Quest Journals
Journal of Electronics and Communication Engineering Research
Volume 9 ~ Issue 5 (2023) pp: 16-21
ISSN(Online) : 2321-5941
www.questjournals.org

Research Paper

Examination Room Guidance System Using RFID and Fingerprint

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ABSTRACT - *The goal of this project is to provide guidance to students at examination centres. Many students are having difficulty finding rooms. Most students are worry while going to the examination, and they even feel tense while looking for their exam location. In these instances, our project is beneficial. As a hall ticket, each student will be given an RFID card. That will automatically display the room number of the student. Our project will primarily save time spent searching for a room in examination centres.*

KEY WORDS: *Arduino, Examination room guidance, RFID system, Fingerprint module, Lcd display.*

R*eceived 02 May, 2023;* ***R****evised 12 May, 2023;* ***A****ccepted 14 May, 2023 © The author(s) 2023.*
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I. INTRODUCTION

RFID (Radio Frequency Identification) technology is a new technology that is being used in a various application. It is a member of the family of Automatic Identification and Data Capture (AIDC) technologies that provides a quick and dependable means of identifying objects.

RFID is made up of two major components. The Interrogator (RFID Reader) sends and receives the signal, as well as the Transponder (tag) attached to the object. RFID tags are "interrogated" by an RFID reader in an RFID system. The tag reader sends out a radio frequency "interrogation" in order to communicate with the tags. The reader also has a receiver that receives and decodes a response signal from the tags. The tag's data content is reflected in the tag's response signal. A passive "backscatter" signal is used to generate the response signal. An RFID tag is made up of a tiny microchip and an antenna. RFID has numerous applications on its own, but when combined with a microcontroller, the possibilities expand even further.

Improvements in RFID technology: memory capacities, reading ranges, and processing speeds continue to improve. The integrated circuit in an RF tag will never be as cost effective as a bar code label, notwithstanding inevitable reductions in raw materials and economies of scale. RFID, on the other hand, will continue to expand in its established niches where bar code or other optical technologies are ineffective. If some level of standardisation is achieved, the market will very probably develop tremendously if RFID hardware from various companies can be used interchangeably.

II. EXISTING SYSTEM

This project proposes a jumbling system-based examination solution. It is possible that students will have difficulty locating their respective rooms as a result of this. Using RFID technology, this system assists in locating exam halls and seats. Each student is given an RFID tag. A valid candidate will be able to easily locate his examination venue using RFID Technology. In existing systems, the researchers created a concept of a secure and adaptable embedded reader system. Another existing system focuses on supply chain management and makes use of RFID. The usage of RFID in a semiconductor technology to handle inventory transaction concerns is another topic under discussion.

This system lowers costs and eliminates human error. Automated attendance management is a system in which they used both an electronic and a mobile platform, respectively, with a stationary matrix AR 400 RFID reader and a handheld MC 9000-G RFID reader. Zhang Young created a wireless fingerprint-based

attendance system that uses finger prints to record and retrieve attendance data. The RFID reader will interrogate the student's swiped tag and obtain the information contained within it. This will be passed on to the controller. A unique passcode is provided for added security, and the student must enter it using the keypad. If both the id and passcode are correct, the candidate's room number will be displayed on the LCD panel connected to the controller, marking him as an authorised entry.

When a student enters the Examination Centre, he must keep his RFID TAG attached to the reader, which is connected to our microcontroller-based embedded board. At that point, the reader will determine whether or not the student's information is correct, and it will then decide whether or not to display the student's room number on the LCD display. When a student enters the Examination Centre, he must keep his RFID TAG attached to the reader, which is connected to our microcontroller-based embedded board. At that point, the reader will determine whether or not the student's information is correct, and it will then decide whether or not to display the student's room number on the LCD display.

III. PROPOSED SYSTEM

Using RFID technology, this system assists in locating exam halls and seats. Each student is given an RFID tag. The block diagram is depicted in below figure1.

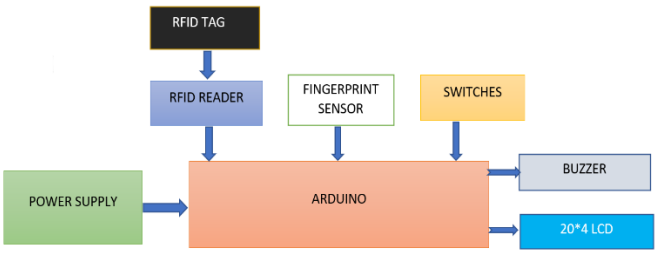


Figure 1: Block diagram of proposed system

The proposed system consists of Arduino NANO, RFID Reader, RFID Tags, LCD, Buzzer, Fingerprint sensor.
Arduino NANO: The Arduino Nano is a compact, breadboard-friendly board based on the ATmega328 (Arduino Nano 3.0) or ATmega168 microcontroller (Arduino Nano 2.0). (Arduino Nano version 2.x) It is similar to the Arduino in terms of capabilities. The Arduino NANO is depicted in Figure 2.

