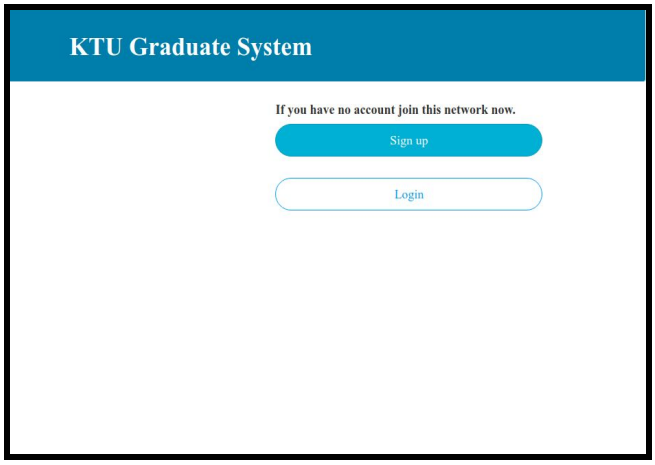
KARADENIZ TECHNICAL UNIVERSITY

COMPUTER ENGINEERING

DATABASE MANAGEMENT

LECTURER: Doç.Dr. Güzin ULUTAŞ

MID-SEMESTER PROJECT- KTU.NET APPLICATION



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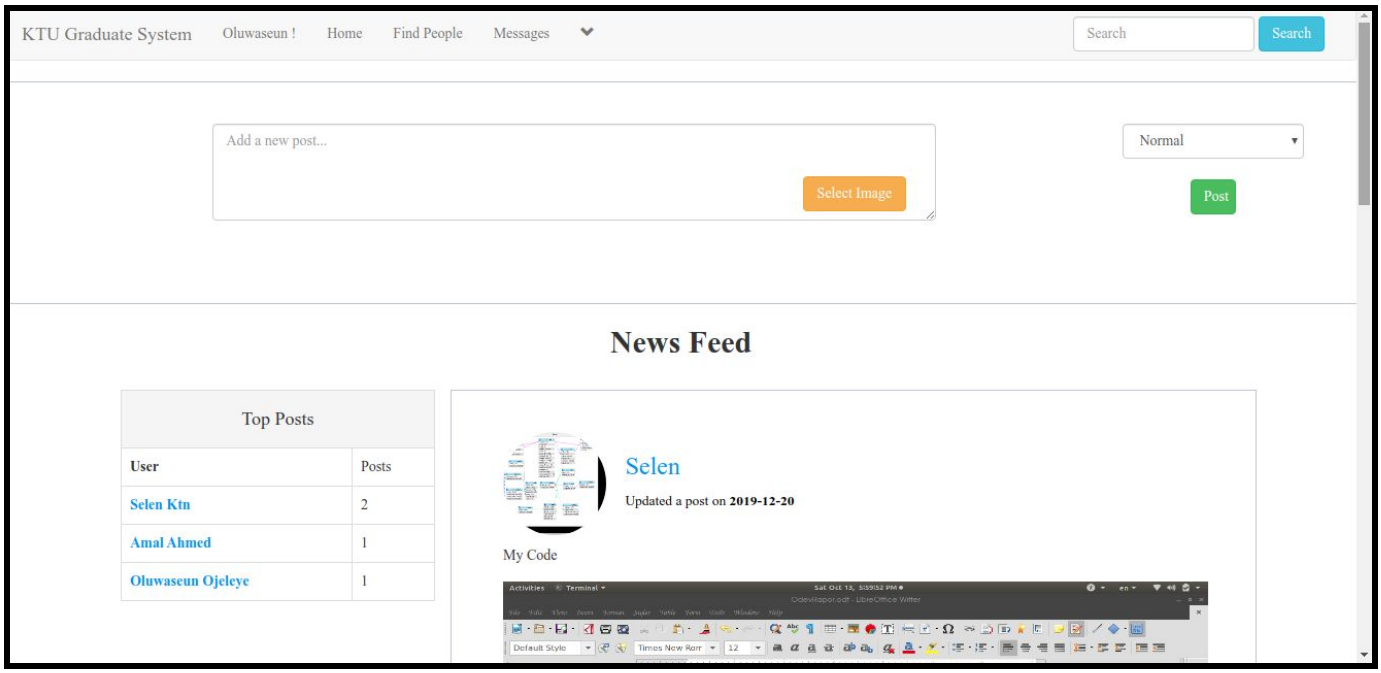

KTU NET APP

Development Report

December, 2019

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1. Problem Description

As a newly graduated student, finding a job or opportunities that suits the career path one wants is almost impossible. In this generation, professional networking is very essential during jobs and opportunities hunting. Well-established network has become an important part of graduates lives.

Today, studies have shown that up to 70-80% of jobs and opportunities are never advertised. They are filled by word of mouth. So it's who you know and who knows you that matters. Graduates must develop connections within their network to have more opportunities to advance their career.

The best place for graduates to create a good professional network is the college/university they graduated from. Creating network with alumni from the same university and most importantly the same department is a way to increase the rate at which graduates find jobs and opportunities. It is partially the task of a college/university to set it's graduates towards a good career path. One of the most prominent ways to do this is by networking graduates with alumni.

In order to solve this problem, we are creating a social networking web application (KTU NET) that graduates, alumni, and professors of a university's department can use to connect and share information such as job, internship and other opportunities among one another from every corner of the world.

