



American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science & Technology (FST)

Fall 21 22

Student Alumni Hub

Software Requirement Engineering

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Project submitted

By

SAHA, ANKUR (18-37919-2)

AERAFIN, SADAT (18-38132-2)

EMON, MD. AL MAMUN (18-37860-2)

1. PROBLEM DOMAIN

1.1 Background to the Problem

Nowadays it is very important to have communication with each other. Students and Alumni are an asset for any university. Therefore, it is really crucial for the students to be guided by the alumni as they are like more experienced in both educational and professional carrier. Various communication system of student and alumni management are present out there but there any not too many. Moreover, these kinds of platforms are not authorized by the officials of any university. Mostly the type of systems those are available in universities of our country, like the portal of our university, but at the end of the day, those are basically a course management platform. The portal of our university does not provide any facilities for the alumni to connect with the juniors.

At present time, during the Covid-19 situation, most of the universities started conducting their activities through some online platforms i.e., Google Classroom, Microsoft Teams, Zoom etc. which were mainly providing the communication between faculties and students for curricular activities. Hence it is not the ideal platform for students to be in touch with the alumni as it doesn't involve them. There are some social platforms like Facebook and LinkedIn but it is really hard to find the persons who are recently graduated from the same university those he actually wants to follow. That's why it is necessary to be considerate about this problem.

1.2 Solution to the Problem

To deal with the problem mentioned above, we want to present a solution, a platform to computerize the communication system between students and alumni or even faculties by developing a web application which is user friendly, simple, fast and cost-effective.

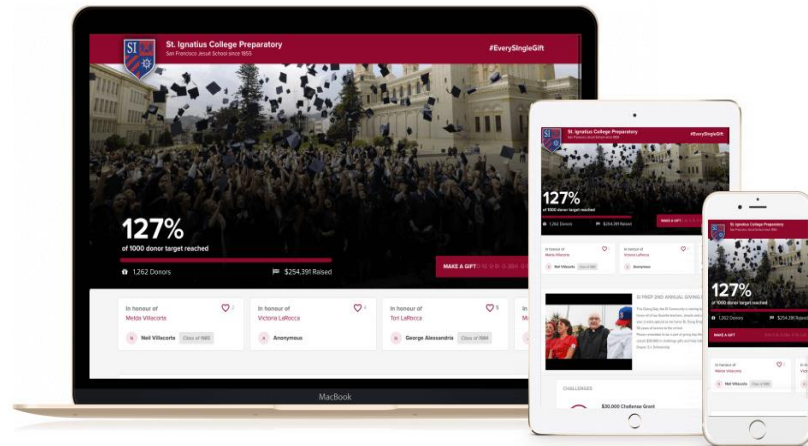
That's when "Student Alumni Hub" comes to light. The system will be functional for any kind university so that connection between educational institute and students remain the same even after graduation and it will be very beneficial for students because it will help them to reach out to their faculties and alumni anytime without hassle for any kind of official as well as non-official queries.

It deals with the admin, student, faculty, alumni information and also to contact with different user through chatting and much more features. The main function of the system is to log in and register user and user information, to check user information, purchase or enroll course, uploading research paper through this website. Traditionally, it was done manually. Our main focus is to design a unique and interactive portal that will improve experience for students, alumni and faculties of any educational institution. The whole system will through the help of internet.

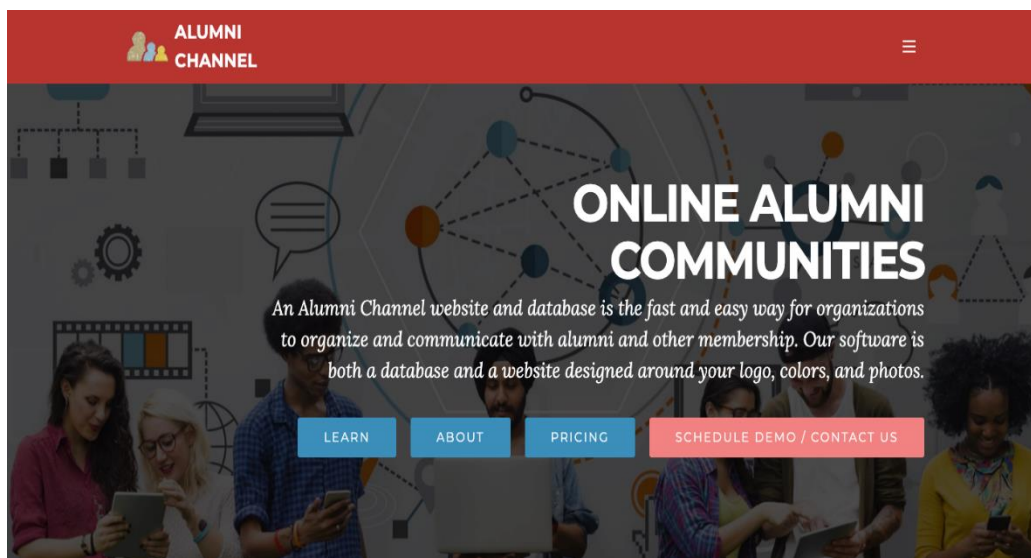
As for business objective, the website will have a good demand for the universities and also for the students. So, we will try to develop the website in such a way that it can be delivered as a packaged solution. It can be used by other educational institutes as out-of-the-box, configured, integrated or even as an extended solution. There is also a feature for enrolling in different types of courses provided by alumni. And every time a transaction takes place, a particular percentage will be deducted from the course fee as per contract with our company.

