RFID BASED LIBRARY MANAGEMENT SYSTEM

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ABSTRACT:

Radio Frequency Identification (RFID) is the emerging technology which uses radio waves to transfer the information. Here RFID is used to automate the library functions such as student identification, book issue, book return, book renewal etc., which allows easy flow of library function without the help of any man power. In this paper, book entry, book return, book available dates and status are announced to the candidate using GSM technology which helps to remind the user about their current library status. This technology is preferred to overcome the drawbacks of barcode system which is currently in practice.

KEYBOARD:

GSM, RS-232-Standard for serial communication, Passive RFID Tag-A small tag which consist of information about the candidate and books, Active RFID reader-reads the information in the tag.

INTRODUCTION

RFID systems do what the bar codes cannot. In RFID data is transferred between the RFID reader and the RFID tags. The frequency ranges distinguish RFID systems. Low-frequency (30 KHz to 500 KHz) systems have short reading ranges and lower system costs. They are most commonly used in asset tracking, animal identification applications, security access, and High-frequency (850 MHz to 950 MHz and 2.4 GHz to 2.5 GHz) systems, offers long read ranges (greater than 90 feet) and high reading speeds, are used for such applications as railroad car tracking and automated toll collection. The main advantage of this type of RFID system is that it works in harsh environment, non-contact, does not require line-of-sight condition.

EXISTING SYSTEM

Till now the barcode system used in libraries. It is extremely time consuming and labor intensive. Relative advantages of RFID technology to current "barcode" based technology have become widely known such as contact-less recognition, batch processing of data, and reusability. When an item is borrowed the barcode tag is desensitized and when returned the tag is activated again. Barcodes do not offer any benefits for collection management. It can be said that the defining characteristic of barcode based library management is the lack of efficiency. In libraries there are tasks, such as check-in and check-out that can be further automated by use of this technology. Though self-service check-in units can also be based on barcodes, RFID offers better functionality. RFID readers can recognize several books at once whereas with barcodes each book needs to be read separately. This will save time as the library staff and patrons to return their books.

PROPOSED SYSTEM

Each book is uniquely identified through the RFID tags which are attached to it. The active RFID reader which is placed in the library desk is used to scan the RFID tags of the candidate and books. The information in the tags are scanned by the active RFID reader when the candidate show his/her RFID tag towards the reader. When the tag is scanned by the reader it displays the information by comparing the RFID tag information with the library database. The display shows three options namely, entry, return, renewal and due amount options. The book is added to the database by scanning the book after selecting entry option. When the book is added to the candidate's account a message is given to the candidate using GSM technology. The similar is done while return and renewal of book. In addition a message is send again to the candidate regarding the last date of book return. When the book is not returned or renewed within the due date fine amount is added to the candidate's account and during the end of the year the fine is collected from the candidate.
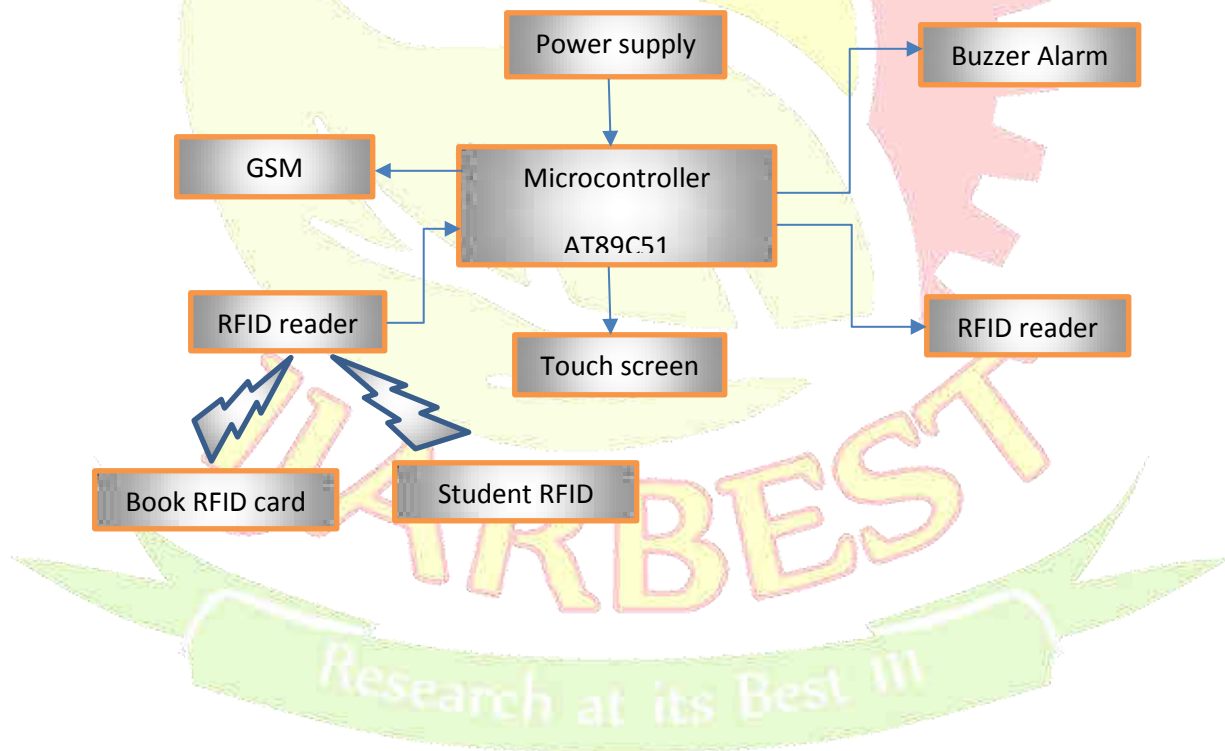
Fig 1: Block diagram

