Effect of Library Assistance System in Efficient Service Delivery: A Way Forward

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-- **Abstract** --
Providing services efficiently to library users informed the idea of this research. Managing library resources manually requires immense resources both capital and human; due to dissatisfaction which students and staff experienced during delivering library services, a library assistance software was proposed, designed and developed for the library of Akanu Ibiam Federal Polytechnic, Unwana to aid staff and students in giving and receiving library services efficiently. In this paper, a library assistance software known as LIBASSYST was designed and developed with the aim of enabling library staff to discharge their duties efficiently. Object-oriented analysis and design methodology (OOADM) and model-view-controller (MVC) were adopted as design methodology and patterns respectively. Unified Modeling Language (UML) was used in creating the software artifacts such as use case, entity relationship diagram and class diagram. Relational database was used in implementing the database of the system. summarily, a functional, secured, scalable, maintainable and robust library assistance system was developed and it was recommended for implementation in the Institution.
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1. Introduction

Library administrations and its logical investigation of admittance to data and successful help conveyance are presently going through intense change with the use of Information Communication Technologies (ICTs). For certain times currently, administration conveyance has gone through huge transformation from simply conventional medullar manual support of a more powerful innovative driven framework. However, these changes in the framework have been incredible universally, in Nigeria it's simply come to remain in the new thousand years. Like cyclonic waves, this innovation driven climate has fostered the library and is taking it's to uncommon statures in data procurement, dispersal, the board and generally speaking assistance conveyance. This paper targets at the effect of library assistance software in delivering library services amongst library staff and patrons. According to (Edidiong & Enyene, 2014), using software in the library hinges on technology which is used in handling, capturing, processing, sorting, storing and disseminating information. Moreso, it can also be said as a range of technologies for gathering, storing, retrieving, processing, analyzing, transmitting information. The significance of using software to deliver service in the library can be viewed in advances that ICT has

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revealed terms of knowledge based economy and global based interconnectivity. The reason for this is because; information has become the driving force behind National development. Academic libraries are expected to adopt ICT resources which should be well organized in a manner that will enable patrons to conveniently use library resource. (Alabi & Sani, 2021)

The challenges faced by library staff in delivering services are quite enormous as activities have changed due to the advent of technology. (Ekere, Ewulum, Eze, Okpala, & Ebodo, 2019) opined that; modern technologies are part of the tools that can help to provide efficient and effective service delivery in libraries. For librarians to perform their jobs effectively, they have to fully utilize modern technologies. Their study was targeted at examining the utilization of modern technologies for effective service delivery in selected special libraries in South-East, Nigeria.

2. Design methodology and patterns

System is any logical piece of entity with a set of clearly defined responsibilities or objectives with hardware, software or both. It can have a specification which can realized by a group of components. The determination of a system is highly dependent on requirement analysis which exposes a system's specified responsibilities. Component on the other hand is any piece of software or hardware that has a clearly defined duty to perform (Martyns, 2021).

The design methodology that was used in the design and development of the system was object-oriented analysis and design (OOADM). (Dennis, Doug, & Penelope, 2014) opined that object-oriented design can be handled sequentially until all phases of the designs are implemented and according to (Bernd & Allen, 2010), in software engineering, there are distinct five (5) principles which must be followed to arrive at a sustainable software solution and they include: practical experience, problem solving, limited resources, interdisciplinarity, and communication.

This research was hinged on problem solving in order to manage the limited resources within the library of Akanu Ibiam Federal Polytechnic, Unwana.

3. Tools used in the design and development

Various tools were used in the design and development of the system and some of the tools were specifically for design while some were for development. Table 1 shows the tools that were used and their categories. (Kasa, 2011)

Table 1: List of design and development tools

Design tools	Development tools
1. StarUML: this was used for designing all the artifacts with unified modeling language (UML) principles and procedures. 2. Figma: this was used in mocking up the system before the actual implementation. 3. Bootstrap Studio: this was used in designing the frontend of the system.	1. Laravel 8: this was the framework that was used in developing the designs ranging from models, factory, observers, notifications and migrations. 2. Visual studio code: this was used in developing and testing the program codes. 3. Browser (Mozilla Firefox, Microsoft Edge, Google Chrome): these were used in testing the developed system. 4. XAMPP: this was used as a local server for test running the system.

