E-Archiving Management System: Analysis, Design, and Implementation (A Case Study at Computer Center, Thi-Qar University)

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Abstract:

   The main objective of this research is to analysis, design, and implementation a requirements model to e-Archiving Management System (eAMS) in an easy and appropriate manner. The computer center of Thi-Qar University was chosen as a case study. The fact-finding techniques such as the interview and the existing previous requirements models were used to identify the needs or requirements of the users from this system. The tentative design is implemented depend on the Unified modeling language (UML) that used to analyzed all system requirements that consists of list of certain textual information like requirements list and system diagrammatical such as use case diagrams, activity diagrams, and class diagrams. The sample system used to validate users needs and the system was completely developed with .NET Framework using C#.NET and Microsoft SQL server 2008. This study helps to understand the procedures in managing e-archive activities and provide a better solution to develop eAMS that can be implementing at any

organization.

Key words: Requirements, Requirement model, unified modeling language (UML), functional requirements, e-Archiving Management System (eAMS).

1. Introduction

The requirements model describes the system functionality such as functional or non-functional requirements (Compton *et al.* 2004). In analysis stage, the users requirements should written from viewpoint the user and it's Concentrate on "what" the system assumed to be; therefore, all requirements should be documented and recorded by used an effective technique or way to model and understand it, this technique named requirements model (Whitten *et al.* 2001); on the other side, Barker (2000) stated on the significance of modeling requirements because the system requirements grope everything and everyone linked to the system. For that, constructing a requirements model is very important technique to initialize the system requirements. Currently, archive documents letter, memo or reports are very important in every organization. It is because documents consist of their corporate assets, which is information that relates to their organization activities. Many organizations have taken a step toward these corporate assets by implementing electronic document management system (EDMS). The technology is used to centrally, store, archive or organize, locate and control their unstructured document (Bielawski & Boyle 1997). According to Raynes (2002), EDMS is a computerized system that facilitates the creation, capture, archives, storage, retrieval, manipulation and controlled circulation of documents in electronic format. In order to develop e-AMS, the analysts or developers need to understand all requirements. Therefore, requirement model is important to

make sure the system which is being develop will meet the user's need and within budget. The purpose of this research is to analysis, design and implementation a requirements model of eAMS to help any organization to document, record, and manage as well as monitor all e-archives activities in effective and easy way. All system requirements must fulfill to obtain on a complete system. The computer center of Thi-Qar University was chosen as a case study to implement this model.

2. Existing Related Work on e-Archiving Management System

2.1. Model Requirements for Electronic Records Management System (ERMS)

This document is a part of the original document was developed by the National Archives of Malaysia under the first phase of the e-SPARK project. It's discussed the creation and management of electronic records. This model explains the requirements list, which must provide in electronic records management system to all possible system functions and specific functional requirements with the user roles either as a relevant mandatory requirements or specify limitation to an authorized user. This model can be concluded that all the information that associated with electronic record management system are containing in the model. With this model, it can be as a reference for developer, designer and users themselves to understand the requirements before developing the system.

2.2. E-Document Management Systems (EDMS)

Electronic archiving management system is like document management system (EDMS). EDMS is an electronic system that manages documents to realize significant improvements in work processes (Kohn 2002). The term of documents refer to any digital or analog, formatted, and preserved "containers" of data or information that can be interpreted in readable,

audible, or visual manner. Bielawski and Boyle (1997) listed the benefit of EDMS, which can be obtained by the organizations that implement EDMS in their company.

· Reduced the cost of create and distribute documents.

· Improve the way of access to the documents.

· Faster implementation to the operations of creation and update documents.

· Raise the operation of reuse and leverage from existing information.

· Improve collaboration among the employees.

· More complete regulatory compliance.

· Strengthen the control and security on the document.

· Best user / client satisfaction.