The application would be created in such a way that setting up an account and CV Portfolio won't be time consuming for graduates. In addition to this, the system's search engine would be created to be able to yield satisfactory results to user's job and internship opportunities search. This application would also provide features such as finding popular companies alumni of the university's department have worked or are working in, networking info to the companies and other beneficial information vital to a user's (graduates, alumni, and professors) search.

In summary, this web application (KTU NET) would help alumni and professors of a university's department stay connected with one another.

1.1 Problem Statement

Creating professional networks, finding a job or internship Opportunities is becoming difficult for newly graduates. A social network web application that connects newly graduates, alumni and professors of a university's department can be developed to connect graduates with alumni for job or internship opportunities.

2. Requirements

2.1 Functional Requirements

- Information such as graduates and alumni personal information, contact information, working experiences (company name, position and field of study), educational information, foreign language and acquired certificate information must be present on their profile.
- These information should be used to generate a CV for graduates.
- The departments and positions a graduate can work in must be specified by the admin.
- The system must contain address, contact info and detailed information of the companies.
- Graduates should be able to follow and add each other to their friend list.
- Users should be able to post jobs and internships opportunities.
- Users should be able to comment on a post.
- Users should be able to see posts of graduates they follow and the HOD's post on their home page.
- Information such as the total number of graduates present in the system, number of firms, and how many graduates worked in which company should be able to be queried by the HOD.
- Graduates should be made to fill a survey and they should be notified on their homepage if the survey has not been filled.
- The system must contain a messaging system so that users can message one another.
- The company that most alumni worked or are working in should be displayed on the homepage.
- The departments where graduates work should be reported by years.
- The period between the year of graduation and the date of first employment must be reported on the total number of graduates.
- Job advertisements should be filtered according to the department and company.
- Internship posts should be filtered according to internship period, duration and company.
- Most job and internship posts should be displayed on the homepage.

2.2 Technical Requirements

2.2.1. Server-Side Requirements

- A database management system such as MySQL, Oracle etc would be used for server-side data retention and systematic management.
- Various web technologies such as HTML, CSS, JS, etc. would be used to create the user interface.
- In order to transfer data between database and interface correctly, a server-side controller must be established.

2.2.2. Client-Side Requirements

- A web browser is required to connect to the server in order to use KTU NET service.

3. Construction Practices

3.1 Coding Practices

3.1.1 Choice of Programming Language

PHP and MySQL are the major programming languages would be used for building this application. Below is an explanation of the PLs based on the subsystem where they are used:

- Front-end:
  There are three main components used in Front-end development: **HTML**, **CSS** and **Javascript**. **HTML** (Hyper Text Markup Language) is a markup language used to create web pages. Skeletal structure of web pages is provided with HTML and **CSS** is used in formatting the webpages, that is coloring HTML pages, changing the text formats and formatting the elements on the page. **JavaScript** or JS for short is to add interactivity to websites and make them dynamic website. In the web service section, HTML was used for the creation of the main frame, CSS was used to format the created web page such as color and font, and JS was used to make the resulting website dynamic.

- Back-end:
  The back-end development would be done using **MySQL** and **PHP**. PHP is used for server-side scripting during the development of the application. It is used to send and get request and data from and to the database using inline MySql statements. MySQL is a freely available open source Relational Database Management System (RDBMS) that uses standard Structured Query Language (SQL) for database manipulation.

3.1.2 Debug Procedure

The debugging technique that would be used throughout in both the frontend and backend development of the application is the “Print-driven” debugging technique. This technique involves us printing the coding dependencies of expected error location, based on different pieces inside the code(variables, loop iterations, control structures, etc.) so that we can compare the expected vs current values of variables/ control structure paths etc.

This technique is easy to use for smaller sized programs and since our application is decomposed into subsystems which are then divided into smaller programs, this technique can and would be used by every member of the project team to debug all the programs we would be working on.

3.1.3 Test Procedure

The system would be tested by key-users of the application and feedbacks gotten from the key users would be used to improve the application.

3.2 Teamwork and Quality Assurance

- **Pair Programming or Individual Programming?**
  Programmers(team members) might be required to work in pairs/ group while writing the test cases for their code. Thereafter, they can work individually while working on their part of the project. The combination of working in group and individual is used in order to make every group member to keep track and have an idea of other member's work.

- **Test case coding:**
  Programmers(team members) must write a test case for their codes before writing the code itself. This method helps programmers to fathom what they are working on before writing a code for the project.

- **Unit testing:**
  It is not mandatory for programmers to write a unit test for their code but if they can, it would ease the work of every member of the during integration testing.

- **Debugging:**
  Programmers are required to debug their code, ensure that it is error/ bug free, and make sure it functions accurately before sending their code for integration.

- **Integration-testing:**
  The integration test of the code would be done as a group after the integration of every code at the end of the project.

