Design of Web-Based Informatics Journal Information System

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Abstract

Informatics has become among the fastest growing studies with thousands or more papers and journals being published each year. The ever expanding repository of published and unpublished journals makes it more and more difficult and expensive to manage it with only human capabilities. As such, the need for an information system that can help classify and manage journals and papers on informatics becomes more and more important. This paper discusses designing an informatics journal information system that uses an automatic journal classification feature as a novel feature using the prototype method and Uniform Modeling Language.

Keywords: *Web-based, Information System, Uniform Modeling Language, Prototype Method, Use Case Diagram, Activity Diagram.*

1.   Introduction

Informatics has become among the fastest growing studies with thousands or more papers and journals being published each year. The ever expanding repository of published and unpublished journals makes it more and more difficult and expensive to manage it with only human capabilities. As such, the need for an information system that can help classify and manage journals and papers on informatics becomes more and more important. This paper proposes creating a web-based information system to help users manage and classify informatics journals in hopes of reducing human burden, human errors and expenses in managing journals and papers on informatics.

Information system are all systems that involve interaction with a shared database can be considered to be transaction-based information systems. An information system allows controlled access to a large base of information, such as a library catalog, a flight timetable, or the records of patients in a hospital. Increasingly, information systems are web-based systems that are accessed through a web browser [1].

There has been several papers that used web-based information systems to support academic entities. A research done by [2], designed a web-based information system for libraries using the prototype method and Unified Modeling Language (UML) where the system helps library staff to manage book borrowing and returns as well as to help members to see what books are available in the library. A research done by [3], designed a web-based academic information system for managing school administrative data, allowing students and teachers to easily manage and access relevant information such as grades, student information, schedules, and more. Another research done by [4] creates an web-based information system for the purposes of civil service where the information system help manage the complaints put forth by the public so that the government can decide what problems needs to be addressed and also sends information to the public about the current activities of the government.

Based on previous research, the author proposes a design for a web-based information system can be implemented to manage and classify informatics journals in order to reduce the problems of reducing human burden, human error, and expenses caused by the very quick growth of published and unpublished informatics journals.

2. Research Method
2.1 Prototype Method

Prototype is defined as a version of a potential system that gives an idea to the developers and potential users on how the system will function in its finished form. The basic idea is to create a prototype as fast as possible then receive feedback from users to allow that prototype to be improved as soon as possible. Every planned diagram or model doesn't need to be perfect and final when prototyping. The main goal is to prepare a design to be used as a tool to give a picture of a system such as materials and menus that is needed in the development of the prototype, after the plans has been formed, it is continued with the further development of the prototype[2]. The following are the stages of prototyping:

1. Identify user needs

   Identifying the user's needs is an important step in understanding their problems and begin designing a prototype to satisfy their needs.

2. Develop prototype

   After finding and understanding the user's needs, begin development of the prototype. Make sure that every feature of the prototype has the goal of satisfying the user's needs.

3. Determine if the prototype satisfies the user

   After development is complete, present the prototype to the user in order to determine if it fulfills all the user's needs. If it doesn't satisfy the user, then it is important to re-identify the user's needs and start developing another prototype, while learning from the previous failed prototype. If the user is satisfied with the prototype, then they can move forward to the next step.

4. Use Prototype

   If the prototype is accepted, then the prototype can be used and be furthered developed to be more efficient and fulfill the user needs better.
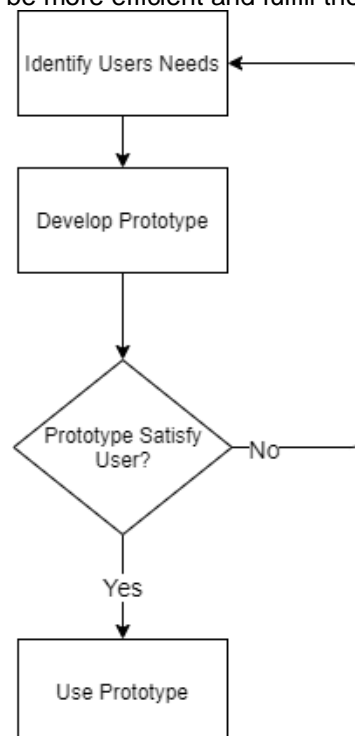