3. Research Methodology

The Object-Oriented method was selected to accomplish this study; it covered the area of evaluation for performance analysis and designs the requirements model using selected ways to gather information. The system analysis method shown in figure (1) by Whitten *et al.* (2001), used to construct a requirements model for eAMS.
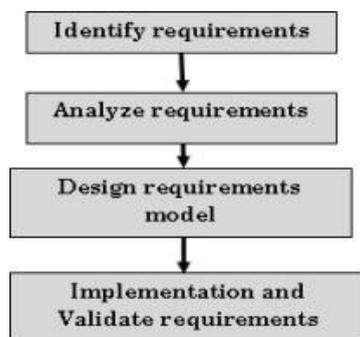
Figure 1: The system analysis method of a requirement model

4. Finding and Results

The finding and results of this study gathered from defined the requirement phase which based on fact finding techniques, review of the existing software application, and interview were used to gather the user requirements for eAMS, and analyze the requirement phase which using UML notation to construct the requirement model by using requirement list, use case diagram, class diagram, and activity diagram.

4.1. Define requirement phase

The *review of the existing software application* depends on the analysis result that illustrates in table (1) for some software application such as Document Management System (EDMS) and Model Requirements for Electronic Records Management System (ERMS), found some functions and characteristics to these systems to manage the users functionalities by the current system and that can be followed it to produce the best requirements model for eAMS. <u>Interview</u> that conducts to understand and explain what the users opinion of used the eAMS instead of used the manual system to archive documents.

REQUIREMENTS MODELS		
	EDMS	**REQUIREMENTS FOR ERMS**
Search	• Provide searching and retrieving function with specific requirements which must and should have in ERMS. • Does not stated what type of indexing and retrieval will be available and to whom.	• Not stated but provide Meta data elements for ERMS. The Meta data elements present in a table. • Give surface explanation about searching function by providing requirement sample accessibility guideline for searching function and indexing using keystrokes.
View	• List specific requirements which must and should have to display the records. • Also provide function for	• Not stated about this

Creation	printing the record either full record or summary list of selected records • Not stated about document creation. • Stated about capturing records function with its requirements	• Not stated about this requirement.
security	• Provide control and security function in order to control user access to the record • Explain about access, audit trails, backup and recovery, tracing record movements, authenticity and security categories.	• Provide access control model • Mention in detail the functional requirement either as a relevant mandatory requirement or to specify limitation to an authorized user.

Table 1: Analysis Result of EDMS and ERMS Models

4.2. Analyze Requirement Phase
4.2.1. Functional Requirement
The table (2) shows the list of functional requirements for eAMS.

No	Use Case Name	Requirement ID	Requirement Description
1.	Login	eAMS _01_001	To authenticate user in order to prevent unauthorized user access to information and function
		eAMS _01_002	To inform invalid password and user ID
2.	Archive documents	eAMS _02_001	To archive or store document
		eAMS _02_002	To check and inform incomplete document form
		eAMS _02_003	To check and inform document already exist
3.	Search documents	eAMS _03_001	To search document
		eAMS _03_002	To retrieve document
		eAMS _03_003	To print document
		eAMS _03_004	To inform document not found
4.	View summary list of documents	eAMS _04-001	To view summary list of selected document
		eAMS _04_002	To print summary list of selected document
5.	Generate report	eAMS _05_001	To view report
		eAMS _05_002	To print report

Table 2: list of functional requirements

4.2.2 Constructed Requirement Model For eAMS

All requirements should be documented and recorded by using an effective way or technique to model out the requirement and to understand all system requirements. This technique calls requirement model. According to Compton et al. (2004), a requirement model describes the functionality of a software system. Many tools have been used in analysis and design of programs and this UML has emerged as a standard technique in object oriented approach (Eichelberger 2003). In this study, the unified modeling language (UML) is used as a tool to define as well as to construct the requirement model for eAMS. The following diagrams and supporting textual information constitute the requirement model were stated as below:

I. Use Case Diagram: this diagram provides an easy and clear way to introduce the requirement structure in software system (Wuwei et al.,2004).The use case diagram for eAMS as shown in figure (2) consist of five use cases and the requirement model for eAMS have three actors that deal with this use cases :

   a. **Admin staff :** the admin staff refers to dean, head of department and selected clerk. They can search documents, generate report, and view summary list of documents after they have log into the system.
   b. **Academician:** the academician can store , search, and view summary list of documents. But they must login first in order to use these functions.
   c. **External Auditor:** the external auditor is an external agent, which is not related to the organization. The external auditor only can use view summary list function.
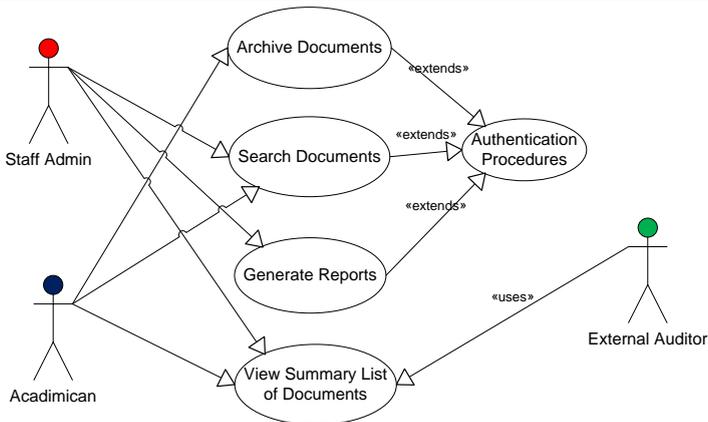
Figure 2: Use Case Diagram for eAMS

II. Activity diagram: this diagram is logical model represent the business domains and operational activities without suggestion how they are conducted. Activity diagram contains five diagrams that constructed for all use cases. In other word, each use case have activity diagram. Figures (3, 4, 5 and 6) show the activity diagrams for some use cases of eAMS.

III. Class Diagram: this diagram represents the ideas, things or concept that are included in the application. The class diagram contains seven (7) diagrams that consists of boundary, controller and entities, and shows the relations between them. Figure (7) shows the class diagram for eAMS.
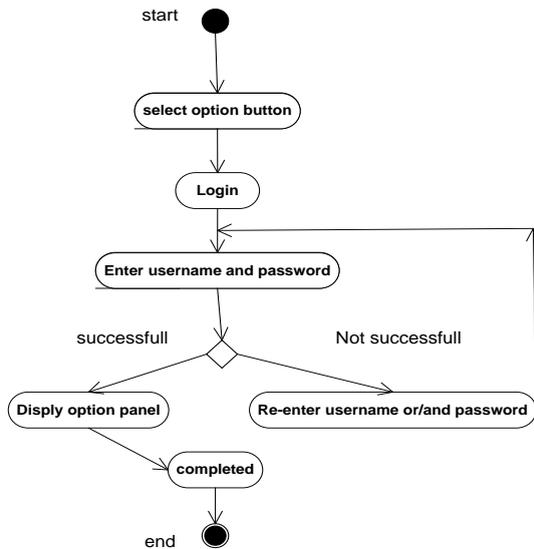
Figure 3: Activity Diagram for use case authentication procedure
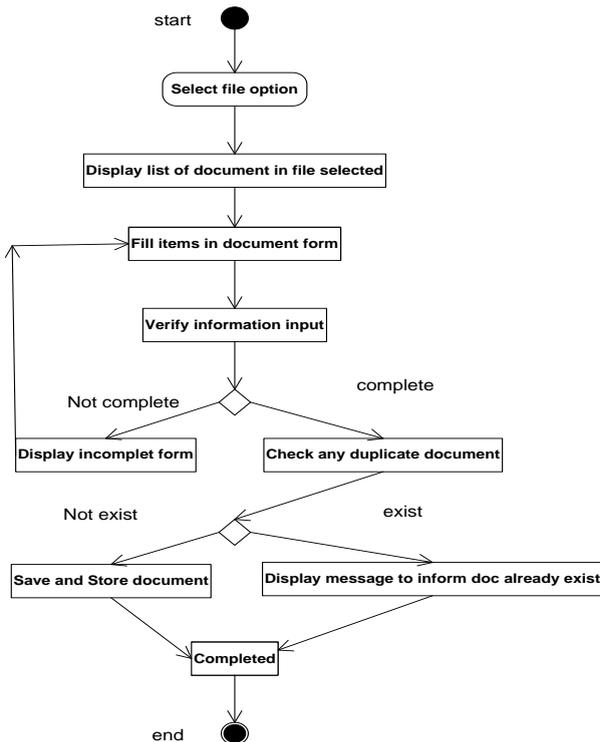
Figure 4: Activity Diagram for use case archiving documents