4. Software Architecture and Design

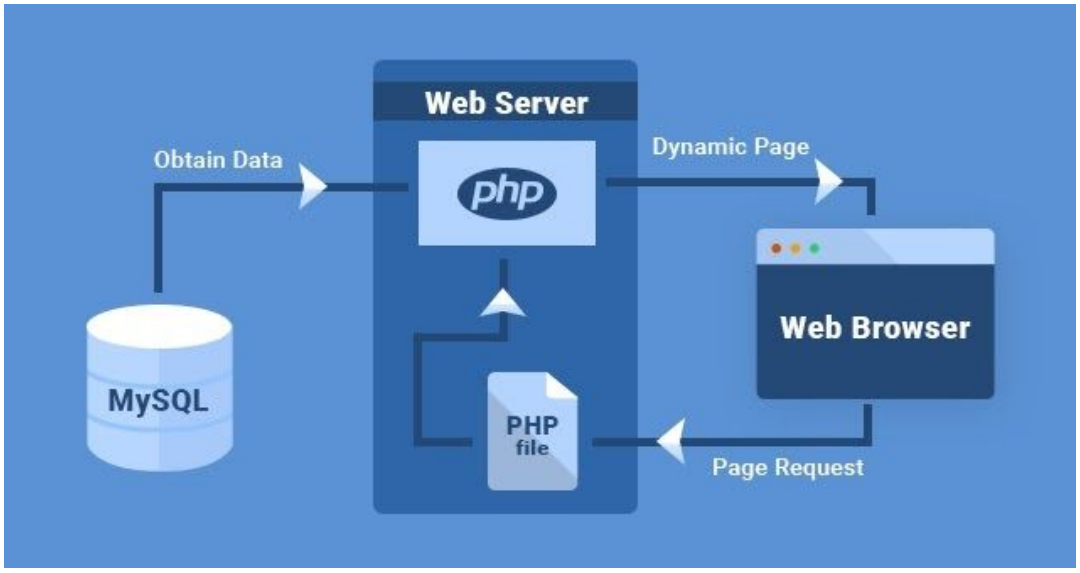
4.1 Design Practices

A Heuristic approach which is understanding a process, devising a plan, carrying out the plan and looking back at the former steps is used to build the application. Divide and Conquer method is also used to divide the system into subsystems which are also divided into sub-programs/ sub-components. These sub-programs are then built and integrated with one another after their completion till the final system is built.

4.2 Overview and Subsystem Decomposition

As stated earlier, the system consists of two major subsystems which are:

1. Frontend: which is the user interface.
2. Backend: which consists mainly of the server and the database.



4.3 Database

The Database Management System that would be used is MYSQL. We choose MySQL over other DBMSs due to its speed, flexibility and reliability. MySQL employs SQL for data manipulation and data querying in the database. MySQL is an essential part of this application and combining it with PHP being the server side programming language would yield a unique and easy solution.

4.3.1 ER Diagram for the Database:

The the ER diagram contains 15 relations which are made up of 11 entities and 4 relationships.

Entities:

1. Users: { school_id_no, f_name, l_name, user_type, address, national_id_no, user_email, user_pass, user_gender, user_dob, user_country, user_image, user_regdate, status, recovery_account, posts }

2. Students: { student_id_no, survey_is_filled }

3. Post: { post_id, user_id, post_type, post_content, upload_image, post_date }

4. Comment: { com_id, post_id, comment_author_id, comment, date }

5. UserMessage: { id, user_to, user_from, msg_body, date, msg_seen }

6. Company: { company_id, company_name, company_address, company_info }

7. Department: { department_id, department_name }

8. Position: { position_id, position_name }

9. Certificate: { certificate_id, student_id, certificate_name, certificate_detail }

10. School: { school_id, school_name }

11. Language: { language_id, language_name }

Relationship:

1. Work: { work_id, student_id, company_id, department_id, position_id, entry_date, end_date }

2. Education: { education_id, school_id, student_id_no, level, entry_date, end_date }

3. Follow: { user_id, following_user_id }

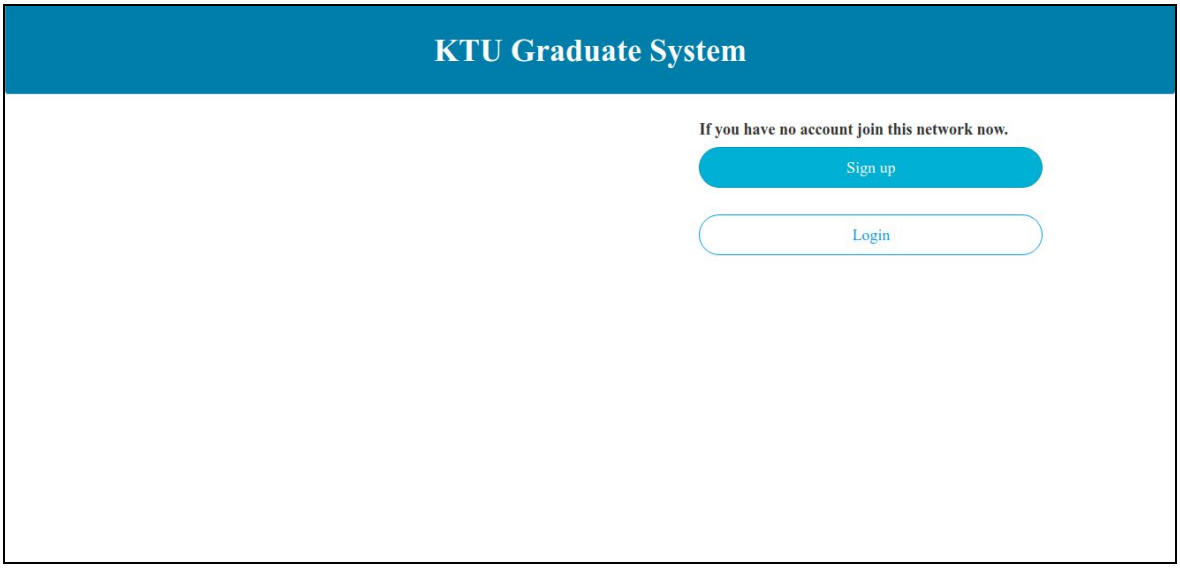
4. Speaks: { student_id, language_id, level }..

4.4 User Interface & User Guide

This section gives a comprehensive explanation about how users can use the KTU NET web app. It contains a step-by-step explanation of the operations users can perform on the most essential web pages on the application.

