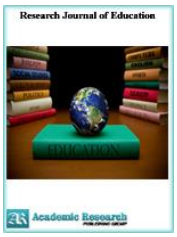

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Internet Based Model for Postgraduate Students Admission to Higher Education: Case of Tripoli University - Libya

Abdalmonem Tamtam* (PhD) University of Al-Jabal Al-Gharbi, Libya

Nura Warag (MSc) University of Al-Jabal Al-Gharbi, Libya

Abstract: Admission to postgraduate education at Tripoli University - Libya suffers continually from being a slow paced process for students, in which, students have to prepare lots of documents, which require students to be precise and careful not to make any mistakes. Additionally, the procedure takes long time and effort consuming for the staff involved in the preparation and processing of the required documents, as well as, being money consuming for university budget. To resolve these issues an online application system for students' admission to postgraduate studies at Tripoli University were designed and discussed in this paper.
The aim of the system is to speed up processing, time and provide an instant decision. The overall results obtained are encouraging but improvement to the prototype is definitely needed.
Keywords: (Internet application, Object oriented analysis and design, Admission system, Tripoli University).

1. Introduction

The World Wide Web (WWW) is growing so fast. The current web is largely based on the file system technology, which can deal well with the resources that are primarily static. However, with the unique growth of resources, it is no longer adequate to rely on this conventional file technology for organizing, storing and accessing large amount of information on the web (Carriere and Kazman, 1997). The official description describes the World Wide Web as a "wide-area hypermedia information retrieval aiming to give universal access to a large universe of documents". Using a popular software interface to the web called web browser, the web project has changed the way people view and create information—it has created the first global hypermedia network (Hughes, 1993).

The internet is a true 'Information Superhighway". It is a collection of electronic documents linked together like a spider web. These documents are stored on computers called server. The Web has evolved into a global electronic publishing medium and a medium for conducting electronic commerce. It is the universe of networks of network accessible information, the embodiment of human knowledge.

The web has a body of software and set of protocols and conventions. Through the use hypertext and multimedia techniques, the web is easy for anyone to roam, browser and contributed to.

1.1. Web-based System

Web-based/online system is a normal application that runs on web browsers, sometimes it is called web-based application. Web-based applications are based on views for showing the objects and Form for changing them. The view provides a 'safe' place where the users always return to after doing something using a Form or wizard. The views are usually lists or tables that allow the display of information to be controlled (Faraj, 2009). According to Tarban (2006) web-based systems refers to those applications or services that are resident on a server that is accessible using a web browser and is therefore accessible from anywhere in the world via a web. Additionally, two other very important features of web-based functionalities are that generated content/data are updated in real time and that online systems are universally accessible via the internet to users (Urdan and Weggen, 2000).

Libya boasts the highest literacy rate in the Arab world, Tamtam *et al.* (2011). and the UN's Human Development Index, which ranks standard of living, social security, health care and other factors for development, places Libya at the top of all African countries. Government reform plans in developing ICT infrastructure in Libya and incorporating ICT in education as key components in its overall development plans, (Hamdy, 2007). Currently, applications for admission to Tripoli University are processed manually, every semester thousands of students apply for admission. From this large number of students only a handful of students get the chance to enter the university. Prospective local and international students, who would like to know about this university usually, access the university's website to obtain relevant information. However, those who would like to apply have to send necessary application materials and application processing fee through postal and bank services. They are not able to apply via online, after receiving the application documents staff at the academic department has to key in all information into

*Corresponding Author

the system and send a copy of the application to the faculty. The faculty coordinator will check all documents and determine applicant's eligibility that he/she meets all admission requirements. The course coordinators will then send list of successfully applicant's name to the academic department. Academic department will send offer letters to the applicants. This is very lengthy process and sometimes the applicant did not receive any acknowledgement regarding their application. Prospective students are concerned about their application status. As a result of this problem, a web-based post graduate application system (WPAS) for Tripoli University will be proposed. The aim is to reduce application processing time, send application acknowledgement/ status, avoid key in student information more than twice and reduce administrative workload.

1.2. Objective of the Study

The primary objective of this study is to develop a web based admission system, the main objectives are:

(i) To identify end-users requirements for the system..
(ii) To design a requirements model of the system.
(iii) To develop a prototype of the system with relevant functionalities.
(iv) To evaluate the usability of the system.

2. Related Works

An interview conducted with a Maybank officer revealed that Maybank have been using online systems such as credit card systems, online applications to handle charging, billing, payments and other processing functions after a credit card is issued. However, most of the upfront application processing is still done manually.

The drawbacks of manual processing are application turnaround time is too long, credit limit assignments are not consistent and decisions are not derived by systematic means. Application processing system (APS) allows paper and applicants will not lie on someone's desk awaiting for processing nor will they lost among a pile.

Meinel *et al.* (2002), developed an application management system for university staff and students, called AMS. AMS started as a simple registration tool for students. However, there was a problem signing up for applying, fees payment and students administration. Then late AMS has been improved to become a powerful system, assisting the staff and the administrator in the management of entire application process. AMS tasks are ranging from apply online, student data administration, creation of course web pages, design and administration of exercises and test sheets, up to the design of certificates for successful participation. AMS can do student administration and can easily be adapted to any kind of management.