start

Select search button at main page

Display list of all type of document

Display search form

Fill search form

Document not found

Document found

Disply document not exist

Display search result list

Print

Retrive full document

completed

end
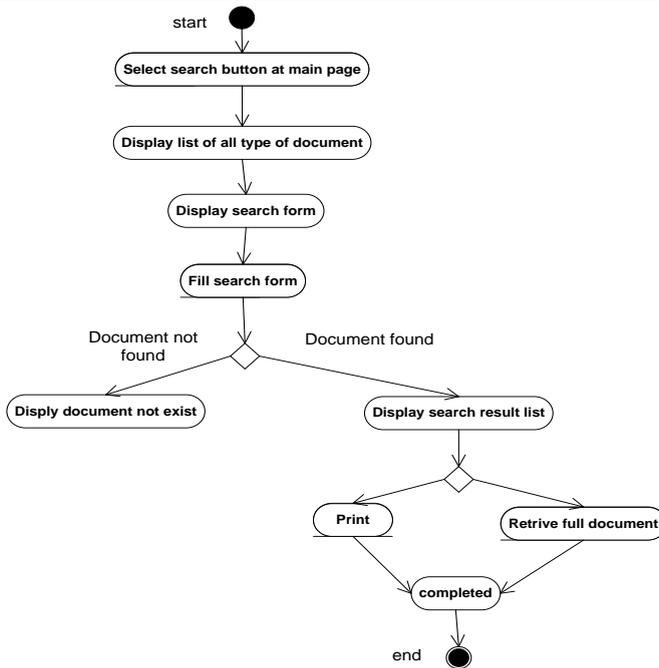
Figure 5: Activity Diagram for use case search documents

