ISSN No:-2456-2165

Lab Component Issuing System

Anuja Kale
Student, Vidyalankar Institute of Technology
Mumbai Maharashtra, India

Akash Singh
Student, Vidyalankar Institute of Technology
Mumbai Maharashtra, India

Siddhesh Kshirsagar
Student, Vidyalankar Institute of Technology
Mumbai Maharashtra, India

Abstract:- Internet of things is an Associate in Nursing rising technology that may and can result in a much better and unreal future wherever most potency may be achieved with the smallest amount of effort. The ideal concept of the projected system is to supply a simple and easy Lab Component Issuing system to the users and at a similar time to make sure a scientific approach towards Hardware lab management to with efficiency utilize the time and energy of the staff. Automation of Lab Component Issuing systems may be a convenient approach, as all the science lab parts are managed from one place by implementing the IoT. You are also allowed to faucet into hi-tech practicality and luxury that wasn't attainable within the past in RFID.

Keywords:- *RFID, NFC tags, NodeMC.*

I. INTRODUCTION

Lab Component Issuing System is a part of institutional management that focuses on a specific set of problems faced by research laboratory management professionals. Lab management consists of normal social control tasks, in addition to intellectual selections and fundraising responsibilities. Radiofrequency identification detection uses radio waves to automatically establish individual things. The goal of any RFID system is to hold information in appropriate tags and to retrieve it back, by machine-readable means that, to satisfy explicit application desires. RFID tags are used to produce self-check stations and good bookshelves beside automation of each appliance or suite of devices within the research laboratory perimeters. We want to keep up the record of latest students and retrieve the small print of elements obtainable within the laboratory that primarily focuses on basic operations in a laboratory-like adding new members, new elements, new information. It offers a well-known and well-thought-out, attractive UI, searching, insertion, and reportage capabilities.

II. LITERATURE SURVEY

The researchers are interested in and concerned about developing the components issuing and related concerns such as monitoring, registering, creating security, managing, tagging, tracking, self-servicing, and detecting users. Nisha et al. (2007) developed an Internet of Things (IoT) system for library management based on Near-field Communication (NFC) technology and NFC embedded tags on books as well as the user cards.

The tags for library operation control are read using NFC scanners. Users can check the entire book information using a smartphone and a handheld reader, which is also available on a desktop.

Mrunal et al. (2014), on the other hand, developed an RFID-based system for developing self-service operations in libraries to increase efficiency. The RFID tags were used to identify the books, and the information was processed and sent to a PC that houses a database. The main purpose of their design was to look at the advantages of employing RFID tags and the data they might collect in the library management system, as well as customer happiness.

Ahmad (2016) used interviews and observations to investigate the IoT's use in RFID technology at the Allama Iqbal Library. He discovered that inventory control using RFID tags was easier and faster than inventory control by hand. Hopkinson & Chandrakar (2006) implemented RFID at the Middlesex University learning resources, and Coyle (2005) studied RFID management in libraries. Chelliaha et al. (2015) concentrated on the effects of RFID deployment on three specific topics: people, processes, and technology, all of which are connected aspects of the library. They looked at a case study of an RFID application in a library at the University of Technology Sydney (UTS) and discovered that enabling it enhanced the efficiency of processes for users. They also recognised that utilising RFID in novel methods aided in the development of a more effective supply chain management and process. Finally, Brian et al. (2014) suggested an IoT smart secure library model that specified a mechanism for retrieving book characteristics using a Wi-Fi positioning system and NFC tags.

III. CHARACTERISTIC OF THE PROJECT

How Does the System Work?

NFC tags are affixed to each component to allow it to be individually identified, and students' ID cards are NFC cards, allowing for wireless connection. The current system will be a lengthy procedure at times. In our suggested system, users must scan component IDs. As a result, they may scan a large number of components at once and compare which component is preferred. After determining which component

ISSN No:-2456-2165

is the best, the user must scan his or her ID. As a result, there is no need to queue for the issuing component, and the librarian's time is saved. The user may log into his or her account from any internet-enabled device and search for a component by its unique Id or name, as well as view its details. The laboratory data may be accessed via IoT while sitting at home. It simply eliminates the need for several registers to keep track of student information.