Zanev (2004) studied the student online application registration system that has been designed and implemented at State University, USA. The problem found was the data transfer between a WAP device and the gateway was relatively slow. A browser interprets WAP content differently. To overcome these problems he used a three-tier architecture design. The information for the tests was stored and retrieved a database.

The languages used to implement the application are WML and ASP. The new improved system has not affected students to apply, check application status at anytime from anywhere with relatively faster time.

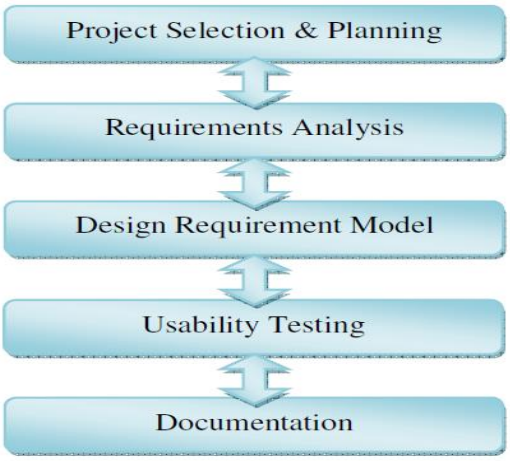
3. Methodology

There are numerous methodologies available today that can be used as tools to develop a system. The research adopted the object-oriented methodology proposed by Hoffer *et al.* (2004). The next section discusses the phase of the methodology.

3.1. Study Methodology

The methodology consists of five phases and these are project selection and planning, requirements analysis, design requirements model, usability testing and documentation. Figure 3.1 shows the diagram of the methodology.

Figure-3.1. Object-Oriented Methodology



3.1.1. Project Selection & Planning

During first stage, a comprehensive study has been done to identifying the activities, milestones and deliverables produced by the project. According to Sommerville (2007) a well project plan is drawn up to guide the development towards the projects goals.

In the planning phase, project scheduling, cost estimation, risk analysis, work breakdown and literature review has been carried out. During the literature review phase ideas, information, issues and problems related to the web-based system have been gathered from proceedings, journals, white papers, reports and news.

3.1.2. Requirement Analysis

According to Olphert and Damodaran (2002) requirements is a formal definition of a system and reflect the needs of users for a system that helps to solve problems. The second stage has presents the end user's requirements towards the Web-based Postgraduate Application System (WPAS) for Tripoli University.

The process starts by getting information about exiting admission process, manual system, features & functions provided and identified the problems upon application requirements, support materials. This stage defines how the current system works, determine & analyze facts and documents how system should work better to support, develop a logical model of the proposed Web-based Postgraduate Application System (WPAS) for Tripoli University.

On the other hand, issues related to the study are gathered from books and websites. From the information, user requirements have been determined.

3.1.3. Design Requirement Model

Design is essential part of the overall software design process. A poorly designed means that users will probably be unable to access some of the features. Thus, user requirements has been collected and analyzed very carefully. This study adopts the object-oriented (OO) approach and HTML to design a prototype of the proposed system.

Use case diagram, sequence diagrams and class diagram are produced during this stage.DBDesigner4 have been used for database and interface design. At the end of this phase a prototype model of the Web-based Postgraduate Application System (WPAS) for Tripoli University has been developed. ASP programming language and My SQL has been used to develop this system.

3.1.4. Usability Testing

During this stage, the prototype is tested to verify whether the system has met user requirements.

3.1.5. Documentation

In the last stage, a full report on the system has been produced. The report includes detailed description and information on the Web-based Postgraduate Application System (WPAS).

4. Finding

4.1. Analysis Approach

The study adopts the object-oriented methodology. The phases of research have been described above. The following section presents the findings on each phases of the methodology.

4.2. Project Selection & Planning

At the beginning of the planning process project scheduling, cost estimation, risk analysis, work breakdown and literature review has been carried out. During the literature review phase ideas, information, issues and problems related to the web based system have been gathered from proceedings, journals, white papers, reports and news.

4.3. Requirement Analysis

The requirements analysis is separated into two parts namely functional and nonfunctional requirements. The list of Functional, Non-Functional Requirements, and updated SRS are presented below. Functional requirements capture the intended behavior of the system. This behavior may be expressed as services, tasks or functions the system is required to perform.

Use cases are useful in capturing and communicating functional requirements. On the other hand, non-functional requirements include constraints and qualities. Instead, non-functional requirements need to be made precise and actionable.

4.4. Current System

Students who would like to apply at University have to send necessary application materials and application processing in hand. They are not able to apply via online.

After getting the application materials academic department has to key in all information into the system and send a copy of application to the faculty. The faculty coordinator will check all documents and determine applicant's eligibility that he/she meets all admission requirements. Then course coordinator will send list of successfully

applicant's name to the academic department. Academic department will send offer letter to the applicants. This is very lengthy process. Sometimes the applicant did not receive any acknowledgement regarding their application.

