the development team continues to maintain and improve the system, fixing any bugs or issues that arise, adding new features, and updating the system to keep up with changing requirements or technologies.

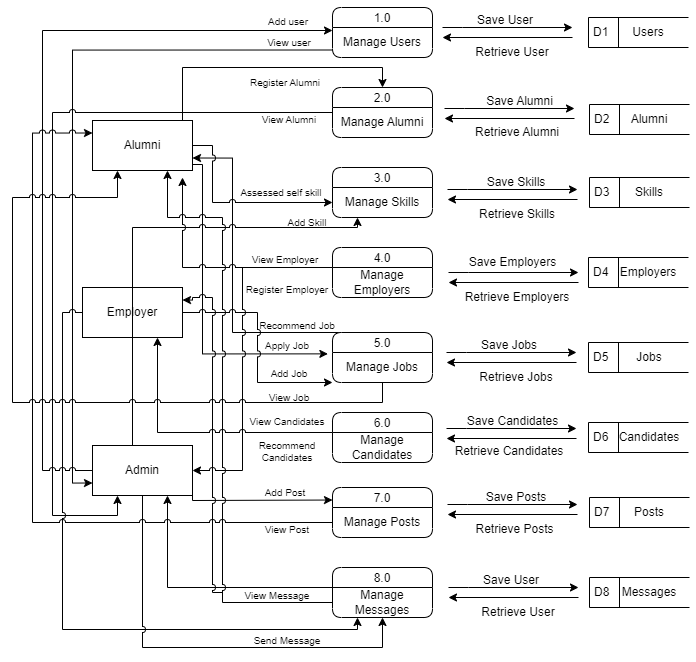
**Context Flow Diagram**



**Figure 3. Context Flow Diagram**

Figure 3 shows how the researcher maps out on how the entire features and components of the system will work together according to its purpose.

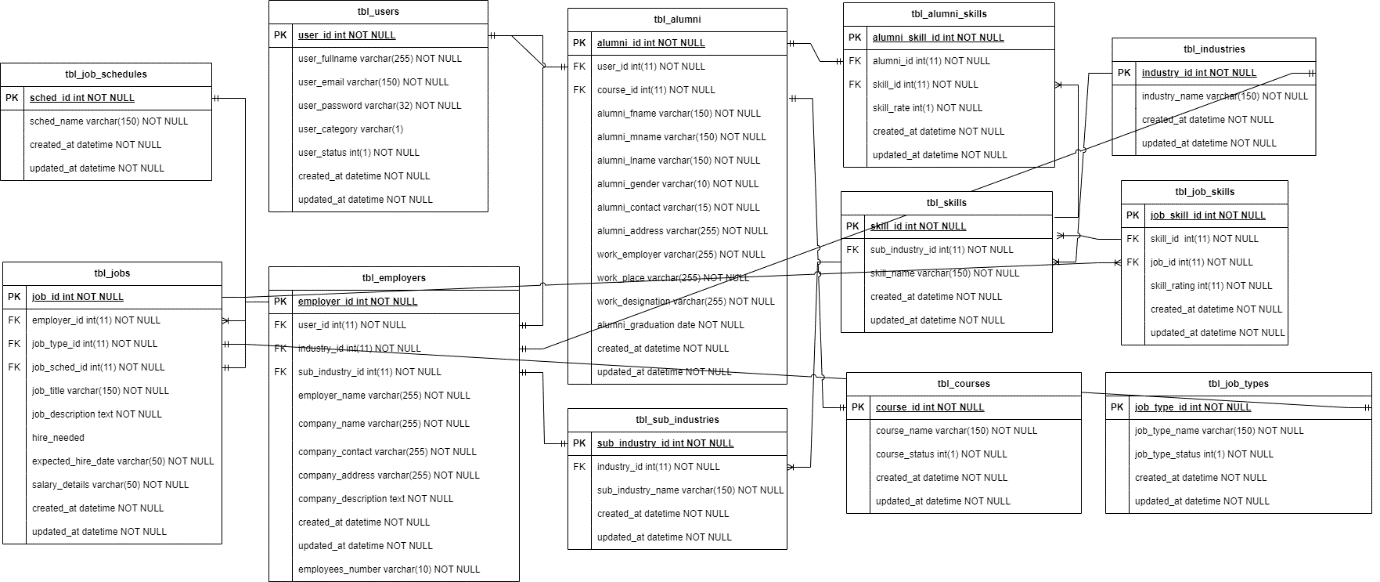
**Data Flow Diagram**



**Figure 3. Data Flow Diagram**

Figure 4 illustrates how information is processed within the system, including where it comes from, how it is transformed, and where it is stored. The purpose of the Data Flow Diagram is to depict the system's scope and boundaries, and it can be used as a tool for communication between the systems analyst and stakeholders involved in the system's redesign.

**Entity-Relationship Diagram**



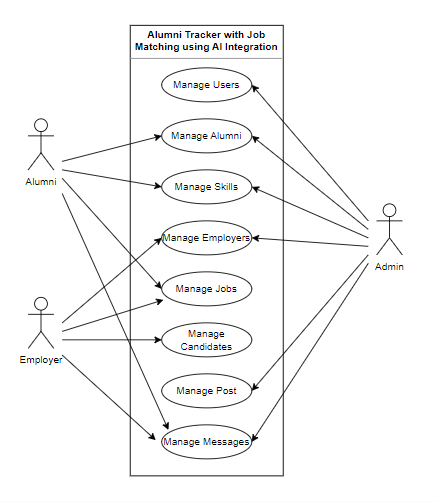
**Figure 9. Use Case Diagram**

An entity relationship diagram gives a snapshot of how these entities relate to each other. You could call it the blueprint that underpins your system architecture, offering a visual representation of the relationships between different sets of data (entities).

**Application Architecture**

Figure 6 shows how the web app will work when used by the registered users.

**Use-Case Diagram**



**Figure 9. Use Case Diagram**

A Use Case diagram is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved as shown in figure 9.

**Software Requirements**

Admin side:

Operating System (Windows 7,8 or 10)

PHP

Web Hosting/Server

MySQL

Python

Client side:

Operating System (Windows 7, 8, or 10)

Web browser

**Hardware and Other Required Devices**

Processor: Intel Core i3 or higher

RAM: 2GB or higher

Hard Disk Drive: 500GB or higher

Printer

Internet Plan at least 5 Mbps

**Cost-Benefit Analysis**

**Chapter IV. PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA**

**Chapter V. SUMMARY, CONCLUSION, AND RECOMMENDATION**

Summary of Findings

Conclusion

Recommendation

Appendices

References

Curriculum Vitae