There are also some companies who are providing to the universities such as:

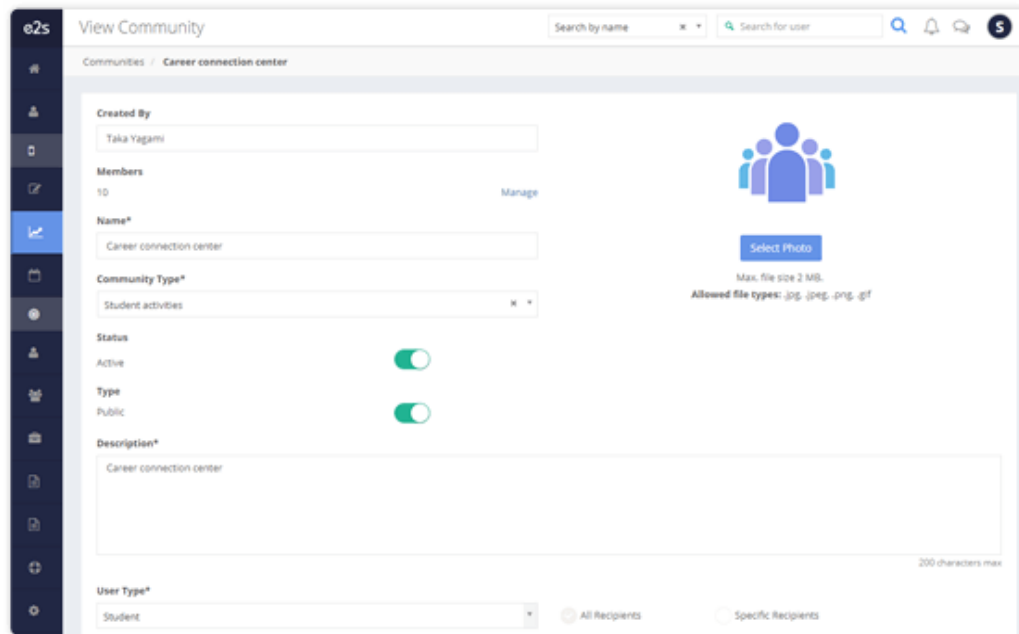
1. **Almabase:** It is an all-in-one software package for running alumni programs. Email marketing, event registrations, a customized website, an online alumni directory, and contribution pages are all included. Almabase is an online network created exclusively for alumni that allows them to search, connect, and network with one another. Although the software does not have its own CRM database, it can be integrated with most database applications such as Raiser's Edge, Ellucian, and Salesforce.



2. **Alumni Channel:** To assist companies maintain and interact with their alumni, Alumni Channel combines a database with a website builder. It has all of the expected capabilities, such as an online directory, email marketing, and payment and contribution processing. Alumni Channel also includes unique features such as message boards for alumni to communicate with one another, a missing alumni directory that lists alumni who have yet to join the platform, and social network integration, which allows members to embed their social profiles into their member profiles.



3. **e2s Connect:** Engage2Serve's e2s Connect is a comprehensive alumni management system that combines all of the capabilities of a CRM system with a social network for alumni to interact with one another. Alumni may build discussion forums, share expertise, and network professionally by joining Communities based on graduation years or interests. Administrators have all they need on the CRM side to fundraise, arrange events, analyze statistics, and communicate with members. Alumni can post positions on the e2s Connect Job Board to share with their peers and networks. Other resources that users may need to find work are included in the module, including resume writing assistance, market information, a searchable database of current job openings, and the opportunity to apply directly from the app.



2. SOLUTION DESCRIPTION

2.1 System Features

System is an entity that actually performs any function. The features are provided by the system so that it can take input from the user and can provide the proper output. The system features can be categorized into 2 types. The functional requirement describes the service that the program must provide. Another type is the non-functional requirement. It is the system qualities as security, reliability, performance, maintainability, scalability, and usability. They act as limits or limitations on the system's architecture across the various backlogs. In the following part, we're going to define some of the major system functions and others quality attributes that will help the project to be sustainable.

Functional Requirements:

- 1. Registration:** The first and foremost thing that a user must do is registration. A user will be able to join the site as a member. A user need register in order to search for other users and perform tasks, but no in order to see the events that have already been made.
- 2. Login:** A user who has already registered may use the features and ability to perform intended task by logging in using their email and password.
- 3. Update Profile:** The currently logged-in user desires to make changes to their user profile information.
- 4. Logout:** The previously logged-in user will be able to log out of the website.
- 5. Forgot Password:** The user has forgotten their password and requires assistance in resetting it. The system must confirm the user's identify before granting them access to their password.
- 6. Search:** The logged in user can look for alumni or student or any kind of event or courses.
- 7. CV submission:** Registered students can submit their CV's which can be found by the alumni if they are looking for interns.
- 8. Pin Events:** Any types of users can pin any important events and also can set reminders.
- 9. Course Offer:** After proper verification, alumni can post ads for their course in the feed. Users can enroll into courses.
- 10. Course Evaluation:** There will be a rating system which will collect feedbacks from the users who enrolled in courses to evaluate the course outcome.
- 11. Paper adding:** Alumni can add their research domain and also can post their research works. They can also look for students for collaborating with their research.
- 12. Chatting:** Users can communicate with each other through message.
- 13. Following:** Each user can follow another user of their liking. A notification system will be there to notify them about any happenings related to those follows.
- 14. Create/Modify/Delete post:** Alumni can create/modify post for job offer and can also delete them whenever they want.
- 15. 24/7 Online support:** Online system support department will be there to handle all types of user queries.

