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An Integrated Examination Room Guidance System Using Arduino And RFID

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ABSTRACT: Nowadays most of the examinations are based on jumbling system. It may cause students facing difficulty in finding their respective rooms. This project proposes a solution for this scenario. It aids in finding respective exam halls and seats using RFID technology. Incorporating RFID technology to examination room guidance system will reduce waiting time of students considerably. Each and every student is allotted an RFID tag and a password of his own. Using the RFID technology and keypad authentication a valid candidate will be able to find his examination venue easily.

KEYWORDS: AIDC, Interrogator, RFID

I. INTRODUCTION

Nowadays examination procedures are time consuming since it is of write and forward type. The traditional way of preparing and photocopying the seating arrangements creates a mess and consumes student's time in discovering their hall and seat number, mainly when it comes to universities that accommodate large number of students. This paper brings out a remedy for this by incorporating RFID technology to the current examination procedures. RFID [Radio Frequency Identification] technology is being widely used in many applications. RFID is a part of Automatic Identification and Data Capture [AIDC] technology [7]. They are similar to bar code. RFID module mainly consist of an interrogator that works as a transceiver and tags that can either be active or passive ones. The interrogator reads the data in tags using radio frequency and also provides power depending on type of tags. Reader communicates with the tag and check it with the database for matching tag and password provided and if verified as true, the LCD module attached will display the corresponding hall number and seating arrangement, otherwise the access is denied.

II. LITERATURE SURVEY

There are many applications of RFID technology to different areas and specifically to the area of guiding the students to the examination hall along with their register number, seat number during the examination. The RFID technology in modern industries has better utility that demand data integrity and high efficiency of the system. The existing systems in which the authors[1] implemented a model of secured and portable embedded reader system to read the biometric data from electronic passport .By this implementation, it is attempted to solve the problems of reliability ,security and privacy in e-passports using GSM network. Another existing system[2] emphasis supply chain management which uses the application of RFID. Another review is the use of RFID[3] in an integrated circuit to resolve inventory transactions issues. This system reduces cost and man made errors. Automated attendance management system [4] is a system in which they used both electronic and mobile platform using stationary matrix AR 400 RFID reader and MC 9000-G handheld RFID reader respectively. In this system the students can visually see their names as they entered the class on screen. By that they are assured that their presence has been entered in the database .The record of attendance are necessary to authenticate students as well as employees at organization. Zhang Young [5] designed a wireless fingerprint based attendance system to record and obtain the attendance data using finger prints. Our proposition emphasizes a simple ,reliable and cost effective model for ensuring that high number of students can entered into examination room in a short period of time with the use of an RFID tag showing to the RFID reader and displays the student details like register number, seat number ,hall number on the LCD screen.

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III. PROPOSED METHODOLOGY

Apart from the traditional system of searching the allotted seat on the list published, we are proposing an integrated system which displays the candidate details on an LCD screen. The system solely relies on RFID technology and keypad authentication. Each and every student will be provided with an RFID tag and a password. Each RFID tag has a unique id. The RFID reader interrogate with the tag swiped by the student and will obtain the information contained in it [8]. This will be passed on to the controller. For further security, a password is provided and the student have to enter it via the keypad. If both the id and password match, the LCD screen interfaced with the controller will display the room number of the candidate thus identifying him as an authorised entry.

A. Block Diagram

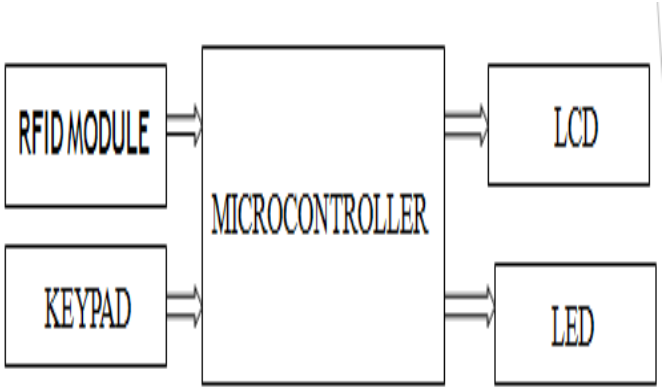

Fig. 1. Block diagram

The main objective of this project is to develop an embedded system, which can be used to verify and authenticate the authorized and also to display the room number. The system mainly consist of microcontroller, RFID module, keypad, LCD and LED. In this project we used ATMEGA 2560 microcontroller and 4X4 matrix keypad.
RFID technology mainly employs an RFID tag and a reader that uses radio waves to transfer information. RFID tag contains a coil and an antenna[7]. Each card has a unique identity. The reader continuously transmits a carrier signal which will be energizing the passive tag once they are in close proximity. This will pass the encoded information of tag on to the reader which will be further given to the controller. The serial communication between Arduino and RFID is done by a baud rate of 9600 bits per second.

The Arduino Mega 2560 microcontroller board based on the ATmega2560 is used for the project. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator. The RFID module and the keypad is interfaced as the input to the controller and the LCD and led modules as output.

Each and every student will be given an RFID tag and a password. Whenever the student enters into the examination centre, he has to swipe his RFID tag to the reader which is connected to the microcontroller .At that moment the reader will check whether the id of the student exists or not and then it will ask for the password. The password have to be entered through the keypad interfaced. If the password matches with ID, a blue LED blinks. and the LCD displays the student name, roll number, room number and seat number. If the password entered is wrong, a red LED blinks and LCD displays ID doesn't match.