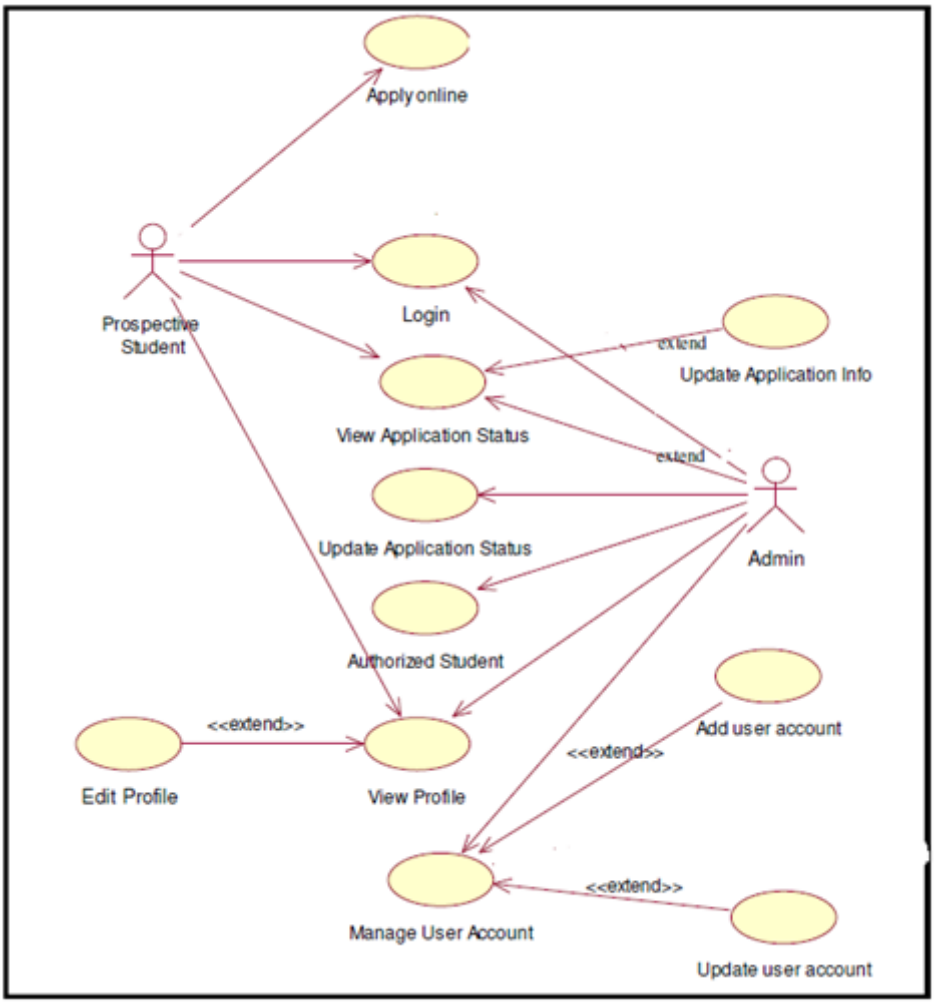
4.5. Design Requirements Model

During this phase several designs have been produced using unified modeling language (UML). According to Booch (1994) UML is a visual modeling language used to specify, construct, visualize and document the artifacts of software system. Use case diagrams in UML are used to give/achieve requirements for a software design and development. Each use case draws in informal (Sendall and Strohmeier, 2000). The Nunes and Cunha (2006) states UML is recognized to be the leading diagrammatic modeling language in the software engineering. According to Eriksson and Penker (1999), UML can be applied in different phases of system development, from the requirement specification to the test of finished system. Whitten *et al.* (2001) describe that UML is conventions modeling language that specify a system in term of object. UML consists of number of graphical elements that comprises from diagram. Dennis *et al.* (2000) added that an objective of UML is to provide a common vocabulary of object-oriented and diagramming techniques that is rich enough to model any systems development project from analysis through implementation. In this study proposed Rational Rose 2005 has been used to draw requirements model. Many errors that occur during requirements analysis and design can be detected by means of execution (Compton and Huggins, 2003).

4.6. Use Case Diagram

There are some use case have been produced. These are Apply online, Login, View Application Status, Registration, Update Application Info, Authorize Student, Edit Profile, Manage User Account, Add, Edit, Search User, and Delete User Account.

Figure 4.1. Use Case Diagram



As shown in Figure 4.1 there are two actors—Prospective student and Administrator.

Student can manage Apply online, Login. Administrator can manage all of them including View Application Status, Update Application Info, Authorize Student, Edit Profile, Manage User Account, Add, Edit and Delete Account.