Non-functional Requirements:

- 1. Privacy:** We'll have to keep it in mind, as our system will store many private information, we must provide proper privacy to all the users data. So, all the information must be stored in the private cloud storage of the organization.

2. Availability: Our “Student Alumni Hub” is internet based and it should be available anywhere anytime. This type of system will be available for access not only on the campus, but also outside of the campus. It would guarantee a permanent service of 24/7 with the use of redundant system to avoid net traffic overflow.

3. Scalability: As our first startup, the resources that will be available to us, can be short. So, it could be still weak on scalability at the infrastructure level. On the public cloud, several resources could be deployed and assigned just for a specific duration when receiving usage of the website is very high. Somehow, we have to build it in such way in which it will be able to add/delete resources when required.

4. Usability: The interface of our “Student Alumni Hub” will be user-friendly and will also support adaptiveness and personalization. Based on user’s preference, user interface is going to change and generate recommendation to guide the user through the site.

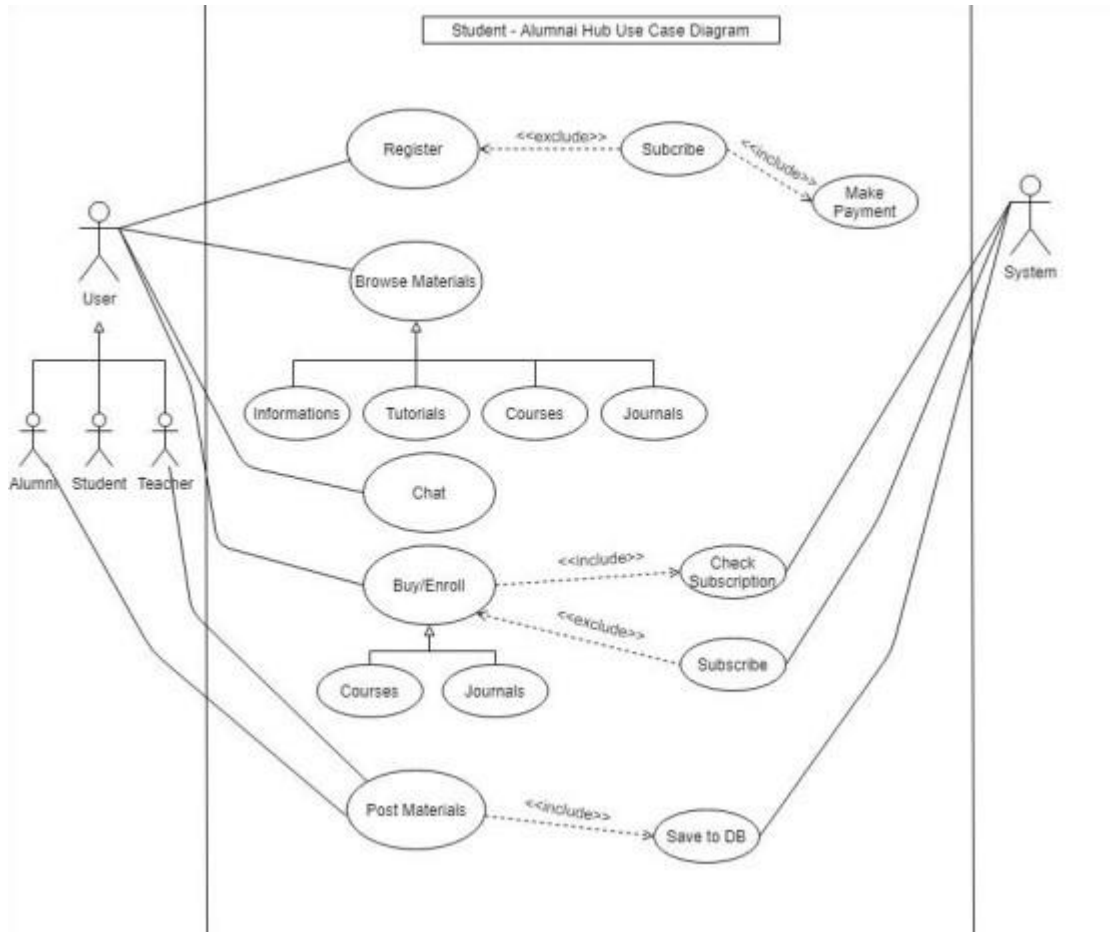
5. Performance: The website response time should be fast. Improvements can be done by upgrading the web hosting plan, enabling leverage browser caching, enabling GZIP compression, reducing HTTP requests, optimizing images and database and so on.

6. Security: We have to keep all the information in the database confidential and as the data is distributed on different servers on the cloud, data is out of the control of the user. So, we have to provide strong security so that any kind of fraudulent incident cannot take place.