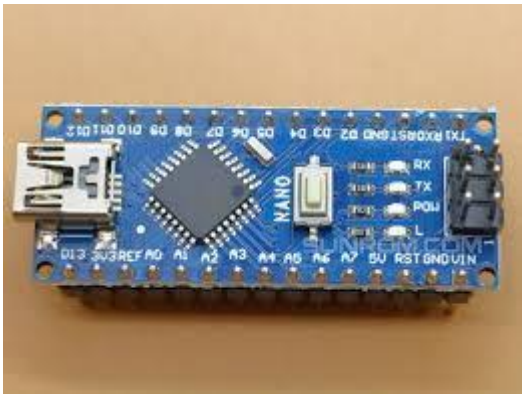


Figure 2: Arduino NANO

The Mini-B USB connection, a 6-20V unregulated external power supply (pin 30), or a 5V regulated external power supply can all be used to power the Arduino Nano (pin 27). As the power source, the maximum voltage source is instantly picked. The FTDI FT232RL chip on the Nano is only activated when the board is connected to the computer via USB. As a result, while using non-USB connection, the 3.3V output (provided by the FTDI chip) is disabled, and if digital pins 0 or 1 are high, the RX and TX LEDs will flicker. The ATmega168 has 16 KB of flash storage (of which 2 KB will be used for the bootloader) for storing code; the ATmega328 has 32 KB, (also with 2 KB used for the bootloader)
RFID Reader: An RFID reader or scanner operates relatively to a barcode scanner, rather than scanning the barcode with a laser beam, it scans it with electromagnetic waves. The scanner uses an antenna that transmits a signal and interacts with the tag's antenna to send these waves. The antenna on the tag collects input from the scanner and send data about the chip to the scanner.

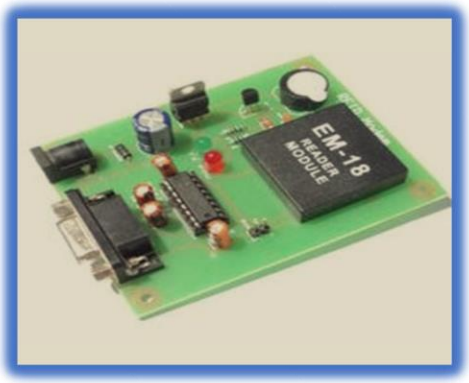


Figure 3: RFID Reader

The data on the chip is generally located in one of two memory types. Read-Only Memory (ROM) is the most prevalent; as the name suggests, read-only memory cannot be modified once it has been encoded onto the chip during the production process. The second type of memory is Read/Write Memory, which can be changed later by certain devices despite being configured during the production line.

RFID TAG:

A radio frequency identification tag (RFID tag) is a tiny device that stores and sends data to an RFID reader. There are two sorts of tags: active tags and passive tags. The reader is not required to power active tags because they have an inbuilt battery. The range of active tags is usually larger than that of passive tags. Tags that are active are larger in size than tags that are inactive. They don't have a built - in battery and depends on the RFID reader for power, and they only get a few metres of range.

Figure 4: RFID Tag

Advantages of RFID

- ✓ Tag identification that is not visible to the naked eye.
- ✓ It is feasible to run operations without human intervention, which lowers human error and saves money.
- ✓ Capacity to comprehend moving items that have tags attached.
- ✓ Wider coverage area, up to a few feet
- ✓ Can be employed in a variety of settings, such as cattle, military, and scientific research.
- ✓ RFID can be used in conjunction with bar codes. Both the technologies may be mutually beneficial.

LCD Display: LCD (Liquid Crystal Display) screens are electrical display modules that have a variety of uses. A 20*4 The LCD display is a simple element that can be found in a wide range of devices and circuits. Because of the following reasons, liquid crystal displays are increasingly being used to replace LEDs (seven segment LEDs).

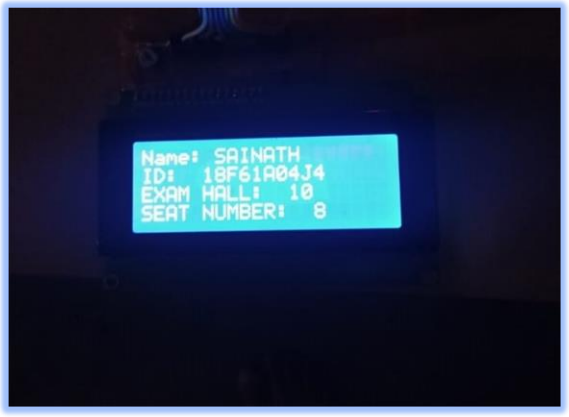


Figure 5: LCD

- LCDs are becoming less expensive.
- Numbers, characters, and photos can all be shown. This contrasts with LEDs, which can only display numbers and a few characters.
- Inclusion of a smart controller through the LCD, allowing the CPU to handle the process of reloading the liquid crystal display. In contrast, the LED should be reloaded using the CPU to keep records.