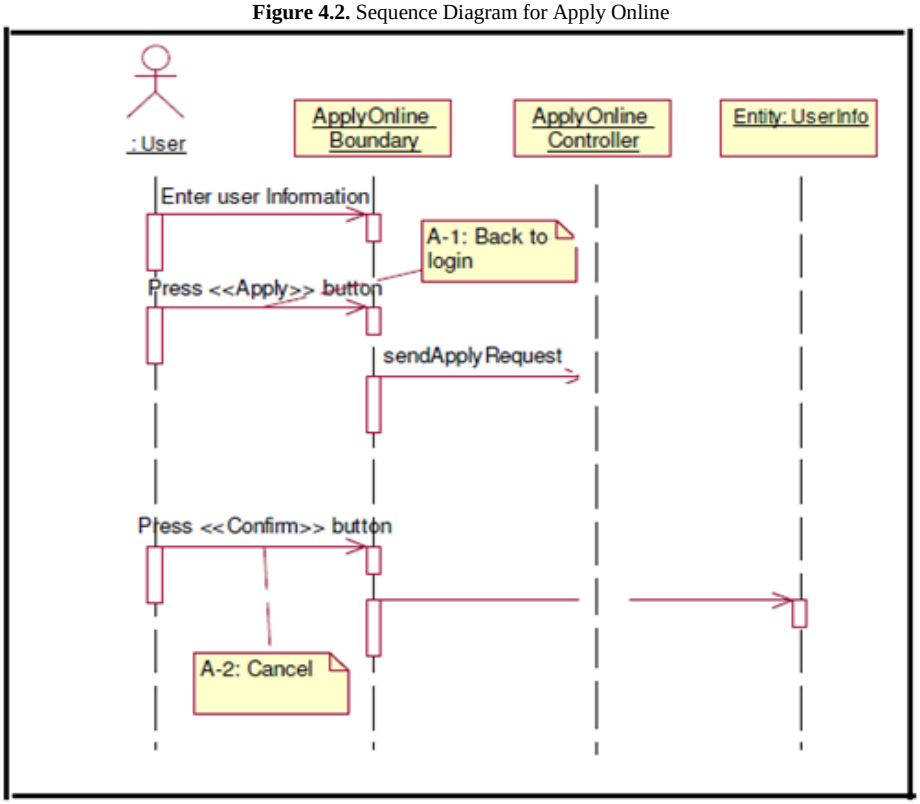
4.6. Sequence Diagram

Several sequence diagrams are produced. These are shown in the following section.

• Apply Online

Figure 4.2 shows the Apply Online sequence diagram of the system. Prospective students (User) can apply through online for admission. They need to enter all requirements and press "Apply" button. System will send Apply Request () to the Apply Controller. Apply Controller will verify all information for data validation and display confirmation page. Once user click "Confirm" button, system will create new user account and display successful message.

Figure 4.2. Sequence Diagram for Apply Online

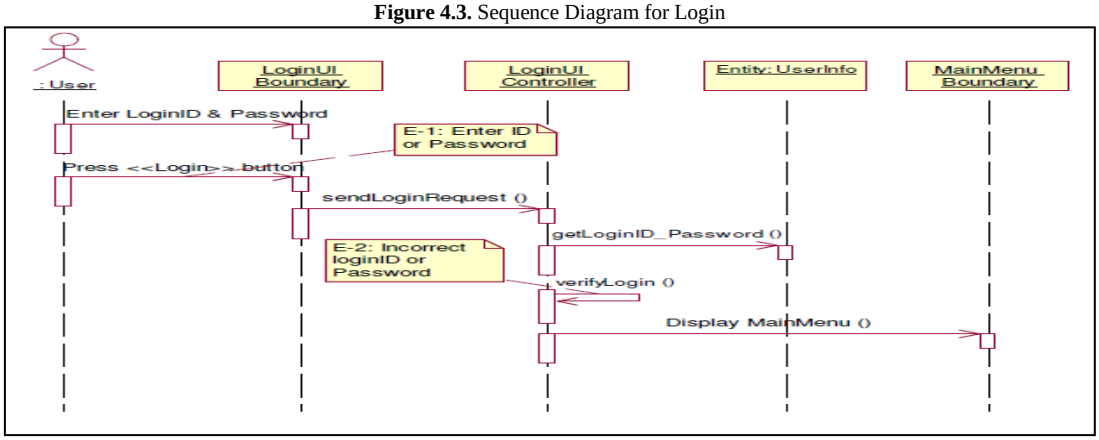


• Login

Figure 4.3 shows the sequence diagram for login. User will enter Login ID and password. Then press "login" button. Login UI Boundary will send login Request ().

Login Controller will get login ID and verify. Successfully match will allow to access to the system. Otherwise, display error message-"Incorrect login ID or Password".