Figure 1 Prototype Stages

2.2 Unified Modeling Language

The Unified Modeling Language (UML) is a standardized specification language used to document, specify and build software. UML is a method in developing object oriented systems and a tool to support system development. [5] UML consists of diagrams that tells the context of how each models interact with each other. The application of UML is usually for the purpose of designing a software, communication between software and business processes, elaborate the system in detail for analysis and finding system needs, and document system processes and organization.

Use cases are diagrams that visualizes the interaction between users (actors) and the system. These diagrams makes it easier to explain the context of a system and gives a clear understanding of the systems boundaries. [6]

Activity Diagrams are specific type of status diagrams that shows the flow of an activity to another activity in a system. These diagrams are important in modeling the functions and puts pressure on inter-object flow control. [7]

3. Result and Discussion

3.1 Identification of User needs

To identify the needs of users, it is first important to understand who are the users that will use this information system. This paper identified 2 groups of users, which are Admin and Lecturers and Students (User). Admin are users who will use the system to manage the journals and accounts of other users, while User are users who use the system to download or upload their journals. Further description of their roles in the system will be explained in the use case diagram.

The Admin's needs is an information system allows them to easily manage informatics journals and users. The system must be able to create, find, edit, download, and delete journals within a reasonable time frame so that the Admin could easily and efficiently manage the large and ever growing repository. The system must also be able to allow Admin to create and edit accounts of other users so that admins can better manage users that use the system. The system also needs to be able to automatically classify and index every informatics journal that the User uploads so that the Admin doesn't need to manage the system every time a User uploads new journals

The User's needs is a system that can help them find journals that are relevant to their needs, they also need to be able to upload their journals to the system's repository without the need to involve an Admin and for Users without an account to be able to create an account in the system without needing the involvement of an Admin.