start

Select view summary button at main page

Display document list by file

Select specific document that want to view

View summary

Print summary

View summary list of document selected

Print summary list of document selected

completed

end
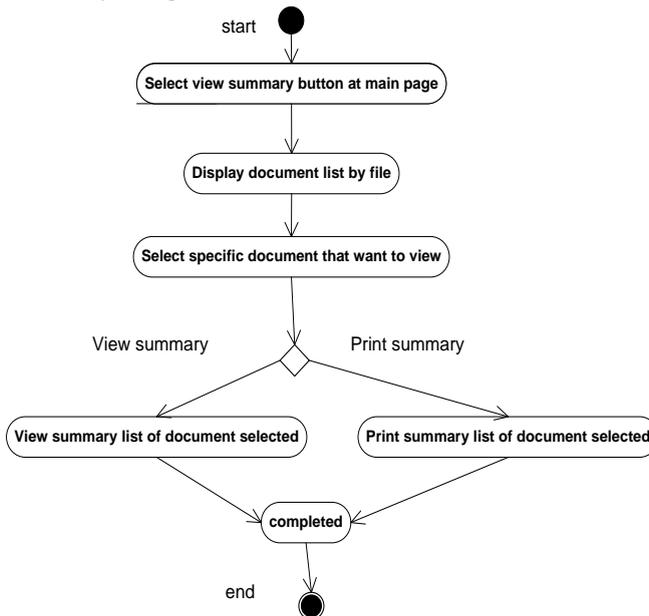
Figure 6: Activity Diagram for use case view summary list of documents
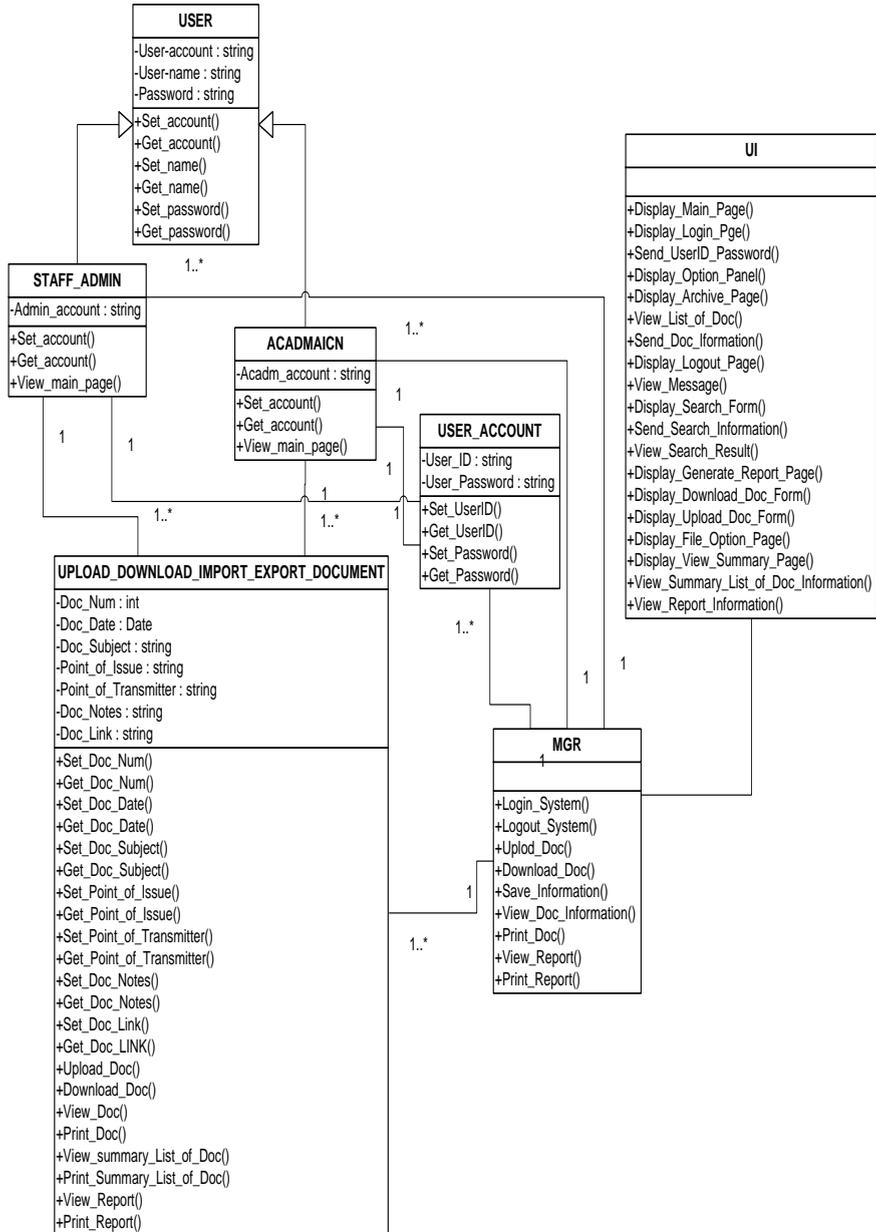
Figure 7: Class Diagram for eAMS

4.3 Validation Requirement Model

This section describes a special method that is used to verify the functional requirements for this model. The Sample system (prototype) was developed as a guide to validate these requirements and to show the user interfaces which is very important to capture all requirements that meet and validate the needs of system users.

Screenshot for Samples of System Interfaces

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5. Conclusion and Recommendation

This study was successfully achieve the objectives by constructing a requirement model for eAMS which is completely developed according to the Computer Center of Thi-Qar university requirements. The focus of this study were to understand and develope the suitable as well as applicatable requirement model specifically on archiving documents subject as a preparation to develope a complete system for this eAMS in the future. furthermore, this model will provide the greatest service to educational organizations or other organizations and individuals with minimal amount of effrot. As a result, the model produced in this project is suitable for organization interested in managing their needs in a proper way.

6. Significance and Contribution

In general, this study provides specific important information to develope a requirement model related to e-archiving management area in future. Further more, this developed requirement model as well as system sample (prototype) can be extended to complete system development to support and overcome all e-archiving management problems. Within requirements, the process of developing a system can make sure that all the activities to move smoothly. In addition; it helps the organization to increase the quality of system development. Moreover, efficient interaction and communication when using this system between the staffs and their organizations will be raised to the best level after implementing a complete eAMS.

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