SMART LIBRARY SYSTEM

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ABSTRACT

This Paper describes the use Arduino and its various sensors for developing a Smart library System. In Ongoing libraries, we encounter bundle of issues like overcrowding, time wastage, or delay while locating /spotting books, power wastage, disarrangement of books, poor decorum, dislocation of chairs and tables from their initial Position, unavailability of staff members, delay while issuing and returning of books. This SMART LIBRARY SYSTEM is proficient/able to resolve these existing problems and provide comfortable & harmonious environment to the students.

INTRODUCTION

The smart library system is designed to cope with the problems encountered at existing libraries. In this we have used Arduino UNO R3 and different sensors for different applications.

Our smart library will save time of students during book return, it will prevent overcrowding, help officials to know the status and availability of books used from book shelf.

Natural ecosystem will provide a peaceful environment for studying. Automatic fire alert and extinguisher system will prevent accidents. This smart library is free of any hustle. This will provide a good and comforting environment for students. This smart library will also allow officials to monitor and control every event and will help to maintain the decorum of the library

METHODOLOGY

The smart library system is based on working principle of Arduino UNO R3, as it is the backbone of our smart library system, this smart library system has various features and for every different feature we have used different modules. Each module is programmed in such a way so that it can perform

the required task. Our library is divided into three sections as shown in figure below as section A, B & C. The features of this system are as follows

FIGURE1

Block A: -This area is designed for book issuing and returning, the component which we have used here are Arduino Uno board, Dc motor, LED's and conveyor belt, servo motors, LCD panel and numeric keypad.

Block B: -This area consists of Automatic power ON/OFF, Automatic Gate and person counter. This area is for managing crowd and saving energy. so, we have used IR sensors, Arduino UNO, servo motors, Relay & LED's.

Block C: -In this area we have Digital Book shelf, sitting area for students, automatic table lights, computer systems and eco-room. This area also has automatic fire alert system and automatic emergency exit. here we have used flame sensors, IR sensors, LCD, servo motor, LED'. This smart library is a step towards digitization, the features of this systems are: -

1). Automatic system for book return: - In this automatic system, student have to enter his/her college id by dialing on the keypad provided, and then he/she have to keep the book on the conveyer belt, the book will pass through the sensor which will scan the barcode of the book. According to the student college id the system will decide in which branch

student belong and accordingly book will fall into branch wise divided boxes.

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2). Smart bookshelf: - There is a lot of time wastage in finding books. This smart shelf will help to find them easily it will also help to maintain discipline. In this smart bookshelf ,in every shelf there is a sensor , simultaneously there is a LED display also which will show "P" (i.e. present) if book is at its specified place and "X"(i.e. Absent) if book is not its specified place, if student take out a book from the shelf then "X" will be displayed on the LED screen, if other student come to search same book then he won't waste time in searching as he will get notified by display that the book has been occupied by some other student.

3). Eco library: - A eco place has been created inside the library which will allow students to study in nature's lap. This would help in increasing concentration and will give relaxation to mind. This feature is for those students who are habitual or like to study in natural environment this will help in boosting concentration.
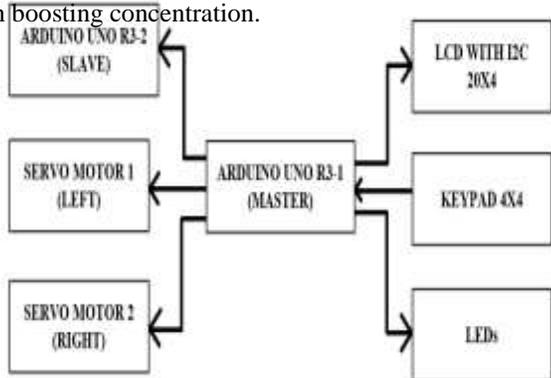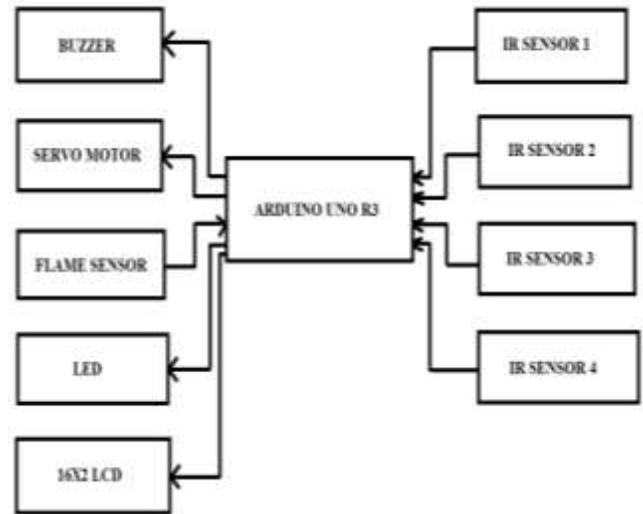