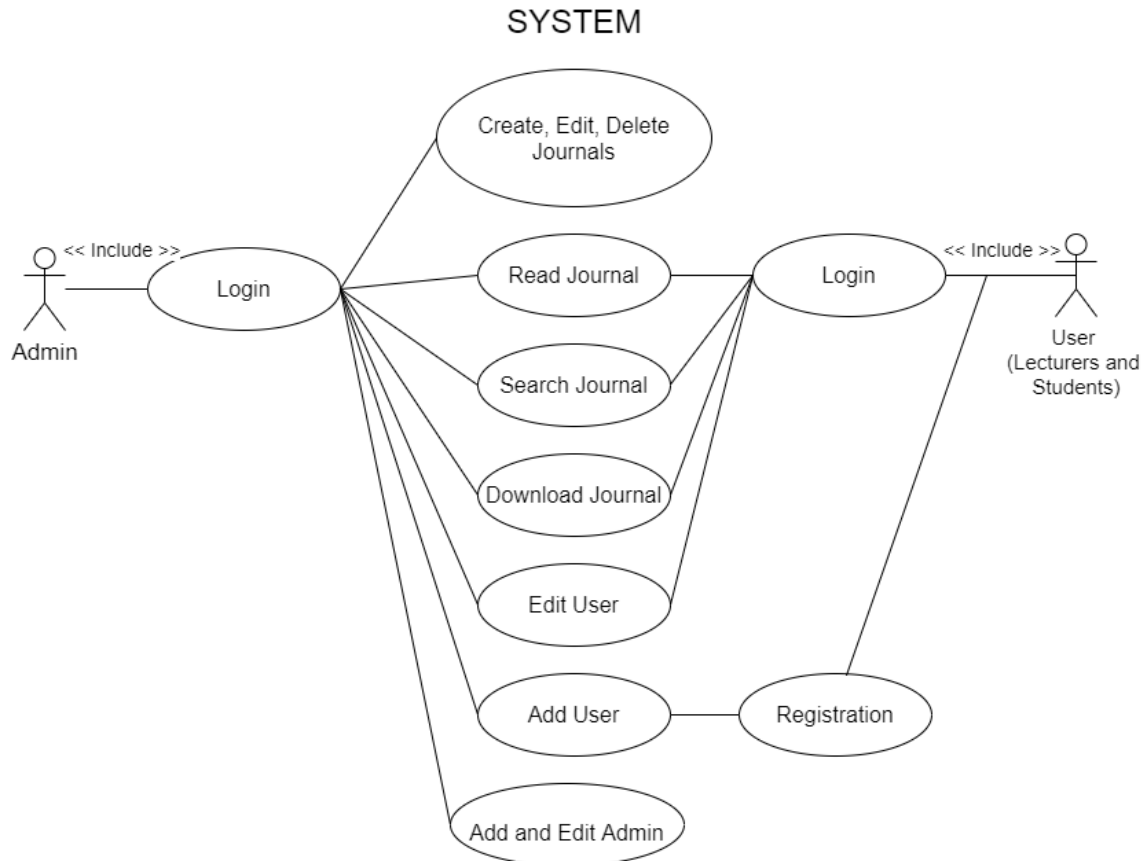### 3.2 Use Case Diagram

SYSTEM

Figure 2 Use case Diagram

In the figure above, there are 2 actors, which are:

1. Admin

    Admin are staff members which are tasked in overseeing and managing the information systems, their jobs are to manage the accounts of admins and users as well as to manually manage the journals when it is necessary (such as a request from a lecturer or student, or when there is a mistake in the system).

2. User (Lecturers and Students)

    User comprise of students and lecturers that wish to upload their journals to the system or to view and download journals that are available in the information system.