4. Design artifacts

According to (Stephen, 2007), unified modeling language (UML) is one of common ways of describing software ideas in pictorial form. The system design phase was handled with the adoption of unified modeling language (UML) to fully express the idea in drawing.
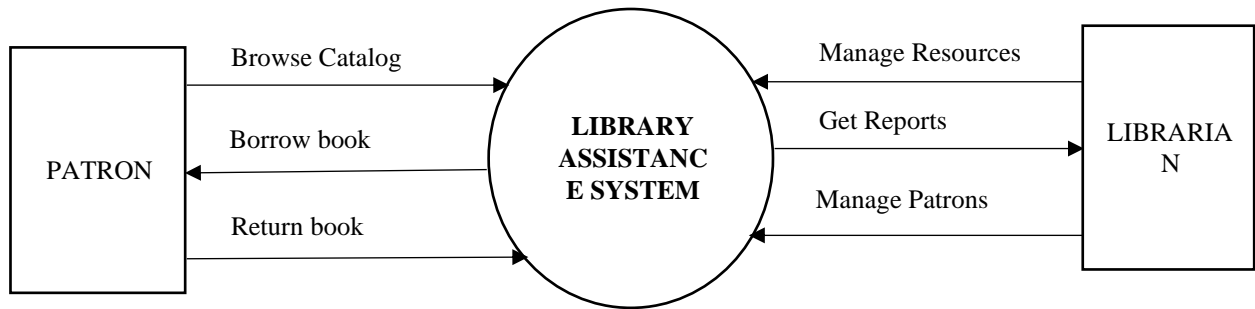

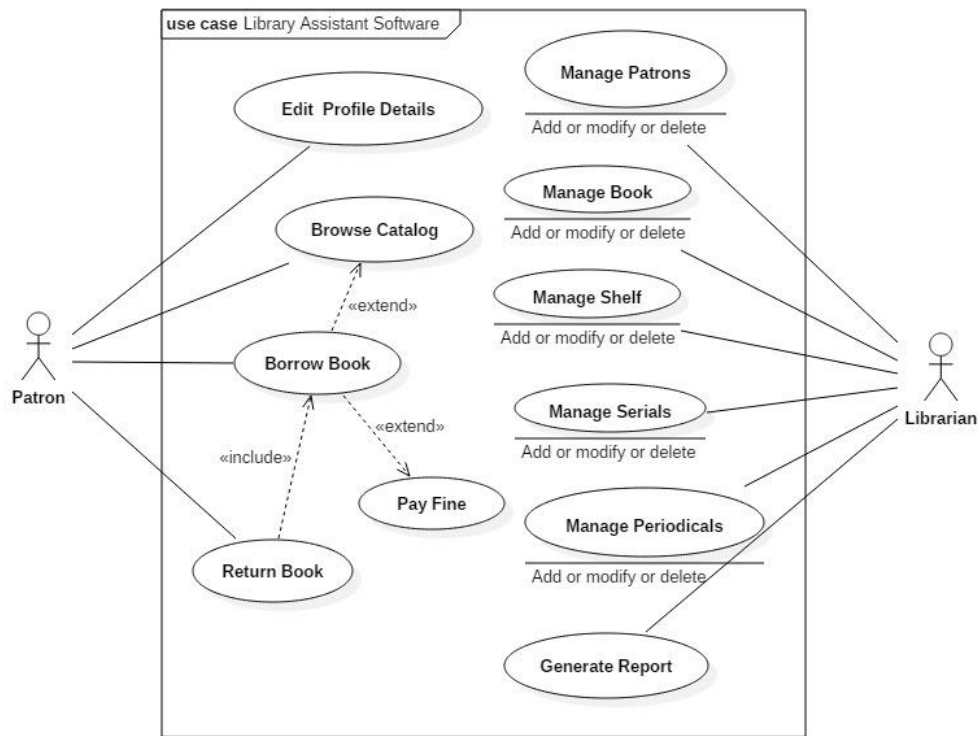Figure 1: Data Flow Diagram (Level 0) of Library Assistance System

Figure 2: Use case diagram of Library Assistance System

Use case reveals the functionality of the system or what the functions which the user can perform whenever the system is in use. Figure 2 shows the use case diagram while table 2 explains the figure 2.