Fig 3: -Block Diagram for Person Counter & automatic lights

Fig 2: -Block Diagram for Automatic Book Return

Fig 4: -Block Diagram for Smart Book Shelf

4). Fire sensor and safety measure: - When there is a fire the alarm gets ON and the water is sprinkled on it automatically along with opening of emergency gate.

5). No Overcrowding: - There is a counter system which counts the number of students entering and exiting the library. If number of student present in library, attains to desired number of students. Then temporarily gate will be closed and won't allow other student to enter in the library until or unless crowd decreases.

6). Auto Power cut off – By this feature, the library power will go down when the library is vacant and thus power and money is saved.

7). Wi-Fi zone, computers and CCTV monitoring are present.

8), Auto focus light path- by this idea the particular sections of the pathway light up through which the people are entering the library and the rest path lights are off. This will save a lot of power and resource.

9). Automatic table light- By this feature the table light will automatically light up when a person is sitting and will turn off when vacant. (This will only happen at dim light)

10). Automatic Book issuing system: - In this system we have attached a robotic arm which rotates according to the servo motors, so the robotic arm keeps the book to be issued on the rotating belt and the required book is transferred to the student. the servo motor works according to the Arduino board.
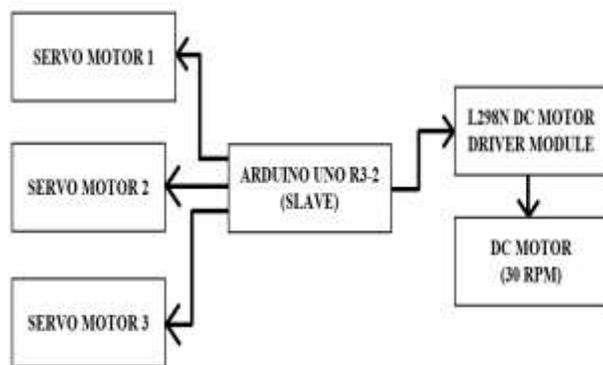

Fig 2: -Block Diagram for Automatic Book Issue

RESULT AND DISCUSSION

SMART LIBRARY gives an effective way to use/access the digital resource, contains simple to sophisticated features and aims to provide better platform for learning. The term "Smart Library" has recently been used more frequently, for labeling a vision of libraries of the future. Technical developments are often used to get rid of non-commodified spaces, the reaction of librarians towards the concept of a "Smart Library" can indeed be skeptical. Isn't the very idea of a library not already pretty smart. The term "smart" refers mainly to efficiency due to the use of technologies and to an Automatization of processes to facilitate the working and everyday environment. some useful and innovative concepts regarding the use of physical space (flexibility and amenity value), digital strategy (including the useful application of technologies, digital

media, and services), and cooperation (with users and other institutions) are presented.

This was an effort to develop a smart library system which may be useful in a library to insert, store, handle and retrieve information about books, magazines, etc.

FUTURE ENHANCEMENT

1) Some problems can be removed or eliminated by using AI.
2) Automatic entry and return of books by showing the student College ID will remove false book return problems and shall also send message to the students a day before the last date of submission of books.
3) The student can take the book directly from the bookshelf and the book will be uploaded in the student's account. (All by the use of sensors)
4) Theft protection for all books.
5) The student's college ID's will be an electronic card which can hold some amount (money) which will be directly deducted for fines.
6) Different book sections for different branches while returning the book. (sorting)
7) Fine on books will be generated automatically.

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