# LIBRARY MANAGEMENT SYSTEMUSING PYTHON

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*Abstract*— A library is a place where a huge collection of books and resources are available which can be accessible by the users. In traditional libraries, the students have to search for books which is a hassle process and there is no proper maintenance of the database about issues and fines. The overall progress of work is slow and it is impossible to generate a fast report. The librarians have to work allotted for arranging, and sorting books in the book sales. At the same time, they have to check and monitor the lent and borrowed book details with fine.To tackle this problem, we have designed a Library Management System using Python. Library management means efficient and effective management of material (information sources), machinery, men (human resources), technology and money to meet the objectives of the library. Our system can help librarians to work easily. This computerization of the library helps in many instances of its maintenance. It reduces the workload of management as most of the manual work done is reduced.The admin can log in using their credentials. The admin can add, update, view and delete any book and can also update the inventory. They can also view orders by filtering the date, whether the books are returned or not, and expired orders.The user would need to register first to log in. They can manage their profile and change their password. They can search for any book by entering the book or author's name. If they find the book they want, they can issue it here. They can view the list of orders. They can also return books. If any particular book is not returned within the given period, the fine will be shown.

***Keywords – Library Management system; database; digital system;***

## I. INTRODUCTION

To evoke the library into the technological era, we presented a system called the Library Management system (LMS). It is an automatic system that reduces the work burden of the staff/librarians through a single click. It will manage, organize and oriented the library task.The LMS supports the librarian to add/view/delete/update details from the library stock. Here we integrate all the library data into the database server. Preliminarily the librarian has to add student and book details into the database. After that he/she can view/delete/update those details through the Library Management system. On account of this, the user can access the library at any time. The librarians can assist the data without any confusion. Each data are retrieved from the database. if he/she access any user details then it shows username, id, book details, and penalty details. They no need to write it on paper for any references. By editing the data they can change the parameter in it. A library is a place where a huge collection of books and resources are available which can be accessible by the users. In traditional libraries, the students have to search for books which is a hassle process and there is no proper maintenance of the database about issues and fines. The overall progress of work is slow and it is impossible to generate a fast report. The librarians have to work allotted for arranging, and sorting books in the book issues. At the same time, they have to check and monitor the lent and borrowed book details with fine. The admin can log in using their credentials. The admin can add, update, view and delete any book and can also update the inventory. They can also view transactions by filtering the date, whether the books are returned or not, and expired orders. The user would need to register first to log in. They can manage their profile and change their password. They can search for any book by entering the book or author's name. If they find the book they want, they can issue it here. They can view the list of orders. They can also return books and generate bills on fine for late returns. If any particular book is not returned within the given period, the fine will be shown with a bill.

## II. LITERATURE SURVEY

Author: HonghaiKan, Zhimin Yang (2010)

He proposed a paper where he represents the wasting of investment in CD which is attached along with the books.

Author: Erxiang Chen,Minghui Liu (2009)

He Launched a paper where he highlighted the disadvantage of the traditional librarymanagement systems.

Author: Weihong Yang (2015)

He Proposed a paper on flexible usage of classes. He suggested the reuse of classes for some similar conditions.

Author: Singh.V (2014)

He Proposed a paper where comparison takes place between expectations and experience of the open source library.

## III. METHODOLOGY

*A.* Database Design Database design controls the duplication of data and it is the method of producing a comprehensive data model of a database. The data model consists of all the required conceptual, logical, and physical storage parameters required to create a design in a Data Definition Language (DDL). DDL is used to create a database. A completely attributed data model holds full attributes for each entity. The method of database design usually contains several stages that are supported out by database designers. Generally, the designer needs to follow those procedures: • Conceptual Design The objective of the conceptual design stage is to construct a conceptual model based upon the previously recognized requirements, but nearer to the final physical model. A commonly used conceptual model is known as an Entity Relationship (ER) model. Entity-Relationship Diagram (ERD) is a popular high-level conceptual data model. It is a complete, logical illustration of data or an organization for a business area. The E-R model is very crucial for mapping denotations and interactions of real-world enterprises onto a conceptual schema. The ERD shown below gives the entities in LMS, the relationship between the entities and attributes of both entities and their relationships. The ERD describes all data that are input, stored, transformed, and produced by the system. It also emphasizes solely on data objects, their attributes, and the relationships that connect different data objects.

- Logical Design The development of logical design includes organizing data into a sequence of logical relationships known as entities and attributes. An entity denotes a piece of information. In relational database, an entity regularly maps to a table. An attribute is module of an entity and supports defining the exceptionality of the entity. In relational database, attribute maps to a column, however entity maps to raw.

- Physical Design During this phase of design, the plan on how to build the tables, including appropriate data, types, field sizes, attribute domains, and indexes are described. The plan must express adequate details of the relevant fields that anyone can understand and use this plan to build a database. For this project, indexes and attribute domains are excluded from the physical design. The conceptual design and logical design were independent of physical considerations. We are focusing on relational model and on creating database management system (DBMS) using MySQL, although our main focus is on those physical considerations.

*B.* Architecture Design The phase of the design of computer architecture and software architecture is denoted as a high-level design. The model in selecting the architecture should understand all typical lists of modules, brief functionalities of each module, their interface relations, dependencies, database table, architecture diagram, and technology details, etc. The assimilation testing design is carried out in a particular phase. After the necessities of the system are determined, the essential specifications for the hardware, software, data resources, and the information products that will satisfy the functional requirement of the proposed system can be determined. As shown in fig.2, this design will help as to outline for the entire system to identify and manage the connections of different sections.