3.3 Activity Diagram

For the sake of brevity, this section will only focus on the most important part of the system, which is the upload and classification of informatics journals, henceforth referred as "journal", by users. The following is the activity diagram of the upload and classification proses.
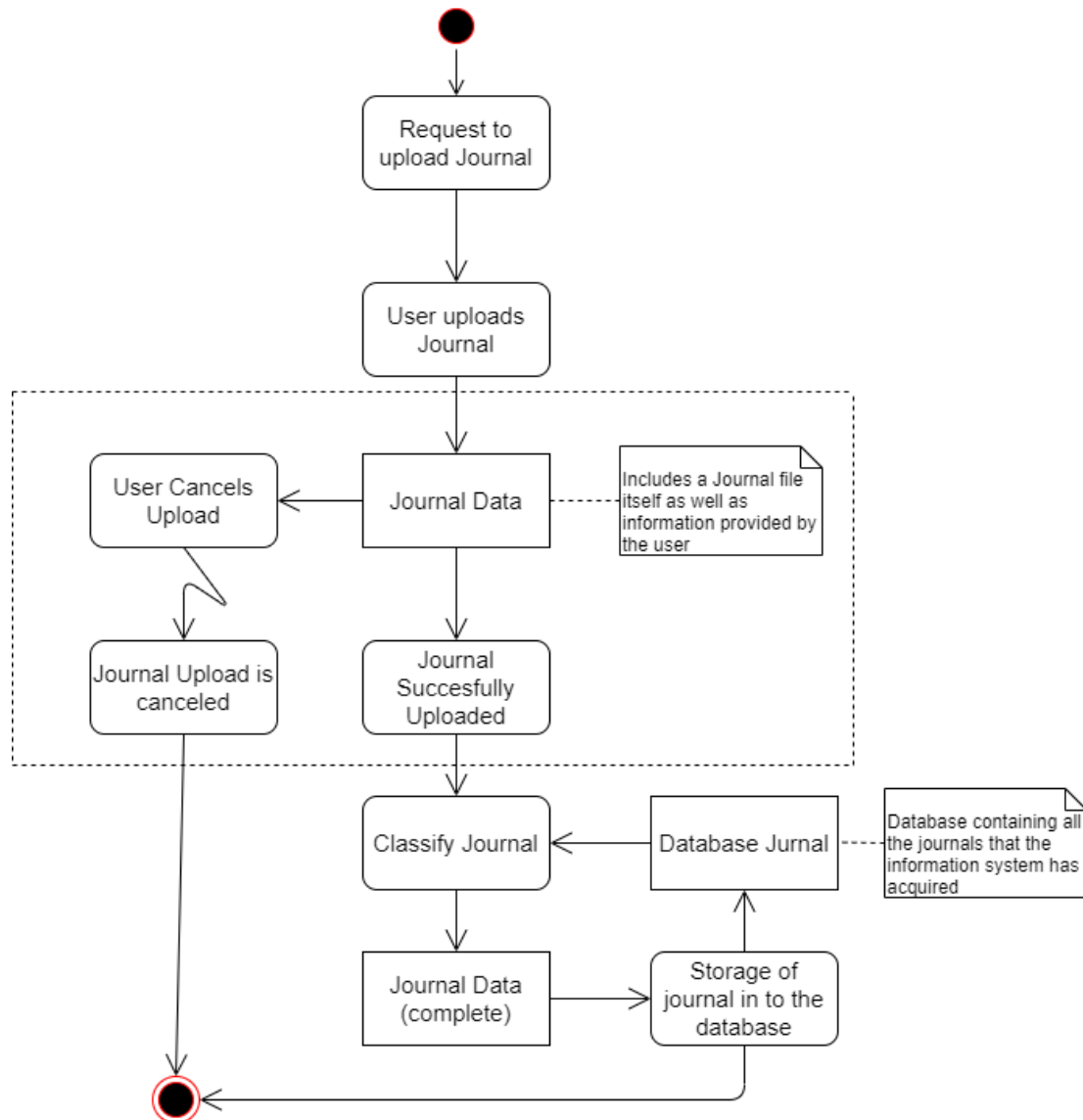
Figure 3 Activity Diagram of journal upload

The Activity begins with the system requesting for the user to upload his journal. The user then insert his journal to begin uploading to the system. During the upload process, the use may cancel the upload process, interrupting the uploading of the journal causing the upload to cancel and end the entire activity. When the journal is successfully uploaded, it is then classified in to existing classes based on similarities to journals that exist in the journal database. When the classification is complete, the completed journal is then inserted in to the journal database for future use and the activity ends.