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IV. HARDWARE IMPLEMENTATION

A. *Circuit diagram*

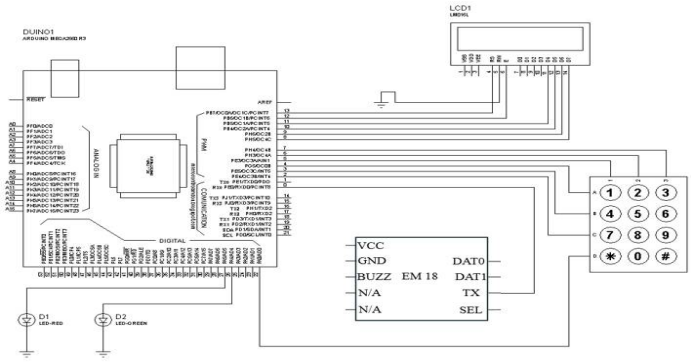

Fig. 2. Circuit diagram

Transmission pin of RFID module is connected to the reception pin of microcontroller enabling serial communication between them. Connections from data pins of LCD is given to input pins of microcontroller. The contrast bit and READ/WRITE are not often used so they can be shorted to ground. This puts LCD in highest contrast and read mode. Enable and RS pin of LCD connected to ATMEGA 2560.Keypad is used as human interface. Rows and columns of keypad are connected to microcontroller pins which are configured as input pins. LEDs are used to indicate the process states. One of them indicate authorised access, while the other one blinks whenever id or password mismatch happen.

B. *Software*

We used the Arduino Integrated Development Environment (IDE) which is an open source software that makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. This software can be used with any Arduino board.

C language is used for coding and the environment was extended through the use of library function.The standard library functions of Arduino for LCD and keypad were used.

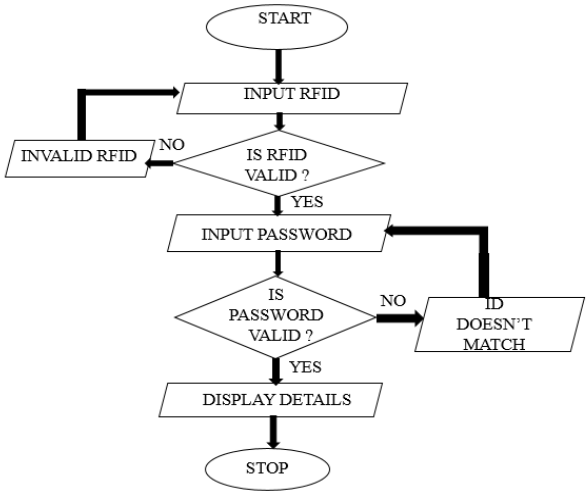

Fig. 3. Flowchart

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The above flowchart explains the working of the system. By default the system will be demanding the RFID Card. When the card is swiped at the reader, the controller checks for its validity. If valid, password is asked and if not, then system returns to default mode.If the entered password and the id match, the details of candidate will be displayed on the screen. Otherwise, the LCD will display, that id doesn't match.

V. RESULTS AND DISCUSSION

For demonstration of our system, we used 3 RFID cards. Two valid cards and an invalid card The developed unit and responses for different RFID tags are given.

Fig 4. Default Lcd Screen

Case 1: When the student swipes the tag in the RFID reader; the corresponding id is fetched from the database of the microcontroller. If the student is an authorised person the system demands the password. If the password and id matches, the details of the student is displayed on LCD screen. Figure 5 and 6 shows the scenario.

Fig 5. Demanding Password

Fig 6. Details Outputed On Lcd

Case 2. If the student is an unauthorized person a red led blinks and also it displays invalid card.

Fig 7. Unauthorised Card

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Case 2. When the student id and the password given doesn't match, the system treats him as an unauthorised person and the screen displays id does'nt match and a red led blinks seeking attention as shown in figure 8.

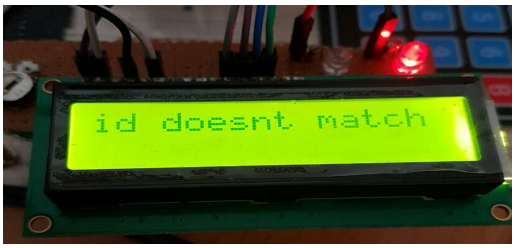

Fig 8. Password And Card Doesn't Match

The tag is first shown and if it is a valid one then password is asked.The student enters the password given. If the card and password matches, the examination room details of student will be displayed on LCD screen. Figure 9 shows the final prototype.

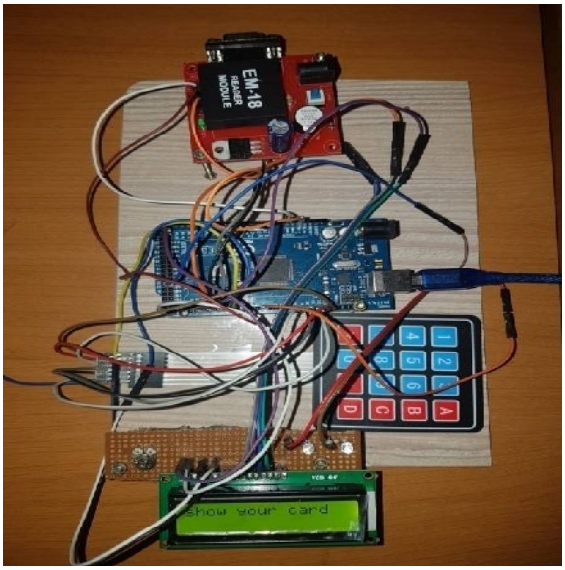

Fig.9. Final prototype

VI. CONCLUSION

By integrating RFID technology and keypad authentication, we could successfully develop an embedded system for examination room guidance, in a cost effective and time efficient manner. The current system can be enhanced with finger print detection for more security. Also it can be integrated with an IR sensor and can be used for attendance monitoring. Thus the system have wide scope of development that can contribute to great innovations

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