Library Automation Using Artificial Intelligence

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Abstract: Artificial Intelligence is a broad, complex area of study, which can be difficult for no specialists to understand. Yet, its ultimate promise is to create computer systems that rival human intelligence, and this clearly has major implications for librarianship. If we want to make progress in the area of intelligent systems, we must have a well-developed understanding of AI technologies. Through the existing application of AI technologies, numerous prototype intelligent library systems has been created for cataloging, indexing, information retrieval, reference, and other purposes; however, relatively few of these systems have evolved into product or systems that are used in the day-to-day operations of libraries. This proposed system automates the task of librarian and the users, using AI concepts like Natural language processing (NLP), data mining and speech recognition system. This system helps user to search and locate (path to reach to book location) books from library. Motivation behind implementing AI is, Data mining simplifies data processing and provides optimal results. NLP and speech recognition simplify system interaction for librarian and users. The system helps simplifying book issuing process and record maintenance as complete solution to conventional library management system.

Index Terms - **Artificial Intelligence, Library, Indexing, Automation.**

I. INTRODUCTION

Artificial Intelligence (AI) encompasses the following general areas of research: (1) automatic programming, (2) computer vision, (3) expert systems, (4) intelligent computer-assisted instruction, (5) natural language processing, (6) planning and decision support, (7) robotics, and (8) speech recognition. Intelligent library systems utilize artificial intelligence technologies to provide knowledge-based services to library patrons and staff.

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In our proposed system, we are going to provide chat-bot. This chat-bot makes user interaction more easy and also the searching mechanism. Users can interact with chat-bot and the result is displayed on the same chat screen. Also user can visit the link provided by chat-bot if book unavailable in the library.

This proposed system automates the task of librarian and the users, using AI concepts like Natural language processing (NLP), data mining and speech recognition system. This system helps user to search and locate (path to reach to book location) books from library. NLP and speech recognition simplify system interaction for librarian and users. The system helps simplifying book issuing process and record maintenance as complete solution to conventional library management system.

II. MOTIVATION

Library Management System is an application which refers to library systems. It is used by librarian to manage the library using a computerized system where he/she can record various transactions like issue of books, return of books, addition of new books, addition of new students etc. Students and Books maintenance modules are also included in this system which would keep track of the students using the library and also a detailed description about the books a library contains.

With this computerized system there will be no loss of book records or member records which generally happens when a non-computerized system. In addition, report module is also included in Library Management System. If user's position is admin or librarian, the user is able to generate different kinds of reports like lists of students registered, list of books, issue and return reports. All these modules are able to help librarian to manage the library with more convenience and in a more efficient way as compared to library systems which are not computerized.

Along with easy work flow for both the admin and the librarian this system also consists of an android application for users which has AI (chat-bot). Students can request to issue book directly from this application remotely over internet.

III. PROBLEM STATEMENT

To develop a system which will automate the library system using artificial intelligence for more sophisticated and easy handling of library resources in an intelligent way, that affects both users and librarian. With the use of Artificial intelligence, a system will be able to reduce its functional complexity and overhead from each stakeholder. Artificial intelligence feature chat-bot provides a reliable and sophisticated way to interact with the system.

IV. LITERATURE SURVEY

"Study on Library Automation Management System of SaaS". At present, there are many problems in the library automation management systems used by medium and small sized libraries in China. For example, a lot of information is stored not safely; information cannot be stored for a long time; the ability to modify the library service at once is poor; it cannot provide the users with characteristic service. In order to satisfy the developmental needs of the library, the library automation management system of SaaS (Software-as-a-Service) fully uses the cloud computing ability and integration ability of information resources, absorbs and integrates information resources and computing resources by service renting, providing multiple users with personalized, accurate, rich service. It provides the most reliable and safe data storage center, easily achieving the sharing of data and application among different equipment, to maintain rapid system response [1].

"Automation In Library Management Using Labview". This paper demonstrates the application of robot for library management system. Usually we need librarian to pick the book and give up it to the one whom the books are being issued. This is difficult task

in case the library floor area is large. Humans takes more time and effort for issuing the book. To defeat this trouble authors are creating robotization in library to fast delivery of books using robotic arm. A robot is designed using sensor operated motors to keep track the library book shelf arrangements [2].