3.4 Implementation

This section will show the planned implementation of the information system using Balsamiq Mockups, the following are the mockups the Information System.
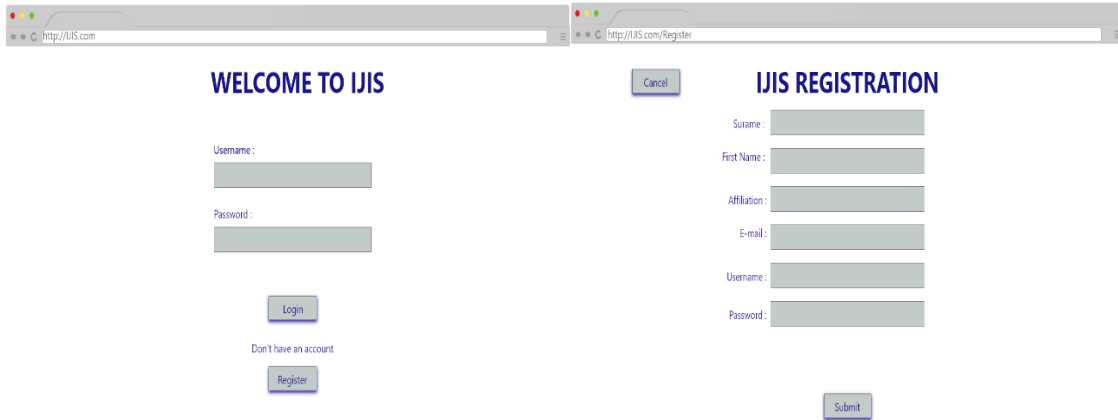
Figure 4 Login Page
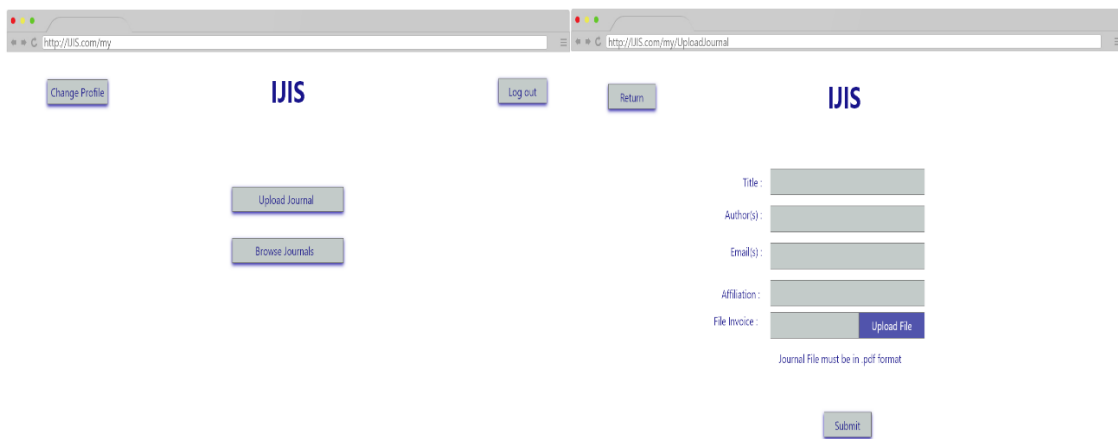