Table 2: Use case description of LIBASSYST

| s/no.	Actor	Use case	Dependency	Description
1.	Patron	Edit Profile Details	User Login	This system functionality enables the patron (Library user) to ensure that their details are up to date. This is highly dependent on the login because it is only authenticated patron that can perform this function.
		Browse catalogue		This function may be performed by all patrons whether authenticated or not. This helps in certifying that the library material in need is available.
		Borrow book	Nill	The patron can use this functionality to borrow book or any other available library material.
		Return book	Borrow book	The patron uses this functionality to return book(s) that has been borrowed.
		Pay fine	Nill	The patron uses this functionality to manage fines in situations where borrowed books are overdue before returning them.
2	Librarian	Manage patrons	Nill	This actor uses this functionality to manage patrons' account. It may be used to add a new patron to the system.
		Manage Books	Nill	This functionality enables the Librarian to create, edit, delete book on the system.
		Manage Shelf	Nill	This functionality enables the Librarian to create, edit, delete shelf on the system.
		Manage Periodicals	Nill	This functionality enables the Librarian to create, edit, delete periodicals on the system.
		Generate report	nill	This functionality enables the Librarian to get report of all the library materials from the system.
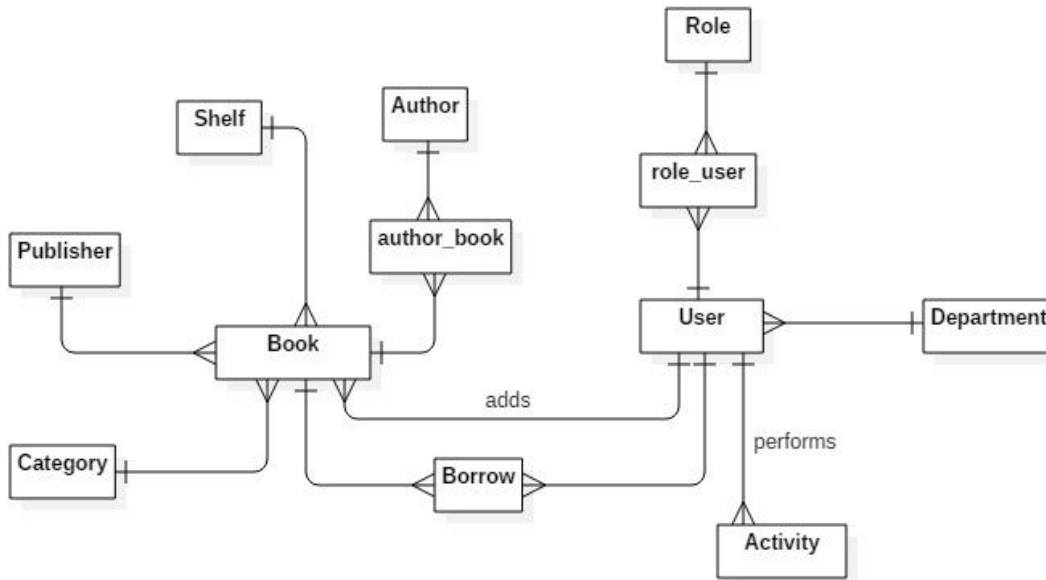
Figure 3: Conceptual Entity relationship diagram of Library Assistance System