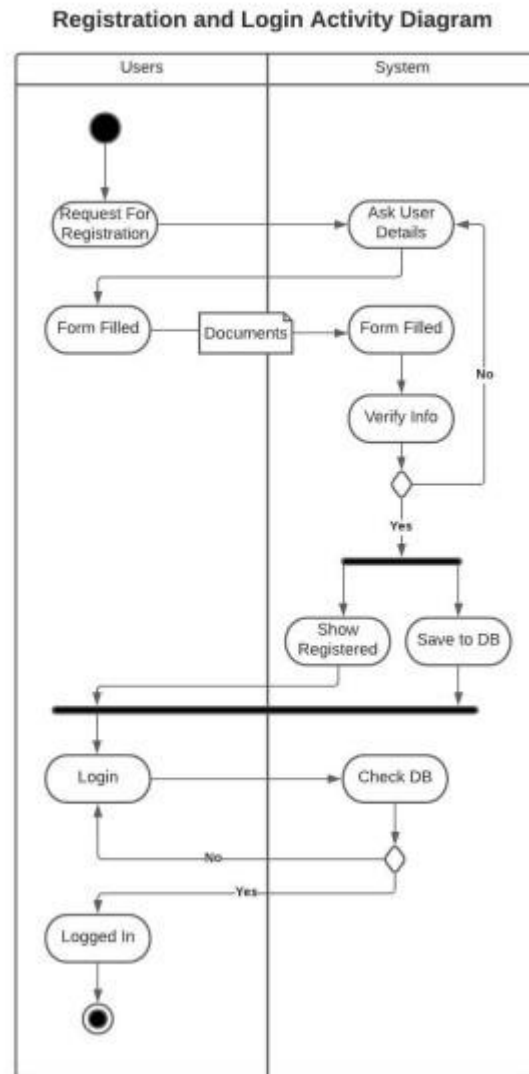
These requirements will be updated according to the needs of the users, so that they can use this platform with full faith.

2.2 UML Diagrams

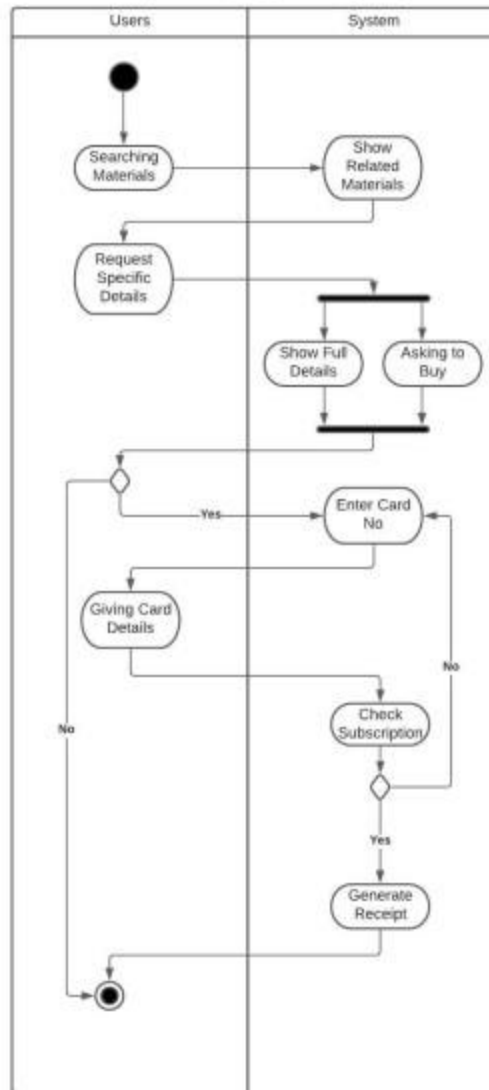
Use Case Diagram:



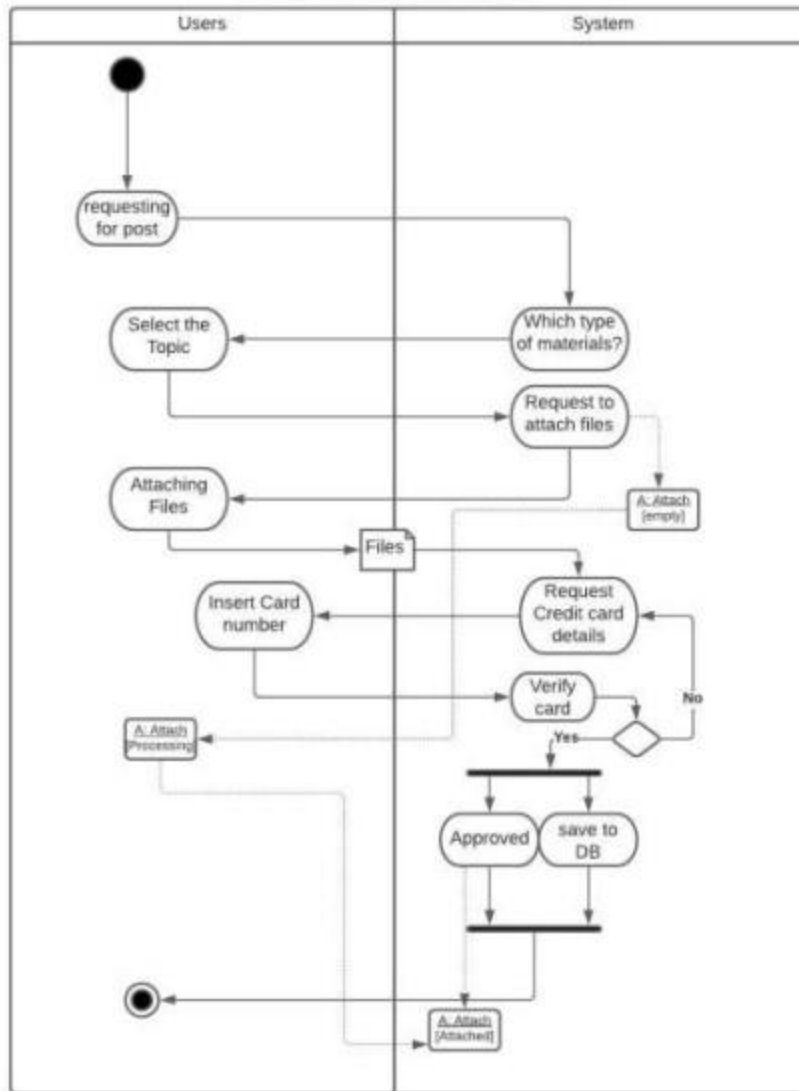
Activity Diagram of Some Major Functions of the System:



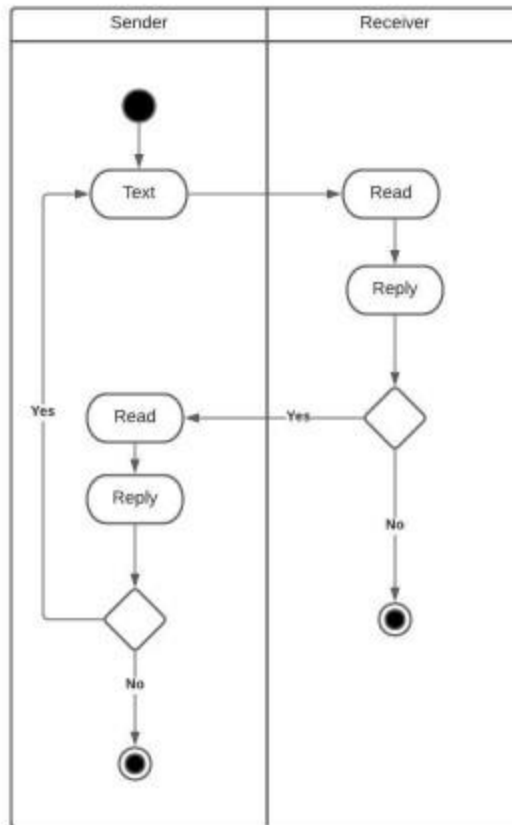
Browsing and Buying Activity Diagram



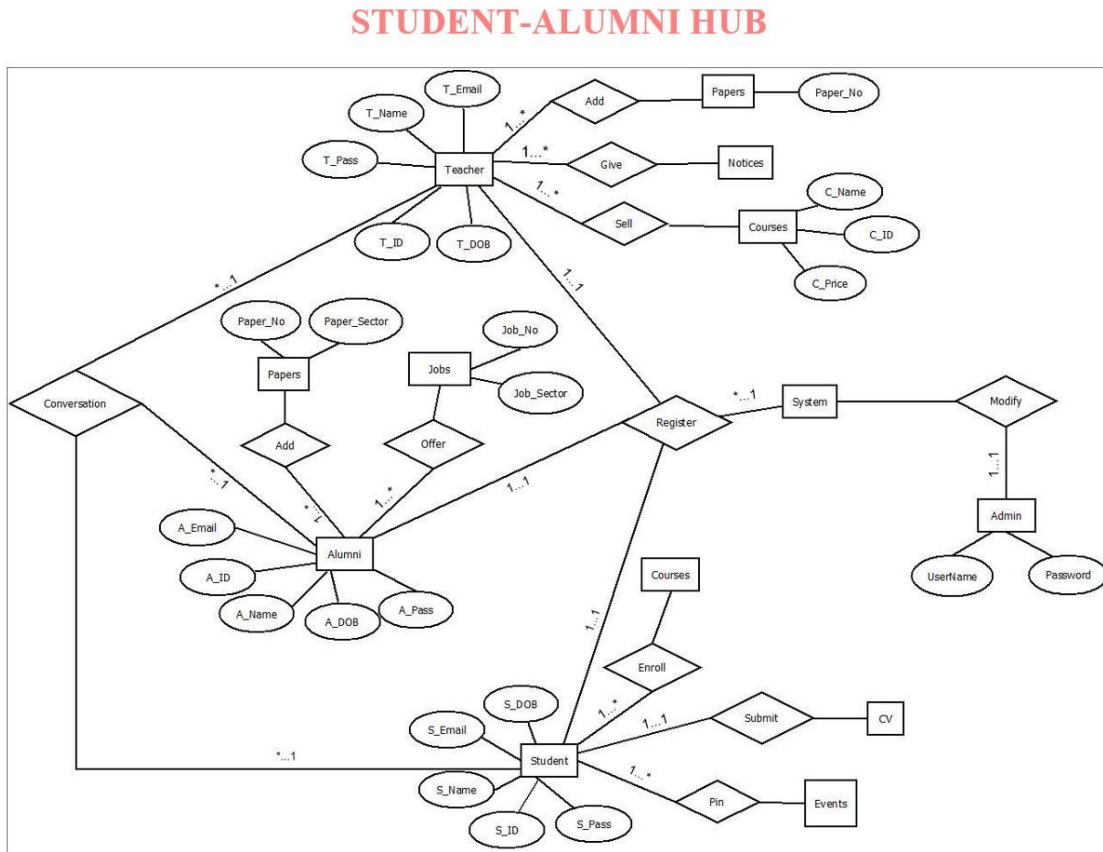
Activity Diagram Posting Materials



Conversation Activity Diagram



ER Diagram of the system:



3. Social Impact

As being a social being, everyone has some responsibilities toward the society. And it is our duty to make a livable society. Through proper communication, students and alumni can cause a great change to the society.