Figure 5 User Registration Page

Figure 6 Dashboard (User)
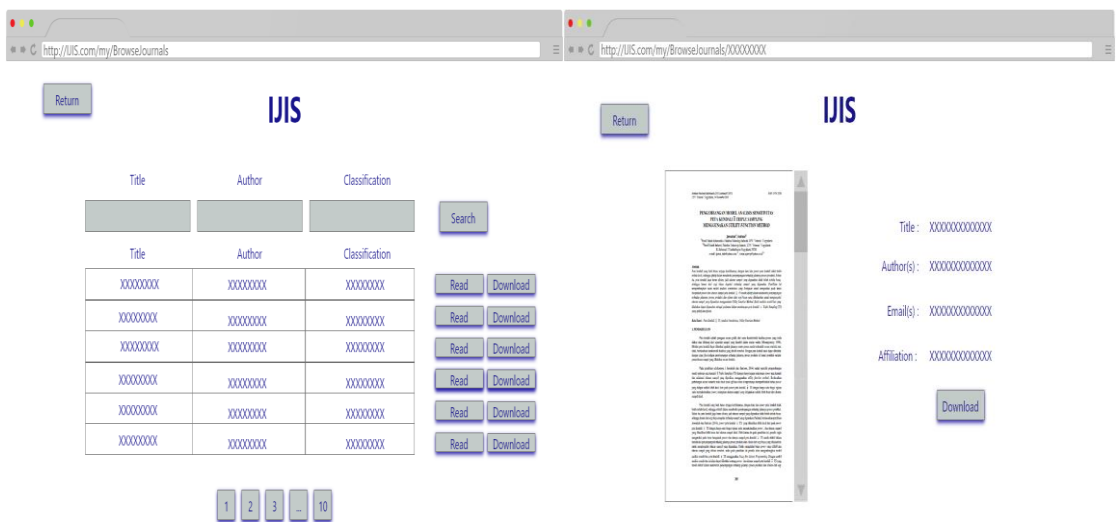

Figure 7 Journal Upload

Figure 8 Browse Journals
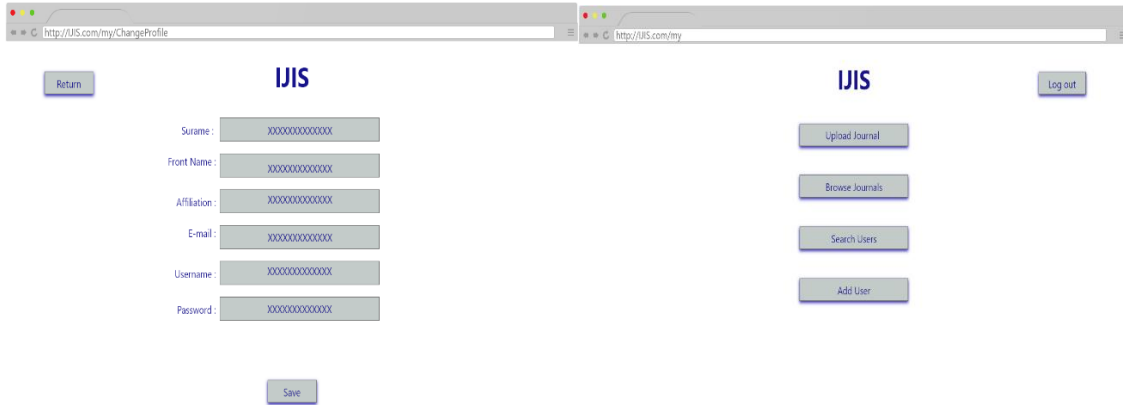

Figure 9 View Journal
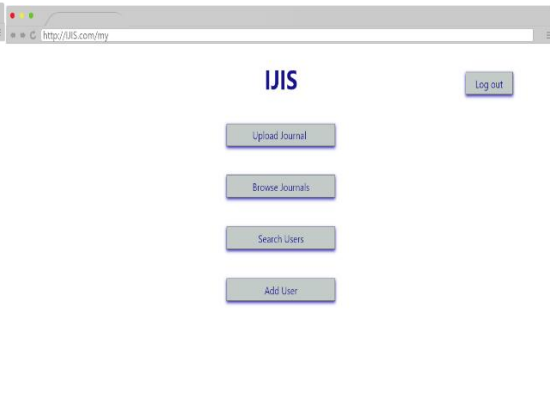
Figure 10 Change Profile
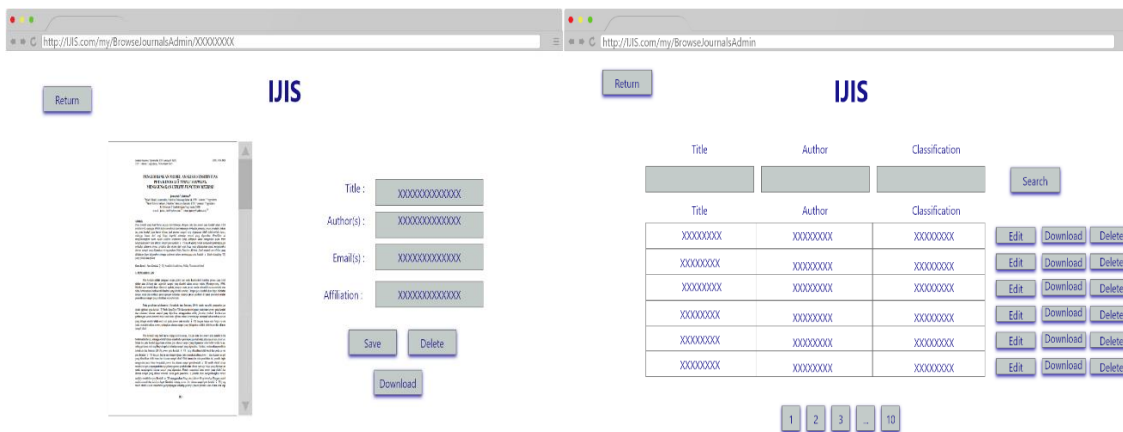