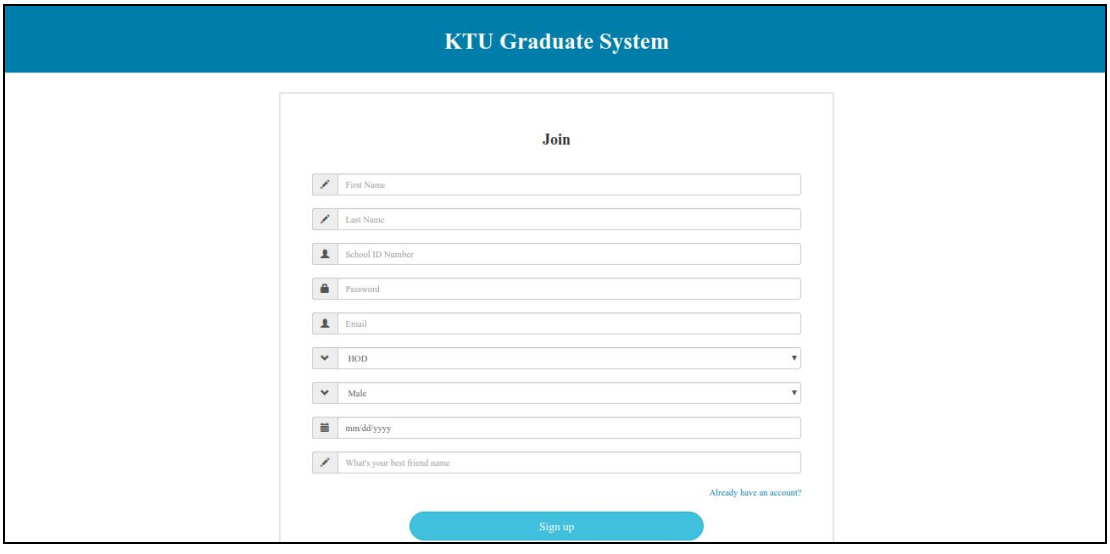
4.4.1 Home Page:

The homepage of KTU NET is as shown in the image below. As seen from the image, it has a simple and user-friendly design. Users who have previously registered on KTU NET must select “Login” to access the login page and for those who have not previously registered on the website must select “Sign up” to access the registration page.

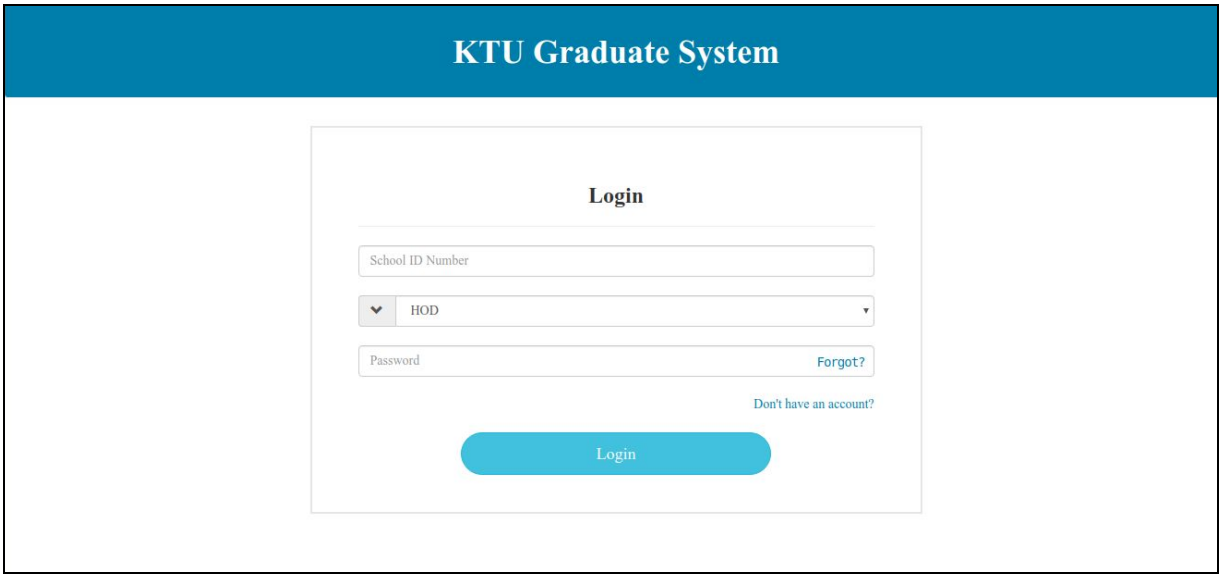


4.4.2 Signup and Login:

In the registration page, users are required to fill all fields. In addition to this, user’s school ID must be a unique school ID that has not been used before and user’s password must be at least 8 characters. After completing all required fields for registration, the user is informed about the registration status (such as Registration successful / Registration failed).