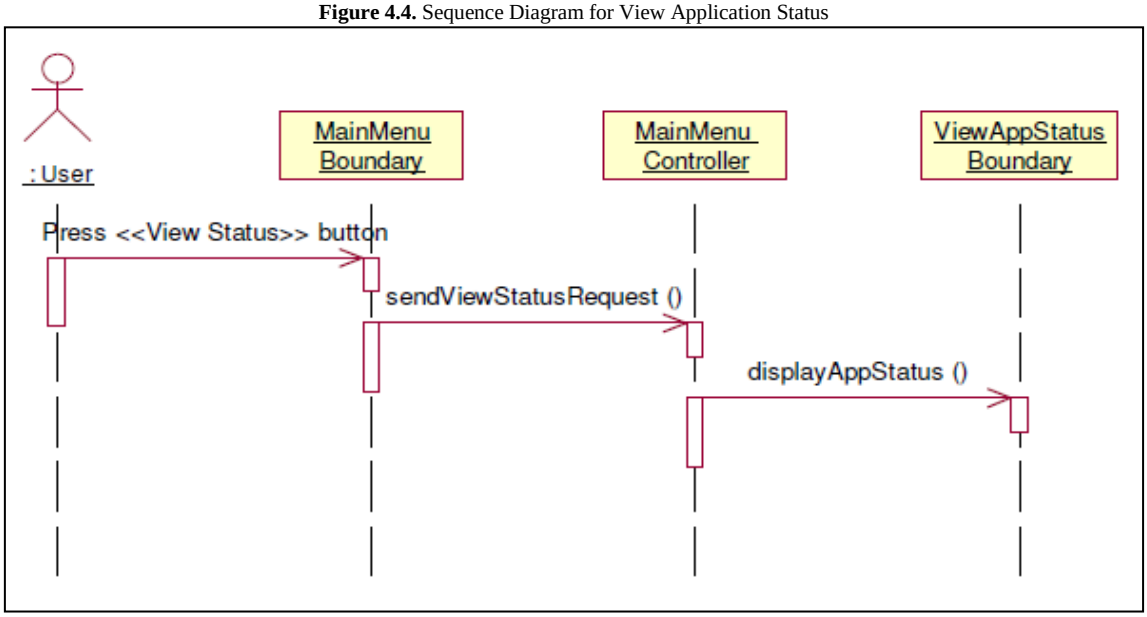
Figure 4.3. Sequence Diagram for Login



• View Application Status

Figure 4.4 shows the sequence diagram for view application status. Students are able to see their application status at anytime from anywhere. From the main menu click "View Status" button. Main Menu Boundary sends the request to the Main Menu Controller. And display the view application status interface.

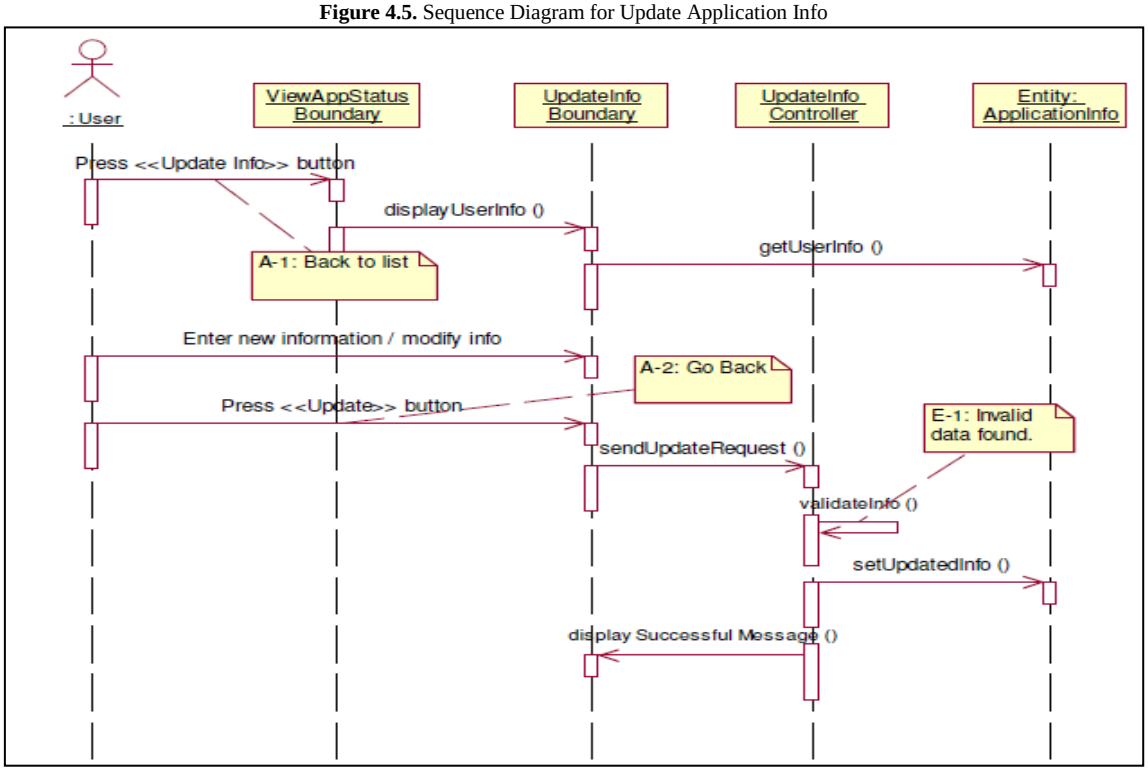
Figure 4.4. Sequence Diagram for View Application Status



• Update Application Info

Figure 4.5 shows the sequence diagram for update application info. Student can update their information time-to-time. There are some process to update application info like —display User Info, get User Info, send Update Request, validate Info, setup date Info, display Successful Message.