SYSTEM DESIGN

1. CONCEPT

Each book is uniquely identified through the RFID tags which are attached to it. The active RFID reader which is placed in the library desk is used to scan the RFID tags of the candidate and books. The information in the tags are scanned by the active RFID reader when the candidate show his/her RFID tag towards the reader. When the tag is scanned by the reader it displays the information by comparing the RFID tag information with the library database. The display shows three options namely, entry, return, renewal and due amount options. The book is added to the database by scanning the book after selecting entry option. When the book is added to the candidate's account a message is given to the candidate using GSM technology. The similar is done while return and renewal of book. In addition a message is send again to the candidate regarding the last date of book return. When the book is not returned or renewed within the due date fine amount is added to the candidate's account and during the end of the year the fine is collected from the candidate.

2. RFID READER

It communicates with the tags through an RF channel to obtain identifying information. Depending on the type of tag, this communication may be a simple ping or maybe a more complex multi-round protocol. In environments with many tags, a reader may have to perform an anti-collision protocol to ensure that communication conflicts don't occur. Anti-collision protocols permit readers to rapidly communicate with many tags in serial order.


Fig 2: RFID Reader

3. RFID TAGS

These are the tags that have a Magnetic coil within them and are used to generate radiofrequency waves. They are passive in nature i.e. they can be read up to a small distance of 10-15 cm, so the system is static. A passive tag is an RFID tag that does not contain a battery; the power is supplied by the reader. When radio waves from the reader are encountered by a passive RFID tag, the coiled antenna within the tag student to

get the details of the student. The antenna resides inside the reader. It generates electromagnetic field. Whenever a tag comes in close proximity of the electromagnetic field

It gets activated and it is able to read and write data to the reader by producing radio signals. Antenna behaves like a communication media between the tag and the reader.
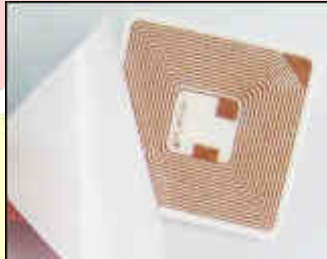
Fig 3: RFID Tag