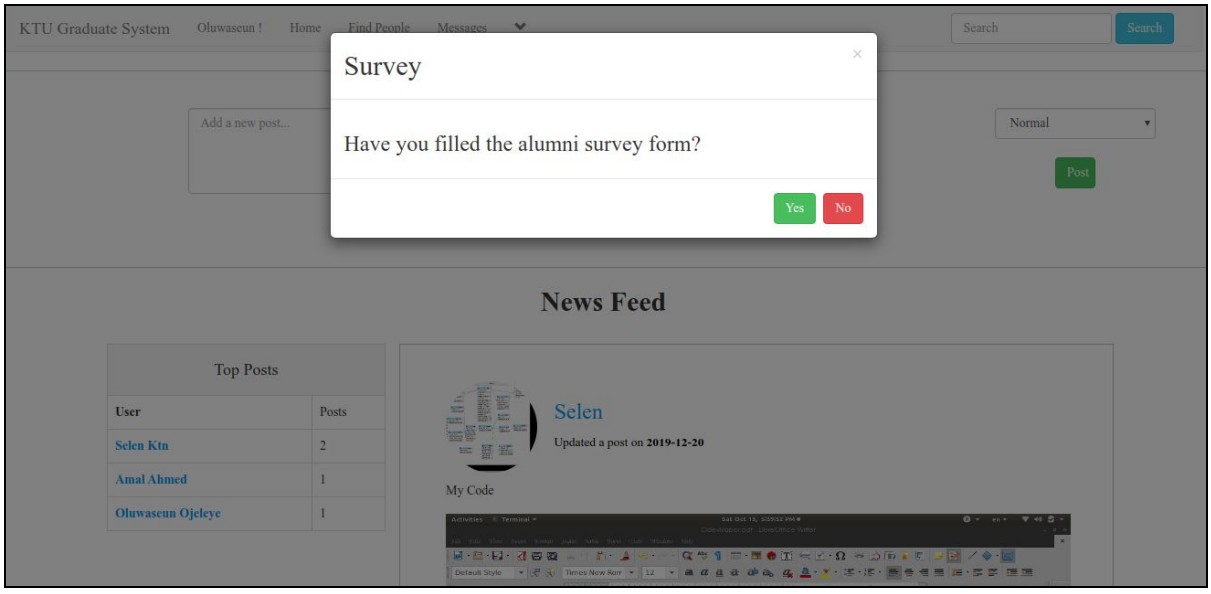


After the registration process has been completed successfully, users are directed to the login page where they are required to log into the system using their school ID, login user type info (Student/HOD) and password. The login page is as shown below.



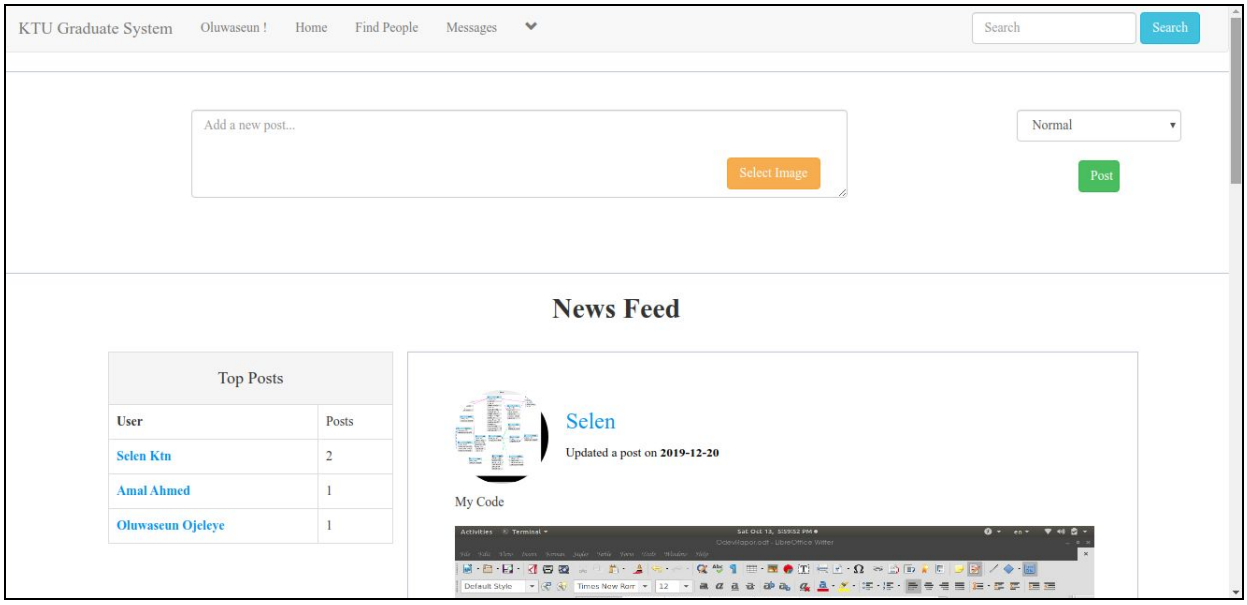
4.4.3 User Dashboard

After the user has logged in successfully, he/she is directed to the dashboard page. On the dashboard page, a survey notification box would always appear if the user hasn't filled the survey form.



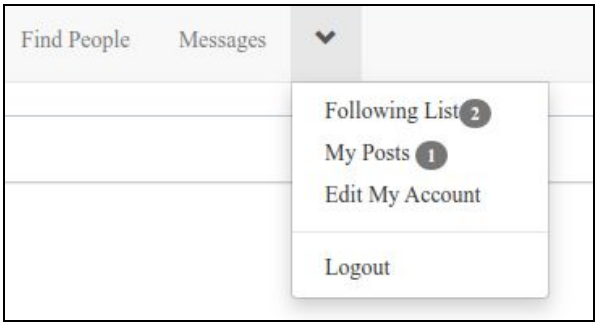
After this survey notification, users can access the dashboard's functions. The dashboard page is designed to display only the posts of the head of department after the first login ever made by

the user on the system. A user is required to follow an alumnus/alumna in order to see his/her posts.