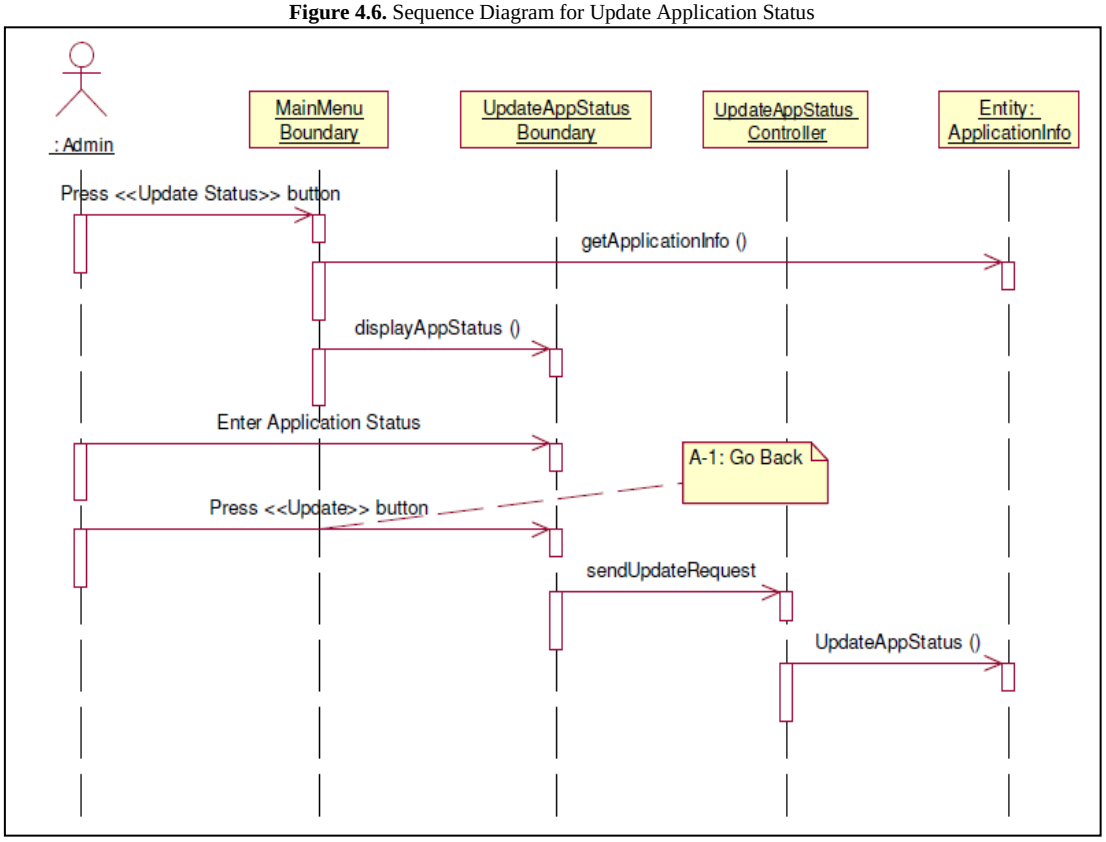
Figure 4.5. Sequence Diagram for Update Application Info



• Update Application Status

Figure 4.6 shows the sequence diagram for update application status. Only administrator can update application status. There are four process such as get Application Info (), display App Status (), send Update Request (), Update Status ().

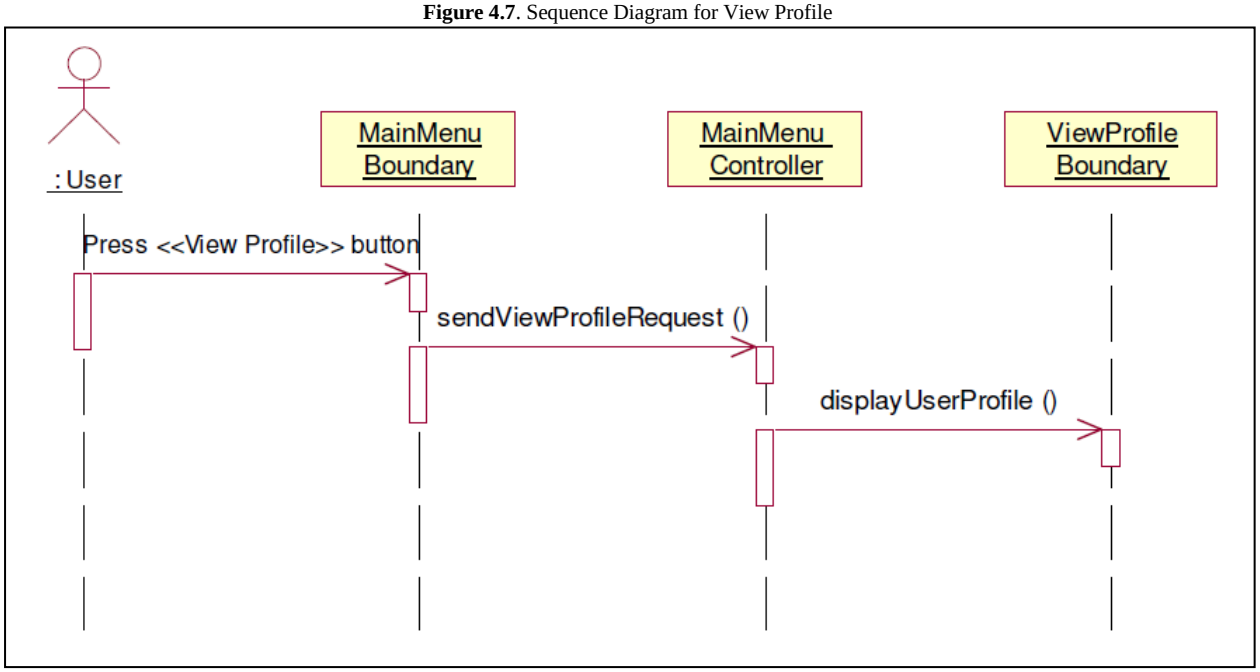
Figure 4.6. Sequence Diagram for Update Application Status



• View Profile

Figure 4.7 shows the sequence diagram for view profile. This sequence shows how user can view their own profile. Just simply click "View Profile" button on Main Menu boundary. The request will send to the controller and display user profile.

