

# Library System Using RFID

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**Abstract:** As we are living in a digitize society, the system is designed to provide an easy and stress free way of issuing any book from the library. The use of RFID in the library sections enhances the borrowing speed of the books followed by monitoring speed enhancement and speedy increase in the process of book searching. It makes the library staffs free to follow the user service jobs. The performance of our project depends on the RFID tags and readers. RFID readers receives the RFID signals from the RFID tag and provides access for issuing of the book. The device also resolves the security issues as it will show the person's unique ID code whosoever have issued any book from the library. Library management plays a key role in patron satisfaction. RFID technology can effectively improve the self-service and the collection management, which correspondingly leads to improving the patrons' satisfaction with using the library. This project focuses on introducing RFID technology and the benefits gained from using the technology by looking into each work process in the case library

**Keywords:** RFID Tags, RFID Readres , Library Management , Unique ID Code

## 1. Introduction

Library management includes areas such as borrowing and returning of books, classification of materials, cataloguing and bar-coding. Many of these areas have direct effects on customer satisfaction. As an example, even in small libraries, where the collection size is small, items can often be misplaced which can cause discontent in patrons. RFID technology had its first commercial applications introduced in the late 1980's. Since then technologies in different fields have advanced causing the cost of RFID tags and readers to go down, thus making it available to a broader market. For example, libraries have slowly started to adopt this technology as RFID tags have become cheaper.

The goal of this project is to find out whether RFID technology offers any significant benefits for library management and how do these benefits reflect to customer satisfaction. Also, in order for a library to get the best possible benefit from using RFID they need to take into account certain factors well before making any investment decisions.

## 2. Methodology

Following is the block diagram of our project:

**RFID tag:** Proximity sensor is used to detect the presence of any intruder or person. (Refer Fig 1.1)

**RFID reader:** This block is used to detect the presence of smoke or LPG. (Refer Fig. 1.1)

**ARDUINO UNO:** All the inputs are processed by the microcontroller.

**LCD display:** The output of the project is displayed on the LCD.

**Power supply:** This block is essential for the functionality of the entire project as it provides with the 5v supply.



Figure 1.1: Block Diagram of the project

## 3. Circuit Diagram

- 1) 13.56 Mhz RFID sensor proximity is an ID system that uses small radio frequency identification devices for identification and tracking purposes. Storage capacity: 8kbit, Read and write distance: 2m and frequency : 13.56Mhz
- 2) RFID RC522 is low cost MFRC522 based RFID Reader Module is easy to use and can be used in a wide range of applications. The MFRC522 is a highly integrated reader/writer IC for contactless communication at 13.56MHz. Supply Voltage: 3.3V. Current: 13-26mA
- 3) Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started
- 4) A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.
- 5) The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing

its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. Supply range is 4.7V – 5.3V and has 8 data pins.

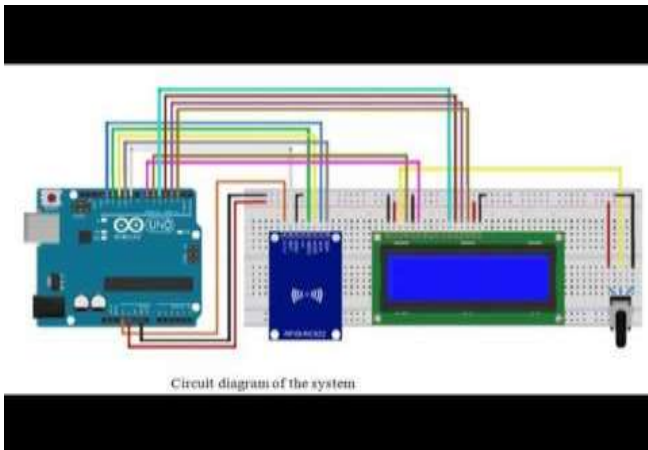


Figure 1.2: Circuit Diagram

#### 4. Result

- 1) After connecting the components as per the circuit diagram, the results were as follows:
- 2) When we were placing our RFID TAG in front of the RFID-RC522 module reader, the information used to get displayed on the lcd screen and in the same sequence as shown in the following figures 1.3 (a,b,c,d,e)



Figure 1.3 (a)



Figure 1.3 (b)



Figure 1.3 (c)



Figure 1.3 (d)

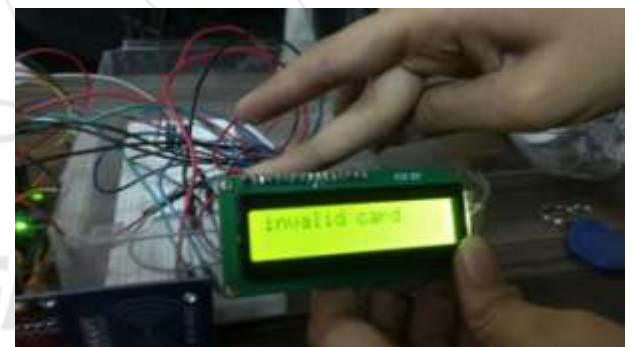


Figure 1.3 (e)

#### 5. Conclusion and Future Scope

- 1) Thus we have designed a product called Library Card Scanner using RFID technology.
- 2) The RFID tag can be affixed to an object and used to track and manage inventory, assets, people, etc.
- 3) RFID offers advantages over manual systems or use of bar codes. The tag can be read if passed near a reader, even if it is covered by the object or not visible
- 4) RFID provides a way for organizations to identify and manage tools and equipment (asset tracking), without manual data entry.
- 5) Casinos can use RFID to authenticate poker chips, and can selectively invalidate any chips known to be stolen.
- 6) Airport baggage tracking logistics .
- 7) Machine readable travel documents.

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