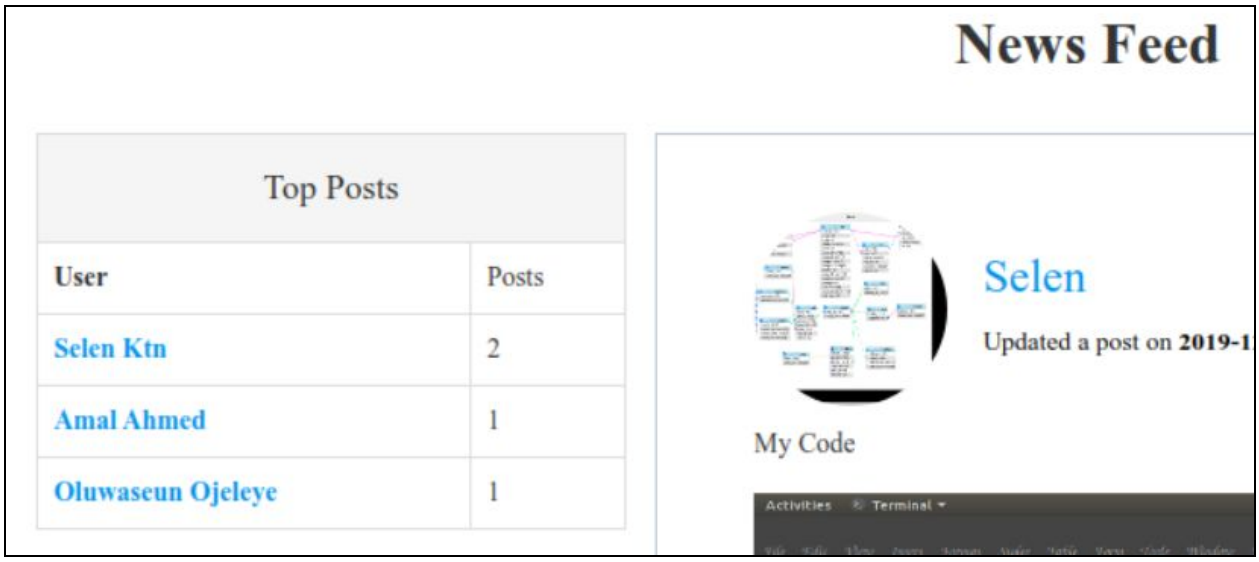


As shown in the picture, the header section consist of:

1. The user's name which is a link to the user's profile page.
2. "Home" which is a link to the dashboard.
3. "Find People" which is a link that allows the user to discover/ find other graduates.
4. The Messages link redirects the user to the messaging system of the web application where they can chat with other users.
5. The "down arrow" link contains the link :
    - That allow the user to view the users he/she is following.
    - That display the posts he/she has shared.
    - To the user's account settings page
    - To log out from the system.
6. The search activity box that allows the user to perform extensive searches within the website.



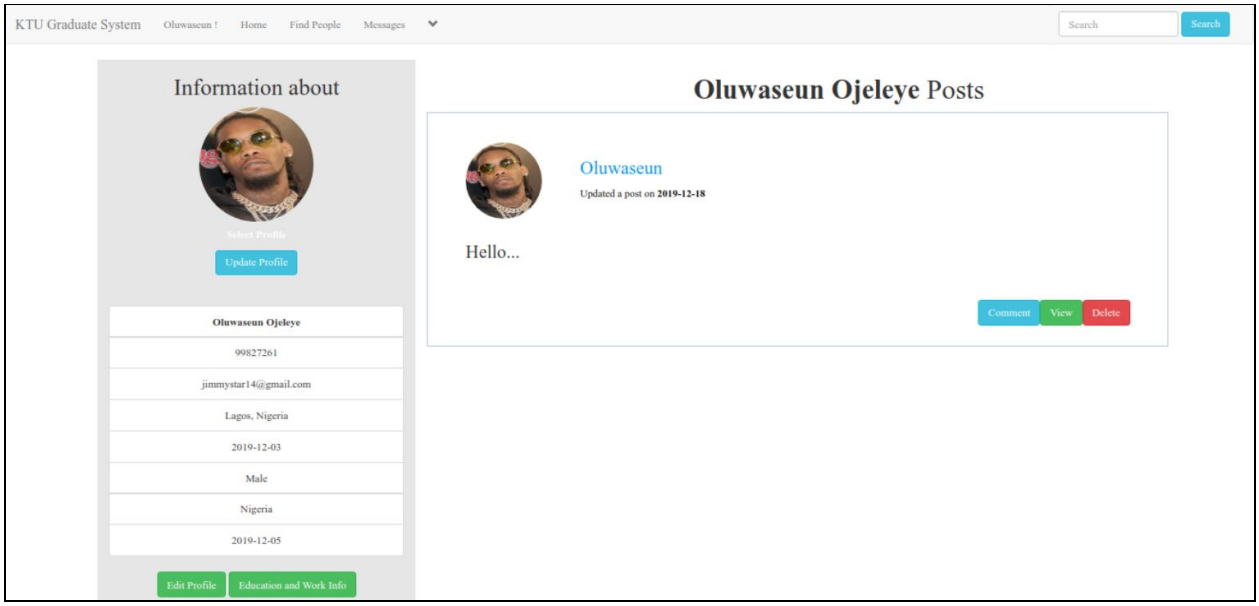
In the section shown in the above image, the user can add a post by typing a maximum of 250 characters in the text box and/or upload a photo. Users are required to select the type of content (Normal, Job or Internship post) he/she wants to share in order to make searching of posts easier for other users.