If students have access to the alumni, they can have inside information about industries and real-world resources. Students can learn trajectory from Alumni and they can share their offer advices. In any formal programming competition or intentional events, when alumni serve as ambassador. They can promote the institution in a way no professional staff or communications can. At times, students get stuck while working on their thesis or project. They might need suggestions from the alumni. Or, the student might not have the clear idea about thesis or project, how to get started with them, how to find a topic to work on, what are the mistakes that the students might make, how to publish paper on journals and preparation for that and so on. Students can be greatly benefited by the help of alumni. When the students are done with their courses, they start looking for internship. As a dweller of Bangladesh, I can say that the students can easily get internship, if they have some sort of connection with the alumni. Alumni can play a great role to find students an

internship. And, from internship, the job might become permanent job also. Alumni can be a source for funding too. If they belong from a poor institute, where the scientific equipment is not sufficient, they can raise funds by doing many sorts of campaign and functions. In many cases, they can fund raise for the needy people of the society. Bangladesh faces many natural calamities throughout the year. And many people get affected. The community of current students and alumni can work together to raise funds in order to help them. It is really great to help other besides helping own people. The students and alumni might develop programs to promote alumni relations and educational programs designed to connect alumni through academic channels. Alumni have the opportunity to enlist many paid courses in this program. Thus, they can help others and can also earn some money to help themselves. The community can make plans, arrange, and join events, meetings, or other activities as requested by academic units. This may also include alumni and volunteer recognition receptions, reunions or any sort of competition. This will definitely help them to enlarge their network and might teach them socializing. One of the biggest advantages of this sort of groups is to make leaders or to pull out the leadership hidden inside the. This will help current volunteer leadership to identify potential new volunteers and future leadership. The community will develop alumni dictionary, which will focus on establishing and managing connections through academic programs. Our community will collaborate with other alumni and students on programs which will engage alumni or students through their knowledge of academic program and other activities. There are many international clubs like IMUN, Business club and so on. The community will collaborate with appropriate staff from their team to ensure alumni and students engagement programs. Our community will work of the Development and will present educational programs, fitness programs, travel groups for alumni and students including lectures, seminars, and workshops, which will train the volunteers who work on events, projects and programs. Serves on committees relating to alumni relations, and serves as liaison between UNM and the community.

4. Development Plan

To develop the project, we follow SDLC or Software Development Life Cycle. The Software Development Life Cycle (SDLC) is a simple diagram that depicts each activity involved in creating a software program. This helps to eliminate waste and improve the development process' efficiency. Monitoring ensures that the project stays on schedule and is a viable investment for the business.

Many businesses will break down these processes into smaller chunks. Technology research, marketing research, and a cost-benefit analysis are all parts of planning. Other steps may intertwine with one another. Because developers must remedy faults that arise during testing, the Testing phase can run concurrently with the Development phase. There are 7 phases in SDLC:

1. **Planning:** Project leaders review the project's terms during the planning phase. Calculating labor and material expenses, developing a schedule with specific deadlines, and forming the project's teams and leadership structure are all part of this process. Stakeholder comments may be included into the planning process. Anyone who stands to gain from the application is referred to as a stakeholder. Obtain input from prospective consumers, developers, subject matter experts, and sales representatives. The scope and objective of the application should be clearly defined during planning. It charts a route and equips the team to produce software efficiently. It also establishes limits to prevent the project from growing or diverging from its initial goal.

So, in case of Student Alumni Hub, the first thing will be to have a proper and complete development plan. That will include all cost calculation with the team and making a proper schedule. This is important to check how is the product according to the client.

2. **Defining Requirement:** Defining requirements is part of the planning process to figure out what the application is meant to perform and what it needs. A social networking program, for example, would need the ability to connect with a buddy. A search function may be required by an inventory program. The resources required to complete the project are also defined in the requirements. A group may, for example, create software to control a bespoke manufacturing equipment. In order to participate in the competition, you must have a machine.

We have included all the functional and non-functional requirement for the project. It is the work for this phase to figure out what is required for the system. The best way is to have meeting with the client and developers for better understanding.

3. **Design and Prototyping:** Prototyping is a step in the design process. In the Iterative software development approach, a prototype is similar to one of the early versions of software. It gives you a general concept of how the program appears and functions. Stakeholders will be able to see this "hands-on" design.

In this phase, the architecture of the project should be made. We should also define the ways customers interact with the software, and how the software responds to input. It also includes the platforms on which the software will run.

4. **Software Development:** This is where the software is really written. A small project may be created by a single developer, but a large project may be divided into numerous teams. During this phase, use an Access Control or Source Code Management solution. Developers can use these tools to keep track of code modifications. They also assist in ensuring that various team initiatives are compatible and that target goals are fulfilled.