4. USER LOGIN PROCESS

The database was already created with the user or student information. And also the information about the user programmed with the unique RFID tag and that contains all the information about the user using the ATMEL89C51 microcontroller. If the user crossed the RFID reader that scans the user's RFID tag and make the entry of the user in the database. Whenever a new book is bought by the library, an RFID tag is attached to the book with adequate information's like, Book name, Book author, Book number, etc. The detailed information regarding the book is stored in the computer database. The computer database also stores all the information of individual users of the library. Each user is given with registered RFID cards. These cards contains identification data and other related details like: name, address, roll no., and mobile no. etc. for each user
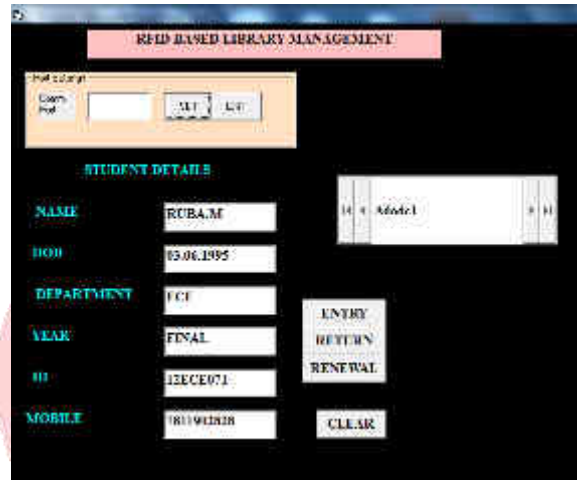
Fig 4: USER LOGIN PROCESS

5. BOOK ENTRY MODE

When the user wants to take books, he simply shows the books in front of the RFID reader and the books are automatically added to the user account. After the entry of books an intimation is send to the user account by sending message to the user mobile number.
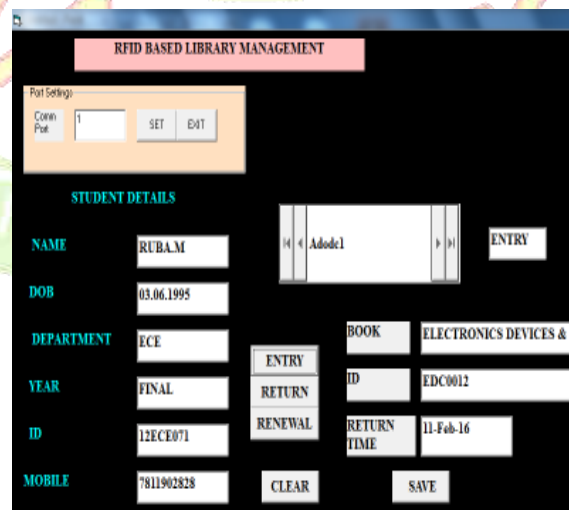

Fig 5: BOOK ENTRY MODE

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6. BOOK RETURN MODE

When the user wants to return books, he simply flashes the books again in front of the RFID reader and the books automatically are adjusted for return against the user's name. Before the return date the user will get a message regarding the last date of book return.

Fig 6: BOOK RETURN MODE

7. BOOK RENEWAL MODE

The renewal of the book is also similar to the book entry mode. Here the actual due date is overwritten by new date and entry is made automatically by making selecting the renewal option. And also if the searched book is not available then the user can mark the book in his account so that when the book comes into library an intimation is send to the user regarding the availability of that particular book.

CONCLUSION

Radio Frequency Identification (RFID) Systems can be used in libraries for book identification, self-checkout, anti-theft control, and for the sorting of library books. RFID technology provides the facility of self-check for the library staff and non-returned books effectively. So, it is expected that this RFID technology will soon replace the presently existing technology method. It provides an intelligent library management system, which creates better service quality with quick and effective benefits to both library management and students. These application can lead to important savings in labor costs, enhance customer service, lower book theft and provide a constant record update of new collections of books.

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