Conceptual entity relationship diagram (ERD) shows the major entities and the relationship that exists between them without exposing the attributes of each entity. This helps in developing a sustainable database structure of a system. In database design, various relations (tables) should be developed in a relational database for easy manipulation of information. Meta database on the other hand should have all the details about the structure of all the databases while exploiting the functionalities of database management system (DBMS).
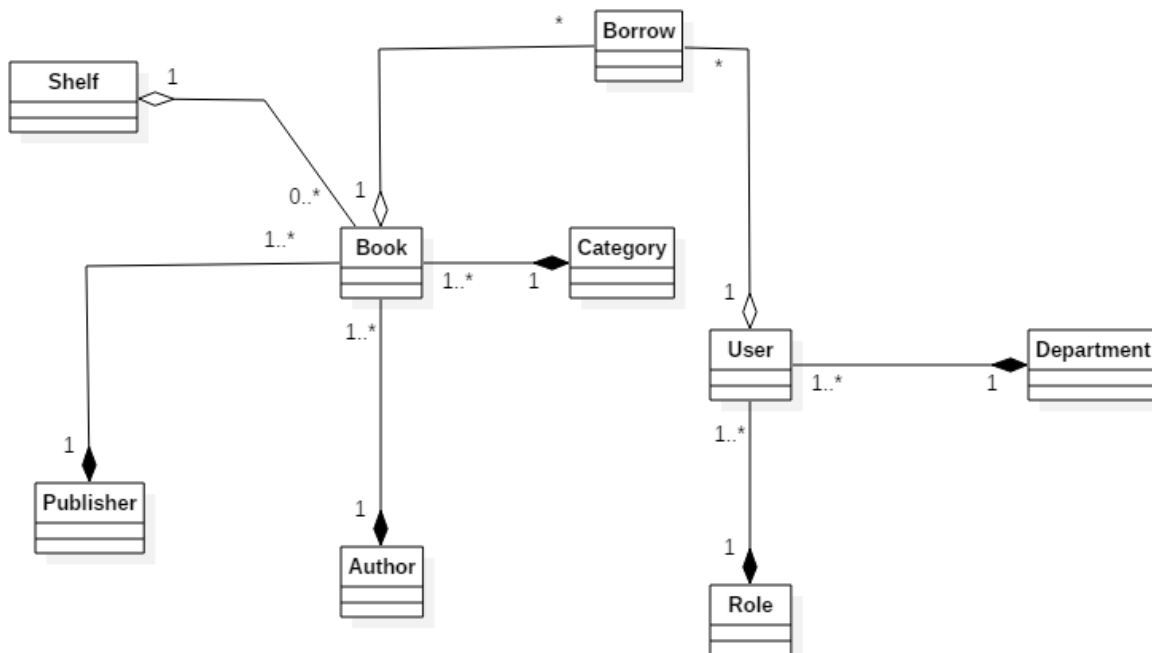

Figure 4: Conceptual Class diagram of Library Assistance System

Class diagram exposes the blueprint of the objects that will be used in a system. it gives clear picture of objects that may be present within a system and their interactivity.

5. Choice of Programming language and its justification

The programming language used in implementing the design was Laravel version 8. Laravel is a PHP framework which follows a design patter known as model-view-controller (MVC). This was used because of its ease of use, ability to manage enterprise software application, and its scalability and flexibility.

6. System testing

The developed system was tested against the initial systems requirements and objectives. The testing approach adopted was unit testing where each module of the module in system was tested before integration was carried out. Actual data and expected data were used in the testing to ascertain the adequacy of the system. One million fake records were seeded into the database to test information retrieval speed of the system and it was observed that the database was properly designed based on the ERD which was implemented.

7. Conclusion and recommendation

The rate at which information storage, retrieval and circulation was increased as a result of the developed software showed that library services can delivered efficiently with the aid of bespoke software. Charging and discharging of library materials to patrons were done efficiently and reports were generated seamlessly. The system has the capacity to enable searching of library material, cataloguing of books, revealing the location of book on the shelf, penalizing defaulters when borrowed books are overdue, and overall inventory of the library resources. Therefore, the developed system in this research can effectively enhance quality of service delivery in the library.

This system is therefore recommended for use in the library of Akanu Ibiam Federal Polytechnic, Unwana, Afikpo. Ebonyi State.

8. Acknowledgement

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