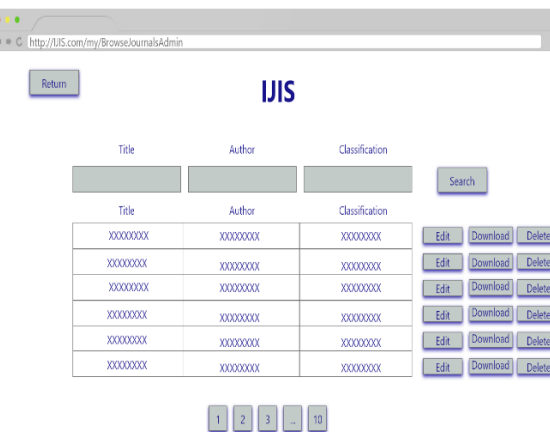Figure 11 Dashboard Admin

Figure 12 View Journals (Admin)
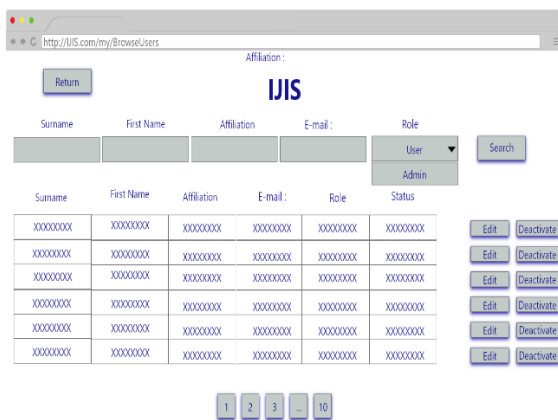

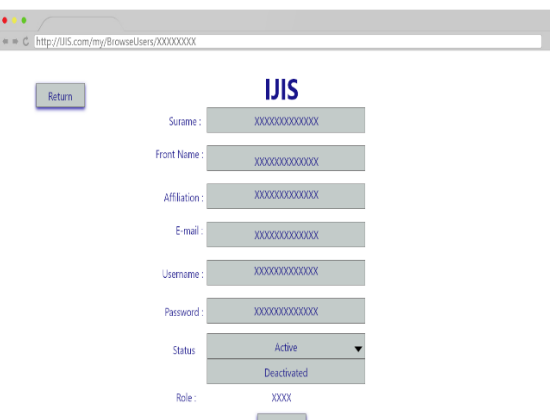Figure 13 View and Edit Journal
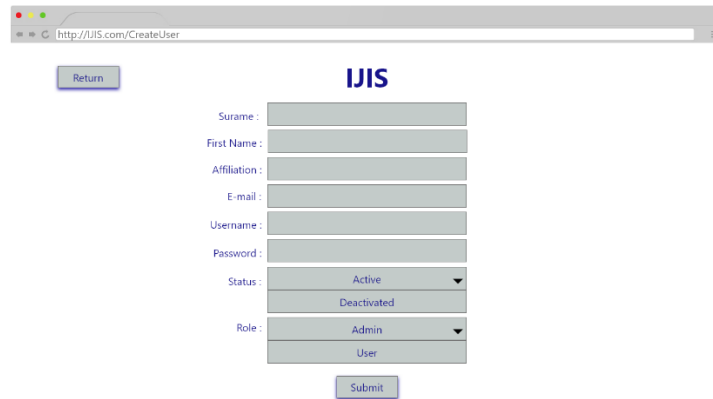