"Development of Library Management Robotic System". Robotic process mechanization is the utilization of programming with manmade brainpower and machine learning abilities to deal with high-volume; repeatable assignments that beforehand required a human to perform. Library management robotic system is combination of software used to manage the library database and hardware used to manage the book handling. This system helps to keep the records of whole transactions of books available in a library. A robot is modular design of sensor operated motors to manage the library. Robot acquires the book information from stored database. The robot gathers the bar-code data from the books and relates the decoded bar-code data with the search input. Global positioning system is used for book location finding. This aides and streamlines the occupation of custodian and lessens the manual routine work done by the library staff [3].

"Library in Everyone's Pocket with Reference to Bundelkhand University App". This paper discusses how the traditional libraries are slowly transforming in to virtual and digital libraries with the help of ICT and internet revolution. It explores various infrastructural requirements with diversified services, about how the e-learning alters to m-learning and their benefits to patrons. In the era of smart gadgets, the libraries and knowledge centers of today have to move with the pace of user's e-tech demands. In the light of this background this paper analyses how library can reach to everyone's pocket with reference to Bundelkhand University library app [4].

V. Proposed System

As shown in Fig.1 there will be three main functional entities as Admin, Librarian and students. Admin has overall control over system and will perform functions like add librarian and reviewing library reports. Librarian has functions to add students, maintaining records of books as well as student and librarian controls the book transaction process.

Student will interact with system using chat-bot for searching the required books, send request to issue book. The system will share the common database for all three entities. The database has dynamic nature, dynamism is maintained by reflecting the changes back in database on the go.
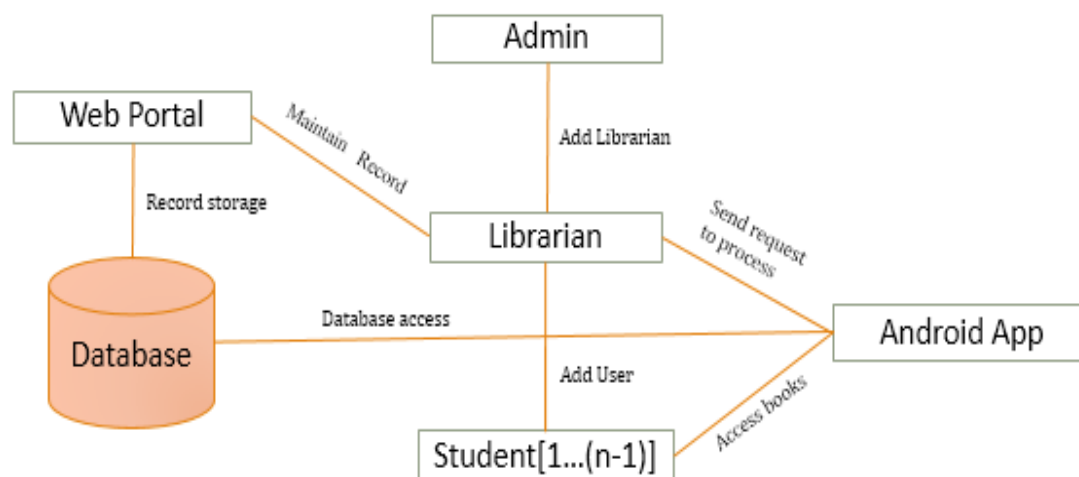

Fig.1: System Architecture

VI. Other Specifications

1. Advantages
1) Simple and Easy to use.
2) Highly-secured data management.
3) Enhances reporting and monitoring.
4) Allows mobile access.

2. Limitations
1) Inherent complexity of expert system development.
2) Limited natural language capabilities.
3) Inability of expert systems to recognize the limits of their knowledge, deal with problems at those limits, and reject problems that exceed those limits.

VII. Conclusion

This proposed system simplifies the overall process of Library management system using artificial intelligence which will benefit the students as well as Library staff. It makes entire process online where student can search books, request for book using chat-bot. Chat-bot reduces book transaction time and simplifies book issuing process. Librarian can generate reports and perform book transactions. This will overcome all the existing problems and will provide a more sophisticated user experience with the help of chat-bot. Library automation should provide quality experience for stake holders.

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