IV. REQUIREMENTS

Components

1. NFC Tag

NFC Tag can consist of EEPROM, CPU or microcontroller unit, anti-collision algorithm, authentication and cryptography method, RF interface circuit, 13.56MHz RF antenna, and other components are often found in NFC tags. Type-1 tag, type-2 tag, type-3 tag, type-4 tag, and type-5 tag are some of the numerous types of tags designed for diverse uses (known as Mifare classic tag).

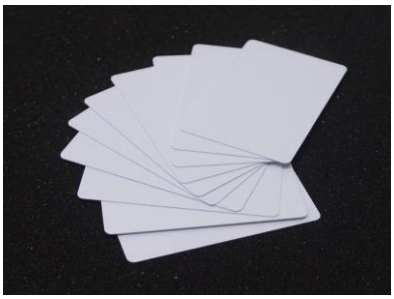

Fig 1: NFC Tag

The following are the general NFC tag parameters that were taken into account throughout the selection process:
• An NFC tag can be either active or passive.
• Memory storage limit
• Operation speed
• Read/write or read-only data access mode
• Mechanism of collision

2. RFID- RC552

The NFC RC522 integrated RFID card reader that works on 13.56 MHz wireless connectivity, designed for NXP such as low power consumption, low cost, and integrated chip reading and writing size, is the best choice for developing smart meters and portable devices. The MF RC522 uses an advanced module modulation system, fully integrated at 13.56 MHz for all sorts of good non-communication communication processes. Support the corresponding response signal 14443A. DSP works with ISO14443A frames and bug fixes. In addition, it also supports crypto1 fast encryption to authenticate NFC series products. MFRC52 supports NFC communication at high speed non-communication communication; Double connectivity up to 424 kb / s. As a new family member in the 13.56MHz RFID family, the MFRC522 has many similarities with the MF RC5200 and MFRC530 and has many new features. This module can be directly integrated into portable production devices. The module uses 3.3V power and can connect directly to any CPU board by connecting with an SPI protocol, which ensures reliable operation, good learning distance.

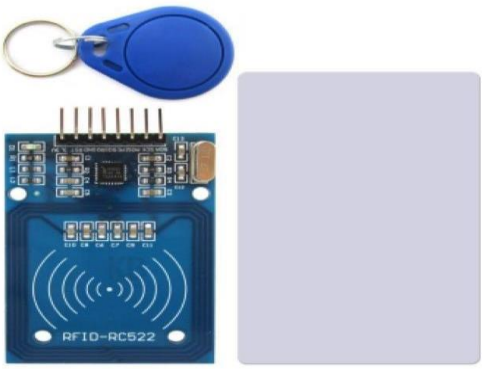

Fig 2: RFID-RC552

Specifications
- Voltage: DC3.3V
- Operating Current: 13-26mA
- Idle Current: 10-13mA
- Sleep current: <80uA
- Peak Current: <30mA
- Operating frequency: 13.56MHz
- Dimensions: 40mm *60mm
- Module Interface SPI Data Transfer Rate : Max.10Mbit/s
- Card Reading distance: 0~30mm (NFC1 card)

3. Node MCU

NodeMCU is an open source IoT platform. Includes firmware running on ESP8266 Wi-Fi SoC from Espressif Systems, as well as Hardware-based ESP-12 module. The term "NodeMCU" automatically means firmware rather than upgrade kits. The firmware uses the Lua script language. Based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS.

Fig 3: Node MCU

Specifications:
- Open-source
- Interactive
- Programmable
- Low cost
- Simple
- Smart
- WI-FI enabled
- USB-TTL included

ISSN No:-2456-2165

V. IMPLEMENTATION

The procedure is broken into five modules, each of which is explained as follows:

1)Getting Started: When the lab receives a new component, the NFC tag is attached to the component's back and saves information such as the component's id. The database is also used to retrieve comprehensive information about the component. The database also has all of the information for each laboratory student. Each student also has a registered NFC card, which is given to them when they have completed the admissions procedure. These cards contain information such as the student's id number, address, roll number, name, branch, and so on. Students will use NFC cards to verify their identities.