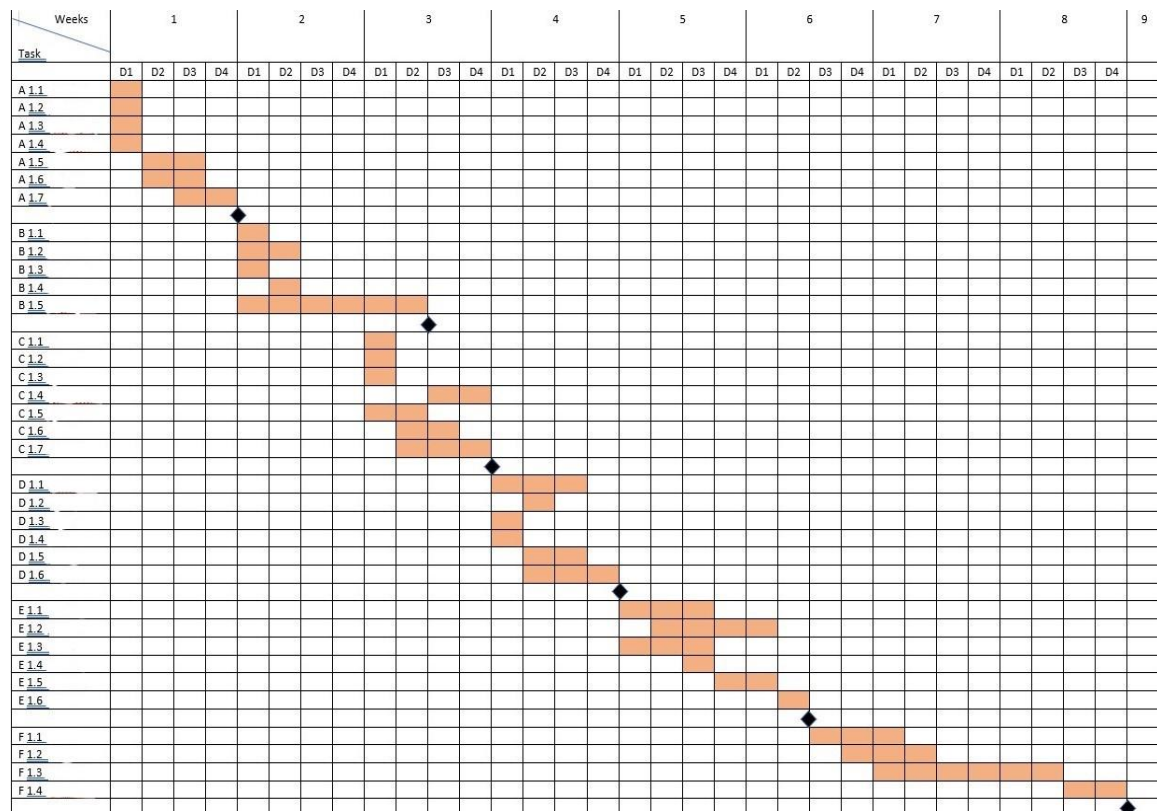
Many more jobs are included in the coding process. Many developers need to brush up on their abilities or collaborate with others. It's vital to find and resolve problems and flaws. Waiting for test results or generating code so an application may run are common tasks that slow down the development process. SDLC can foresee these delays, allowing developers to be reassigned to other tasks.

5. **Testing:** Before making an application available to consumers, it's vital to test it. Much of the testing, such as security testing, may be automated. Other testing can only be done in a specific context; for complicated deployments, consider developing a simulated production environment. Each function should be tested to ensure that it functions properly. Different elements of the program should also be evaluated to ensure that they function together seamlessly—performance testing, to eliminate any processing hitches or delays. The testing process assists in reducing the number of faults and malfunctions seen by consumers. As a result, there is a higher level of user satisfaction and a higher rate of utilization.

6. **Deployment:** In the deployment phase, the application is made available to users. Many companies prefer to automate the deployment phase. This can be as simple as a payment portal and download link on the company website. It could also be downloading an application on a smartphone.
7. **Operations and maintenances:** The development cycle is practically complete at this stage. The application has been completed and is currently being utilized in the field. However, the period of operation and maintenance is still crucial. Users find flaws that were missed during testing at this phase. These issues must be addressed, which may result in new development cycles.

In case of our project, at the end of trial version and every testing phase, we will do the job to fix existing bugs. It also includes database handling as there will be a huge amount of data of both student and alumni.

Timeline Chart:



Activity List:

Activity Keys:

A	B	C	D	E	F
1.1 : Meeting with customers	1.1 : Meeting with the development team	1.1 : Selection of the primary requirements to begin with	1.1 : Specifying module 1	1.1 : Unit testing	1.1 : Adding additional features
1.2 : Idea Generation	1.2 : Analysing the features	1.2 : Setting the work schedule in JIRA and giving the tasks	1.2 : Specifying module 2	1.2 : System integration testing	1.2 : Releasing beta version
1.3 : Analyzing the problem	1.3 : Defining rules and regulations	1.3 : Creating Remote repository in GITHUB to store continuous progress	1.3 : Specifying module 3	1.3 : Security testing	1.3 : Taking feedbacks and working on them
1.4 : Requirement Analysis	1.4 : Choosing a platform for development	1.4 : Drawing the Use Case Diagram	1.4 : Code Module 1	1.4 : Fixing the bugs and performance issues	1.4 : Releasing Final Build
1.5 : Market Analysis	1.5 : Training for a new platform	1.5 : Drawing the Activity Diagram	1.5 : Code Module 2	1.5 : Delivering a initial release to the customer	
1.6 : Identifying the needs and benefits		1.6 : Drawing the Class Diagram	1.6 : Code Module 3	1.6 : Taking Customer feedback	
1.7 : Cost Estimation		1.7 : Designing the UI			

5. Marketing Plan

In your document you should provide proper marketing plan that will make your idea popular among the community so that you can make business. Marketing plan should have short term, long term and continuous plan.

A marketing plan is a report that explains the business plan and marketing strategy of a company. Typically, a marketing plan includes:

- An overview of marketing and advertising goals.
- A description of current marketing position.
- A timeline of strategy that will be completed.
- A description of target market and customer needs.

It takes time to develop a marketing plan. It is a step-by-step process that requires identifying and researching the target audience, learn about the other companies, branding, messaging, separating business from the competition. Marketing plan is one of the most important things that can ensure the success and sustainability of your business.

In order to create a successful marketing plan, one will first need to define the marketing strategies – short-term and long-term. Every company needs to plan for the future success of business, but without a short-term strategy, the business may not be around long enough for those long-term strategies. On the other hand, simply focusing on the short-term successes will put the business in a bad position for future growth. The two strategies need to be part of the bigger marketing picture. Except these 2 types of marketing plan, there should be some continuous plan.

Short-term marketing activities are those that produce a temporary boost in business and traffic. Short-term success is crucial for any business. Whether you are a startup looking for funding, or a company looking to successfully launch a new product or service, short-term success is necessary for long-term growth.