LCD interfacing with controller: The LCD protocol includes three control lines and eight I/O lines for the data bus.

8 data pins D7-D0

- Bi-directional data/command pins.
- Alphanumeric characters are sent in ASCII format.

RS (Register Select)

- RS = 0 -> command register is selected.
- RS = 1 -> Data Register is selected.

R/W (Read or Write)

- 0 -> Write, 1 -> Read

E: Enable (Latch data)

- This is used to latch the data on the data pins. To latch the data, a high-to-low edge is required.

FINGERPRINT SENSOR

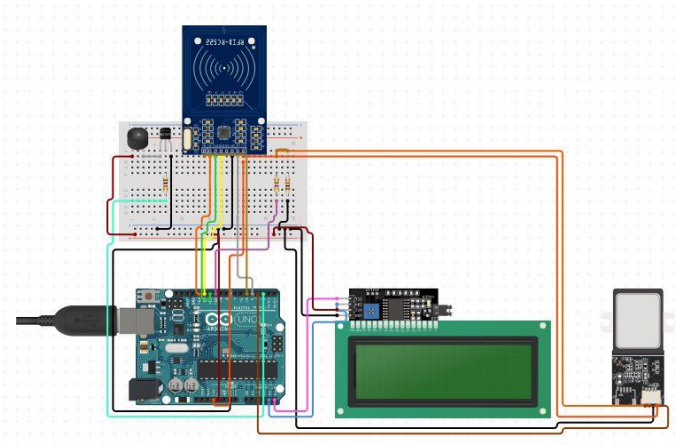
- The R307 Optical Fingerprint Reader Sensor is what you're looking at. The R307 fingerprint module has a TTL UART interface for direct connection to a microcontroller UART or a PC through a MAX232.The user can save fingerprint data in the module and set it to identify the person in 1:1 or 1: N mode.
- The FP device can connect directly to a 3.3 or 5 volt microcontroller. Interfacing with a PC serial port necessitates the use of a level converter (such as MAX232).

Figure 6: Fingerprint sensor

BUZZER

A buzzer or beeper is an auditory signalling device that can be mechanical, electromechanical, or piezoelectric Buzzers and beepers are commonly used for alarm clocks, timers, and confirmation of human input such as a mouse click or keyboard. Buzzers are electronic transducers with a DC power source that are commonly used in sound devices such as computers, printers, alarms, electronic toys, automobile electronic and other electronic products.

Connection diagram



EXPERIMENTAL RESULTS

Exam information such as the name of the exam, the name of the student, In the Arduino Nano's built-in memory, the exam code, roll number, registration number, room number, and bench number are all preserved. When the RFID is placed in front of the RFID scanner, the details of that particular RFID tag, as well as the room number, are displayed on the LCD screens. Figure 7.1 depicts the experimental setup.

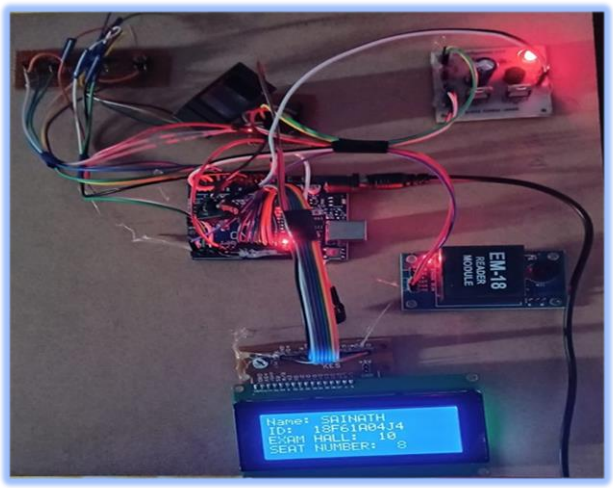


Fig 7.1 Experimental setup

Figure 7.2 Experimental Result

IV. CONCLUSION

We were able to design an embedded system for examination room navigation that was both cost-effective and time-efficient by combining RFID technology and a fingerprint module. The existing method can be improved by adding an infrared sensor and utilised to track attendance. As a result, the system offers a wide range of potential development that can lead to significant advancements.

V. FUTURE SCOPE

In addition to the present system, a facial recognition system can be incorporated for increased safety. More capabilities are being added, such as the ability to keep track of a student's details, such as fees due, library transactions, and attendance. The notion is not only useful to students but also to corporations, depending on how well it is implemented, as seen by the seeds that have sprouted into a variety of viable projects.

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