Figure 14 Browse Users

Figure 15 Edit User

Figure 16 Add User

3.5 Evaluation Design

The purpose of evaluation design is to test every element of the system to determine if it has met all the desired result. The Informatics Journal System evaluation design will be conducted using the black box method. The black box method evaluates the fundamental aspects without examining the internal logical structure of the system. This method is used to know if the system is functioning correctly by creating test data according to the specifications of the systems and examining if the results were according to expectations [8]–[10]. Below are some of the results of the black box testing:

Table 1 Design of login page evaluation

Input	Expected Result	Actual Result	Conclusion
Entering the correct Username and Password then clicking on the login button	Directed to the user's dashboard	Directed to the user's dashboard	[√] Accepted [ ] Denied
Entering the incorrect Username and Password then clicking on the login button	Return an error pop up	Return an error pop up	[√] Accepted [ ] Denied
Entering only a correct Username then clicking on the login button	Return an error pop up	Return an error pop up	[√] Accepted [ ] Denied
Entering only a correct password then clicking on the login button	Return an error pop up	Return an error pop up	[√] Accepted [ ] Denied
Clicking on the Registration button	Directed to the Registration page	Directed to the Registration page	[√] Accepted [ ] Denied

Table 2 Design of registration page evaluation

Input	Expected Result	Actual Result	Conclusion
Properly entering appropriate information according to the forms then clicking on the register button	Directed to the login page with a "registration complete" pop up	Directed to the login page with a "registration complete" pop up	[√] Accepted [ ] Denied
Only clicking the register button without filling the forms	Return an error pop up	Return an error pop up	[√] Accepted [ ] Denied
Filling all the forms except for middle name then clicking the register button.	Directed to the login page with a "registration complete" pop up	Directed to the login page with a "registration complete" pop up	[√] Accepted [ ] Denied

Table 3 Design of upload journal evaluation

Input	Expected Result	Actual Result	Conclusion
Entering the relevant information according to the forms then clicking the upload button	Begin uploading the pdf file with a "Journal accepted" pop up.	Begin uploading the pdf file with a "Journal accepted" pop up.	[√] Accepted [ ] Denied
Entering the relevant information according to the forms but don't provide a pdf file then clicking the upload button	Return an error pop up	Return an error pop up	[√] Accepted [ ] Denied
Entering a non-pdf file for upload	Return an error pop up	Return an error pop up	[√] Accepted [ ] Denied
Entering a pdf file for upload but don't fill the forms	Return an error pop up	Return an error pop up	[√] Accepted [ ] Denied

Table 4 Design of browse (admin) evaluation

Input	Expected Result	Actual Result	Conclusion
Clicking the search button without entering any forms	Directed to the Browse Journals (Admin) page with no changes	Directed to the Browse Journals (Admin) page with no changes	[√] Accepted [ ] Denied
Entering "Chandra" in the author(s) form	Directed to the Browse Journals (Admin) page	Directed to the Browse Journals (Admin) page	[√] Accepted [ ] Denied

and clicking the search button	showing only journals with the author containing "Chandra"	showing only journals with the author containing "Chandra"	
Clicking the download button of the first row	Downloads the journal in a pdf file	Downloads the journal in a pdf file	[√] Accepted [ ] Denied
Clicking the delete button of the first row	Deletes the journal page of the first row	Deletes the journal page of the first row	[√] Accepted [ ] Denied
Clicking the edit button of the first row	Directs to the view and edit journal page of the journal	Directs to the view and edit journal page of the journal	[√] Accepted [ ] Denied
Clicking on the 3 button at the bottom of the page	Directs to the 3rd page of the browse (admin) page	Directs to the 3rd page of the browse (admin) page	[√] Accepted [ ] Denied

4.   Conclusion

Based on the explanation given above, it can be concluded that it is possible to design an informatics journal information system with an automatic journal classification feature. It is hoped that future research could implement and improve the design made in this paper to help universities and publishers to better organize and classify all informatics journals in their repository.

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