Figure 4.7. Sequence Diagram for View Profile

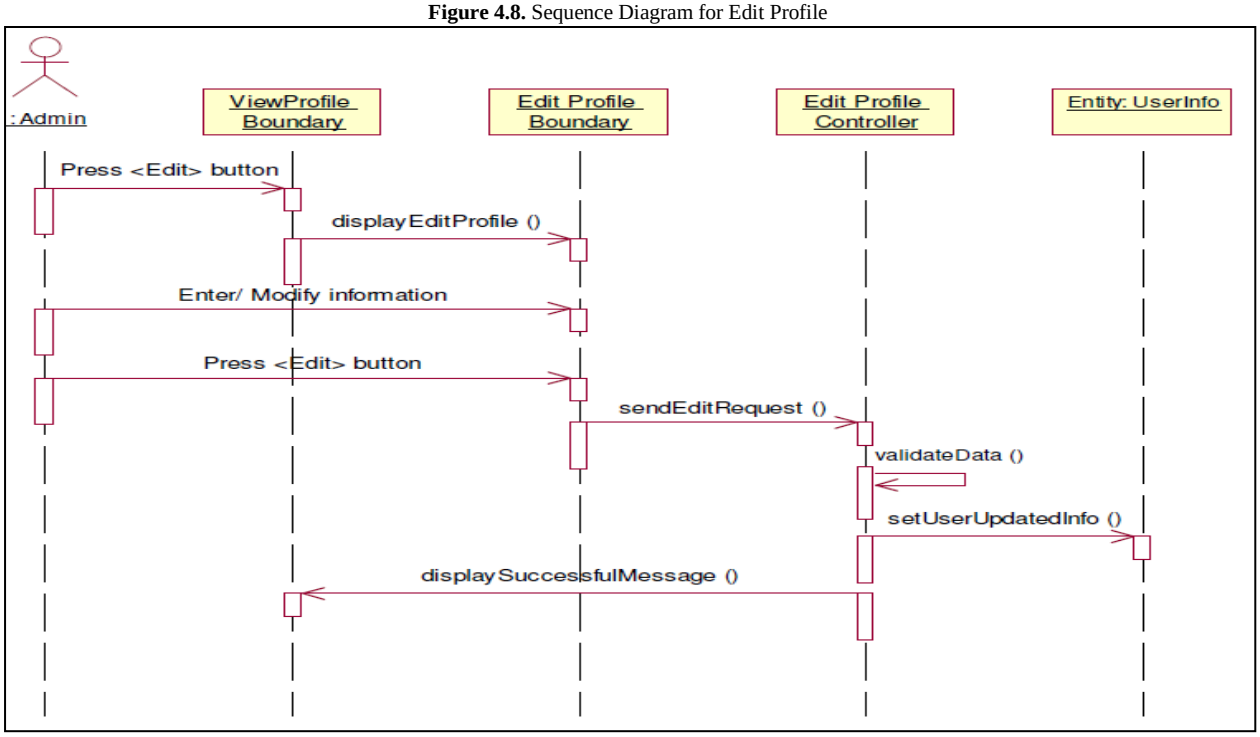


• Edit Profile

Figure 4.8 shows the sequence diagram for edit profile. Users are also allowed to change their profile information. Form view profile interface, click "Edit" button.

Request will send to controller and display edit profile interface. User modify information and press "Edit" button. Controllers verify data and se User Update Info. Finally, display Successful Message.

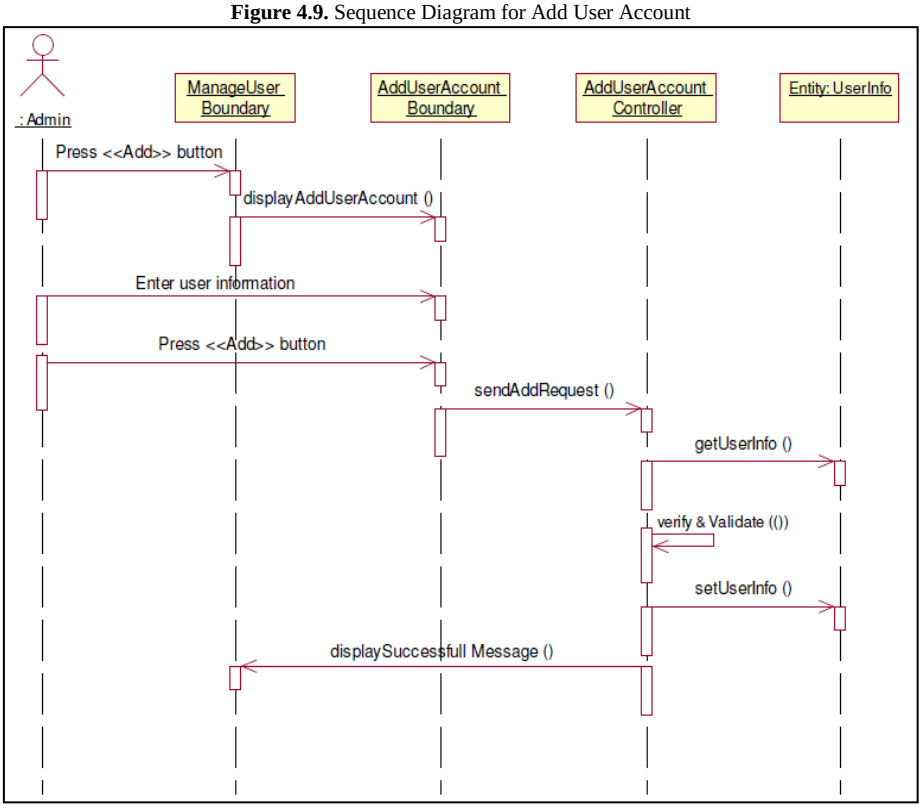
Figure 4.8. Sequence Diagram for Edit Profile