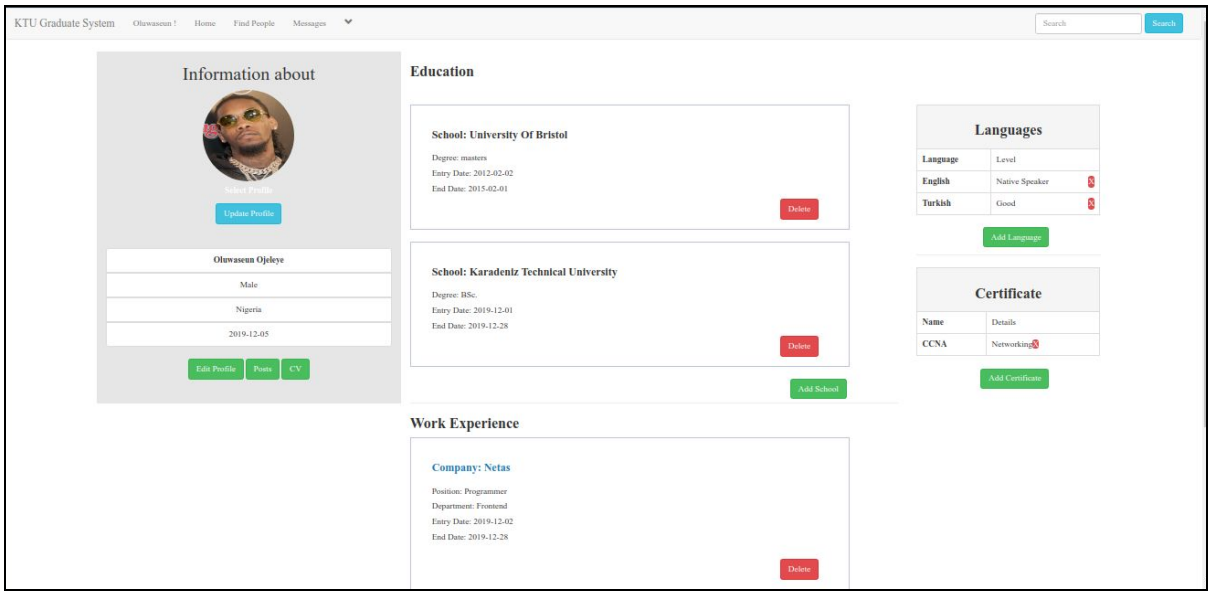
The five most active users on the platform and the five most popular companies alumni has worked and are working in is displayed on the left side of the dashboard.

4.4.4 User Profile

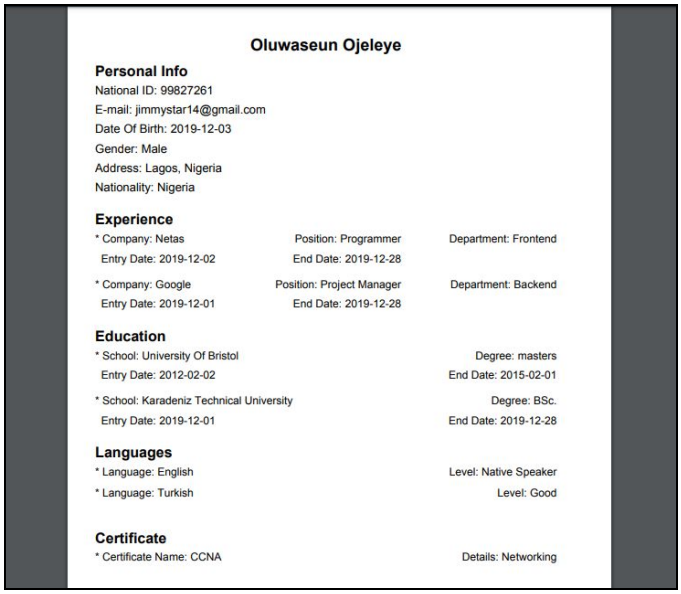
The user profile page contains the personal information of the user and the user's posts. Operations such as delete and view can be performed on the user's posts from this page. It also contains buttons that link to the "edit profile" page and "education and work" page of the app.



In the Education and Work info page (shown below), the user can save, view, edit, or delete education, work experience, history, language, and certificates.

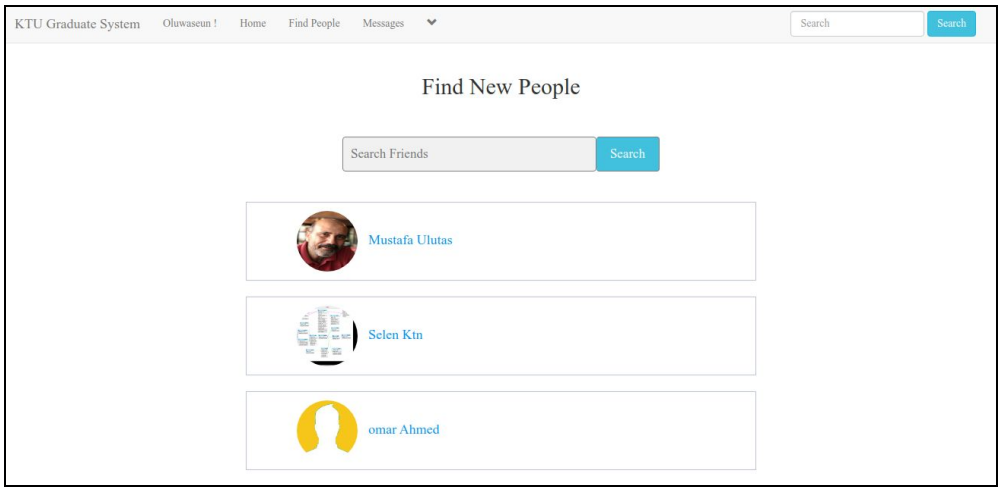


In addition to this, the user can generate a CV from his or her data using the CV button. The CV output is shown below:



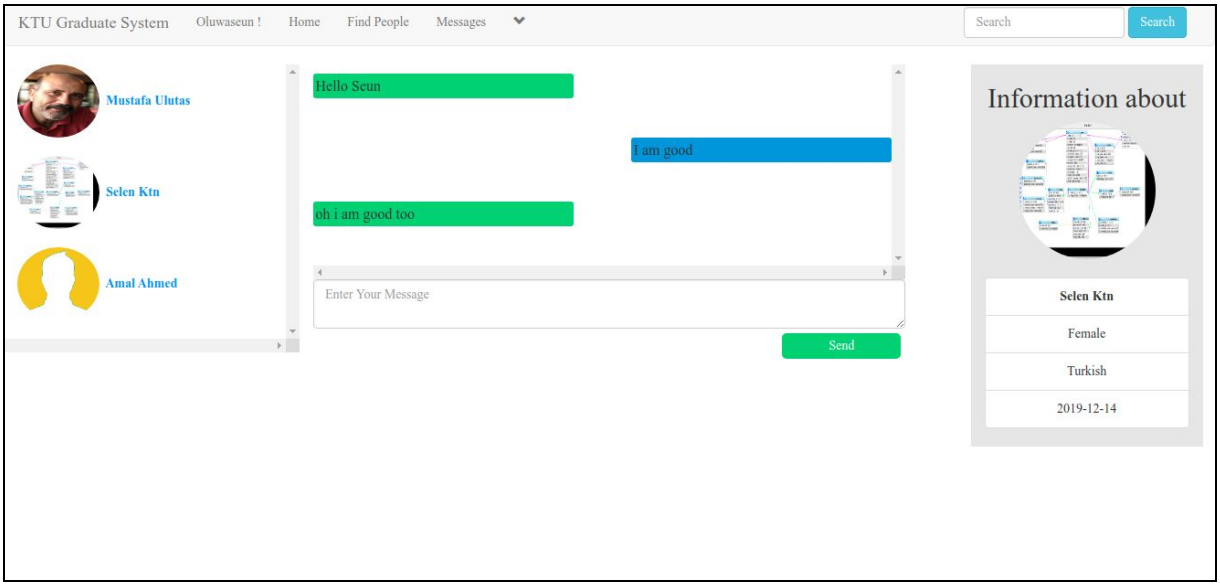
4.4.5 Discover Alumni

The Find People page allows users to search and follow the other users(alumni) that are also using the platform.



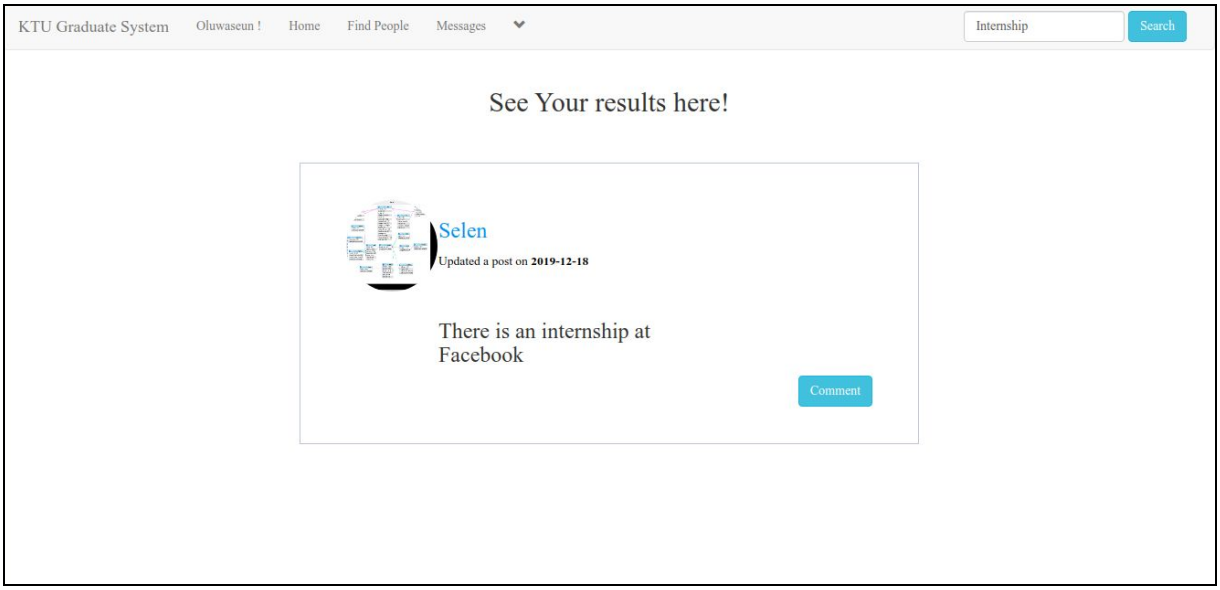
4.4.6 Messaging/Chatting Platform

On the Messaging page, users can chat with alumni they are following and the HOD by clicking on the name list of the user they want to message.



4.4.7 Opportunities Search Page

With the Opportunities Search page, the user can search for desired announcements and posts easily.



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