*C.* Interface Design User Interface (UI) Design emphasizes expecting what users want to do and confirming that the interface has features that are easy to access, understand, and uses to smooth those actions. This interface collects the concept from visual design, interaction design, and information architecture. D. Module design Module design level is mentioned as low-level design. The intended system is fragmented into smaller units or segments and each of them is explained, this indicates that the programmer can start coding.

## IV. PROPOSED SYSTEM

The proposed Library Management System using Python aims to address these issues by offering an automated solution. It includes features for book categorization, member management, borrowing, returning, bills on late returns and generating reports.Utilizing Python's libraries and frameworks,the system provides an intuitive interface for librarians to manage the library inventory and for users to easily search, borrow, and return books.This system will support the librarians to work very fast and efficient. All the details will be updated on the LMS.So they can verify every book details in it. The clumsiness of the existing system is removed for the librarians. LMS provided user-friendly environment for them. Thus the system enhances the library management with block chain technology.

### *A. Data Collection*

This is the initial step where the system gathers data. This data can come from various sources such as sensors, databases, or APIs.

### *B. Imbalanced Data*

After the data is collected, the system assesses the data for balance. In machine learning, imbalanced data sets can cause issues during training, where the model might favor the majority class in the data. Techniques are available to address imbalanced data.

### *C. Data Preprocessing*

This stage is crucial for preparing the data for the machine learning model. It involves cleaning the data by handling missing values and outliers, and formatting the data into a suitable form for the model.

### *D. Feature Selection*

Here, the system selects the most relevant features from the data. Feature selection can improve the performance of the model and reduce training time.

### *E. ML Feature Selection*

After feature selection, this stage refers to selecting the most appropriate machine learning techniques for the problem.

### *F. Model Evaluation and Recommendation*

Once a model is created, it is evaluated to assess its performance. Here the system would recommend the best model based on the evaluation results. Overall, the architecture you sent me depicts a typical machine learning workflow that involves data collection, data preprocessing, feature selection, model creation,and model evaluation.


Fig. 1.1: Architectural Diagram

## V. MODULES

### *A. Student Module*

The student module contains details about all the students registered with the library. Only the librarian can register the students with the application after successful verification. The operations that student can perform inside the student module includes: view all books available in the library, search the availability of a particular book, number of books he has issued from the library, overall fine that he has to pay, submit the queries. Apart from this, the students can cancel their registration from the library.

### *B. Algorithms*

Advanced Encryption Standard (AES): is an algorithm that uses the same key to encrypt and decrypt protected data. Instead of a single round of encryption, data is put through several rounds of substitution, transposition, and mixing to make it harder to compromise.

Transactional data is encryption by AES algorithm for data confidentiality.

### *C. Message Digest V5 (MD5)*

**S**ignature/hash is created by taking a string of an any length and encoding it into a 128-bit fingerprint. Encoding the same string using the MD5 algorithm will always result in the same 128-bit hash output. MD5 hashes are commonly used for block chain signatures

## VI. EVALUATION METHOD

The system testing process aimed to determine all defects in our project. This program was subjected to a set of test inputs and various observations were made and based on these observations it will be decided whether the program behaves as expected or not. Levels of testing: -

### *A. Unit Testing*

In the V-Model, Unit Test Plans (UTPs) is developed in the module design phase. This UTPs are implemented to remove bugs at code level or unit level. A Unit is the smallest entity that can exist independently, e.g. program module. Unit testing confirms that the smallest entity can function appropriately even though it's separated from the rest of the codes.

### *B. Integration Testing*

Integration Test Plans are implemented in the Architectural Design Period. These tests prove that unit formed and verified independently that can coexist and communicate among themselves. Test results are shared with the customer's group.

### *C. System Testing*

System Tests Plans (STP) are developed in System Design Stage. Disparate Unit and Integration Test Plans, STP is composed of the client's business group. System Test certifies that expectations from an application designer are met. The entire application is verified for its functionality, interdependency, and communication. System Testing proves that functional and non-functional necessities have been met. Load and performance testing, stress testing, regression testing, etc. are subset of system testing.

### *D. User Acceptance Testing*

User Acceptance Test (UAT) strategies are developed in the analysis phase. Test Strategies are composed of business users. UAT accomplished in a user environment that resembles the production of the environment, using accurate data. UAT proves that the delivered system meets the user's necessity and the system is ready for use in real-time.

## VII. CONCLUSION

In conclusion, the hindrance and issues of the traditional library are identified and promote it to easy access for the libraries. In the Library Management system, the librarian can add/update/remove the student and book details into the database. The students have a Unique ID for accessing any book from the library. Through the ID, the librarian can check the user details, fine payment, and book details. The LMS reduces labor work and makes the system efficient. In future work, we planned to enhance the LMS by integrating the LMS with Local area Network (LAN) which increases the efficiency of the system.

## REFERENCES

[1] Bao Sun, JiangweiFeng and Ling Liu, "A Studyon How to Construct the Prediction Model of Library Lending of University Library", International Conference on InformationScience and Technology March 26-28, 2011 Nanjing, Jiangsu, China.

[2] Erxiang Chen,Minghui Liu,"Research and Design on Library Management System Based on Struts and Hibernate Framework", WASE International Conference on InformationEngineering2009.

[3] JianhuZheng, YunqingFeng, Yun Zhao, "A Unified Modeling Language-Based Design and Application for a Library Management Information System", in cybernetics andinformation technologies.

[4] Michael Hitchens, Andrew Firmage,"The Design of a Flexible Class Library Management System", in IEEE conference1998.

[5] WeihongYang,"Design and Implementation of Library Management System", International Conference on Management Science and Innovative Education (MSIE 2015).