2)Login process : The lab assistant has the unique advantage of having their own login and password to control the entire process of the NFC-based lab component issuance system. As soon as he turns on the computer, the LOGIN dialogue box displays. The lab assistant then inputs the appropriate login and password, allowing the system to be used further.

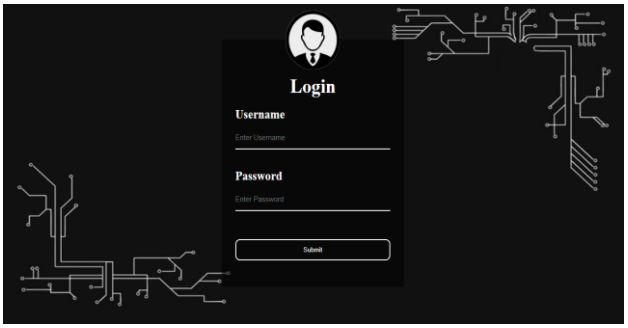

Fig: 4 Login Page

3)Add New Id Interface : Lab administrators may use RFID RC552 to add new Rfid tags to the system, as well as new Student/Component information, in order to borrow components, explore the library, and so on.

Fig 5: Add elements

4)Issue Process : When a student wishes to issue a component, he or she just scans his student id card in front of the RFID RC552, then scans the component they want to issue in front of the reader, and the component is instantly issued. Finally, the learner receives a notification stating that the component was successfully issued.

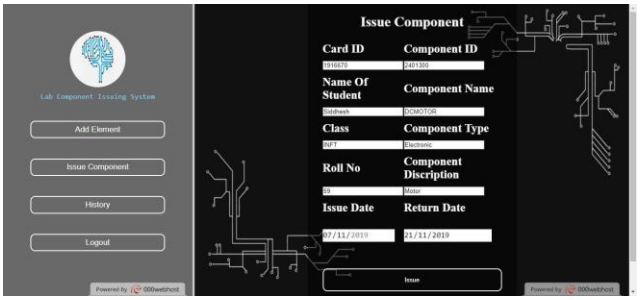

Fig 6: Issue components

5)History: Admin may view the whole history of students who have been assigned components with component tags.

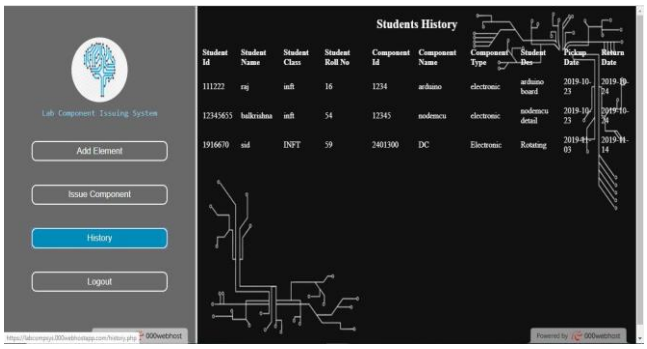

Fig 7: History

VI. CONCLUSION

We used IoT to create a lab component issuing system in this work. The student will be able to complete the issuing procedure faster with the help of this technology. To interact with RFID RC552, we placed NFC tags on the components. The system also improves the components' availability. The component will be more precisely located in future work. This might make advantage of approaches such as BEACON technology, which reduces hardware complexity. In addition, there is room for improvement in the security system.

REFERENCES

[1]. "RFID Based Library Management System", Discovery, Volume 19, Number 55, pp. 6- 5, 2014
[2]. Shashank Agarwal and Dario Vieira, "A Survey on Internet of Things",Abakós, Belo Horizonte,Volume 1, Number 2, pp. 78 – 95 , 2013.
[3]. John A. Stankovic, "Research Directions for the Internet of Things", Internet of Things Journal, IEEE, Volume 1, Issue 1, pp. 3-9, 2014.
[4]. Dhaval H Kotecha, "Automation in Library using RFID Technology" 6th Convention Planner - 2008 Nagaland University, Nagaland, November 06-07, 2008.
[5]. A. Pravin Renold, Joshi Rani, "An Internet Based RFID Library management system
[6]. Faheem Zafari, Ioannis Papapanagiotou and Konstantinos Christidis, "Micro-location for Internet of Things equipped Smart Buildings"