Short-term marketing:

Reduced pricing promotions: Limited time price reductions excites customers to act. Lowering the price will give them an incentive to purchase. In our case, time to time, we'll reduce the cost for the courses. Thus, it'll encourage others to buy our courses.

Group offers: This is an effective strategy for gaining exposure, especially with a new set of customers. Offers could also be tailored to provide a permanent discount to important groups. For example, the courses that we will offer, we will notice that among all of the courses, some of the courses are popular or have high demand. We will not charge a lot for the courses. Rather, we will charge the minimum for the courses. And we believe it will get us a continuous marketing.

Pay-per-click (PPC) advertising: Pay-per-click campaigns are another way to become visible to new customers. Effective implementation of PPC campaigns is known to drive significant targeted traffic to the websites. Then also, now a days Facebook allows to put advertisement. Through Facebook, we can reach enormous number of people. Besides, we'll use other platforms and social medias to do our marketing. And we believe, nowadays, Facebook is the biggest way to do the marketing.

Tradeshows: Tradeshows offer an excellent short-term way of promoting or introducing the products and services within a specific market. Additional opportunities in the form of sponsorships, speaking opportunities and VIP parties are often great opportunities to take advantage of the captive event audience. As a worker on student- alumni, we would like to visit other universities, join some podcast to do our marketing.

Long-Term Marketing:

Long-term activities help to establish brand awareness Without long-term marketing strategies, short-term success may be short-lived. This marketing answers the question, "Where will your business be in five years? How about in 10 or even 30 years? What initiatives are you going to put in place to reach your goals further down the road?"

Here are a few tactics to achieve long-term marketing success:

Search Engine Optimization (SEO): SEO is a long-term play that can take several months, but it is crucial for success because organic search engine traffic has been found to be the best source of B2B leads. Knowing your audience and optimizing the website for keywords and phrases that potential customers would use in their online search is critical to being found on the Internet. SEO is an ongoing process and to do it effectively takes time. Businesses should consider engaging experts they can trust to keep their website optimized. For our case, we will try to do SEO, so that our company will remain on top in search engine.

Public relations (PR): PR efforts, in general, are proactive actions that positively build a company's brand online and offline over the long term. PR teams often accomplish goals by strategically sharing information with relevant media outlets. A well-executed PR strategy builds over months, not days, and

takes time to succeed. Since, it's a startup, after growing the company a little, we will appoint someone to manage public relation.

Publishing and Promoting Content: Developing a stream of fresh, relevant content like newsletters, tips or blog posts will result in quality traffic to our website, but will also place our company among the top thought leaders in your field. Content that is posted, updated and archived on a regular basis will provide us a great ammunition for long-term nurture campaigns and encourage visitors to return.

Continuous Marketing Plan:

Among the short term and long-term plans, some of them can be considered as continuous plan. We will ensure the continuity of these plans. They are:

- I) Reduced pricing promotions,
- II) Tradeshows,
- III) Search Engine Optimization (SEO)

Besides this, we will take necessary steps in accordance with the market. And the plans might get changed considering the market and others.

At the end of the day, it's a finely tuned balancing act. The key is to build a marketing plan that values and achieves short-term, long-term and continuous marketing strategies simultaneously. Doing so will ensure that your business is better poised to prosper for years to come.

6. Cost and Profit Analysis

Effort Estimation

Coefficient=2.4 [as the project type is organic]

We assume the SLOC of our project=14000

Project Complexity, P=1.05 [as the project type is organic]

Effort = Coefficient_{<Effort Factor>}*(SLOC/1000)^P

$$=2.4*(14000/1000)^{1.05}$$

$$=38.34$$

$$PM=38.34$$

$$T=0.38$$

$$\begin{aligned}\text{Duration time in weeks for project, } DM &= 2.50 * (PM)^T \\ &= 2.50 * (38.34)^{0.38} \\ &= 9.993 = 10\end{aligned}$$

Required number of people = ST (average staffing necessary)

$$\begin{aligned}&= PM/DM \\ &= (38.34/ 10) \\ &= 3.84 = 4\end{aligned}$$

Budget Estimation

$$\text{Duration} = 10 \text{ weeks} = 70 \text{ days} = 2.5 \text{ Month}$$

Working Days = 5 days a week.

$$= 5 * 10 = 50 \text{ days} = 50 * 8 = 400 \text{ hours.}$$

$$\text{Salary} = 1500/- \text{ (per hour)}$$

$$\text{Salary} = 160 * 1500 \text{ [As 160 hr in 1 month]}$$

$$= 240,000/- \text{ (monthly)}$$

$$\text{Total Salary for Project} = 240,000 * 2.5 = 600,000/-$$

$$\text{For One Developer} = 600,000 / 4 = 150,000/-$$

$$\text{Utilities Bill} = 15,000 * 2.5 = 37,500/-$$

$$\text{Office rent} = 30,000 * 2.5 = 75,000/-$$

$$\text{Transportation Cost for employees (per-month)} = 6,000 * 2.5 = 15,000/-$$

$$\text{Instrument Cost} = 50,000/-$$

Maintenance Hour per month 15 hr and cost 2500/= per hour

Maintenance cost= $2500 \times 15 \times 6 = 225000/-$

Criteria	Tk
Total Salary	600000/-
Utilities Bill	37500/-
Office rent	75000/-
Transportation Cost	15000/-
Instrument Cost	50000/-
Maintenance cost	225000/-
Total Cost=	1002500/-

Total Cost 1002500/-

We assume 20% of total cost as profit

Total amount to be Paid= $(1002500 + 1002500 \times 20\%)$

= 1203000/-