• Add User Account

Figure 4.9 shows the sequence diagram for add user account. Only administrator can add/ create new user account. Enter user information and press "Add" button. Controller will do these process—send add Request , get User Info, validate, set User Info and display Successful Message.

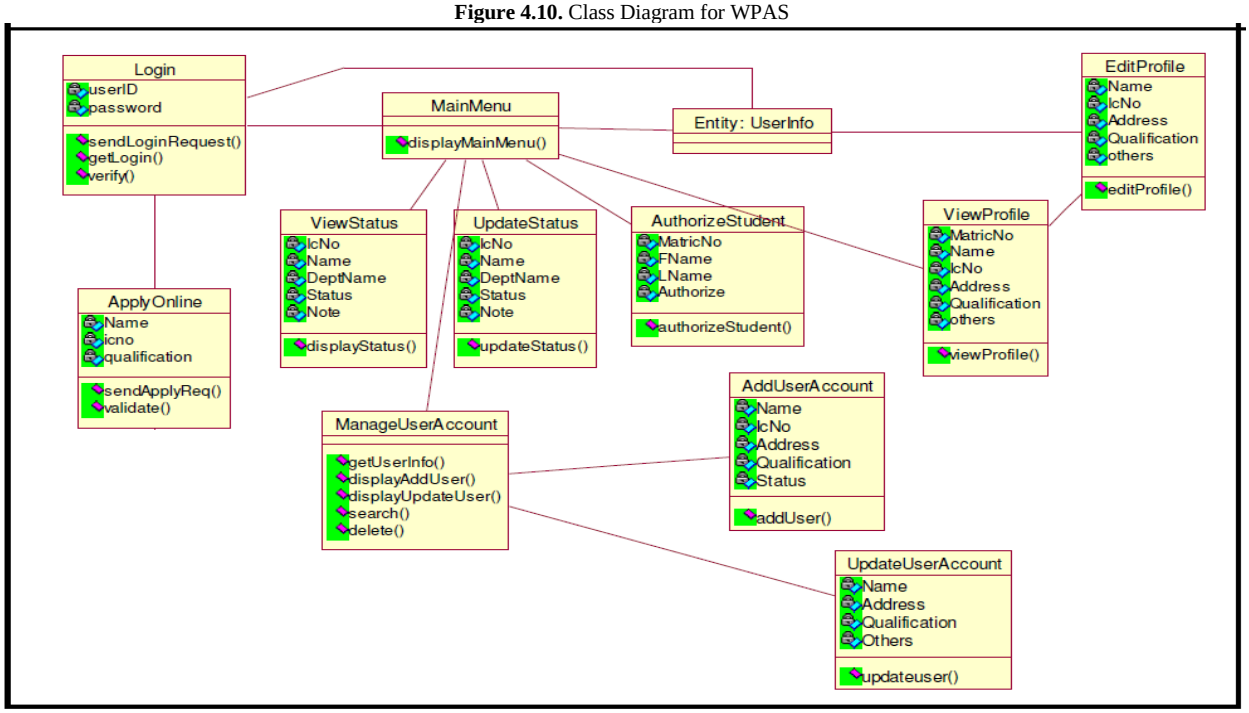
Figure 4.9. Sequence Diagram for Add User Account



• Class Diagram

Figure 4.10 shows the class diagram for the WPAS.

Figure 4.10. Class Diagram for WPAS



5. Conclusion

The application of web-based technology is most popular among the society. It is believed that the time comes and one of the main methods used by people to communicate and share information. This chapter presents limitation of the proposed system, user satisfaction result and recommendation. At the end of the chapter, future works on web-based post graduate application system is highlighted. This paper concerns about the problems faced by prospective students when they want to apply online and would like to know status of their application. Tripoli University currently, applications are processed manually. Every semester thousands of students apply for admission. From this large number of students only a handful of students get the chance to enter the university. Application form increase every semester and academic staffs need to check the documents before deciding either to accept or reject. This process is time consuming and application status can only be given to students after at least two weeks. A web-based application system solution is proposed. The aim of the system is to speed up processing, time and provide an instant decision. The overall results obtained are encouraging but improvement to the prototype is definitely needed.

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