IOT Based Staff Monitoring System

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Abstract- *In this proposed framework we are trying to implement a system to monitor and update real-time information about the productivity and availability of the staff at their respective position of work. This is achieved by following a proper protocol, when the employee enters the office premises at the gate his fingerprint is scanned and if it matches with the database only then the entry is allowed this ensures that only valid person can enter in the premises. When the employee reaches at his desk he has to use his RFID id card at his assigned desk to gain access at this point his time of entry at the desk is updated online at the head office website. Hence in the same way his entire days productivity and schedule is updated on the website.*

Keywords- IOT; RFID Reader; Finger Print; Wemos D1 R2; Staff Monitoring System

I. INTRODUCTION

Most management teams set goals and strategies to empower employees to be more productive. There are hundreds of articles, books, even TED Talks focused on how to create a productive and motivated work environment, offering tips on how to clearly outline expectations, provide adequate feedback and create economic incentives. But one often overlooked strategy to promote productivity lies in the organization's physical infrastructure and the technology that powers it.

Today, the intelligent, networked and fully sensor building is one of the most valuable applications of the rapidly-evolving internet of things. Be it in industrial spaces like manufacturing floors or more traditional office settings, the smart building has proven to dramatically increase employee productivity, engagement and happiness — a big win for both management and the brave new world of advanced infrastructures.

There are different sorts of participation frameworks that are connected in various fields. For the most part, the working spots are as yet utilizing the punch card framework. Yet, some of them had incorporated their framework into biometric participation framework. Another innovation is Radio Frequency Identification (RFID) based participation framework that comprises of RFID Reader, RFID Tag, LCD shows and Arduino unit RFID can be interfaced to Arduino. Information is exchanged from RFID cards to per user and from that point to the microcontroller.

II. METHOD

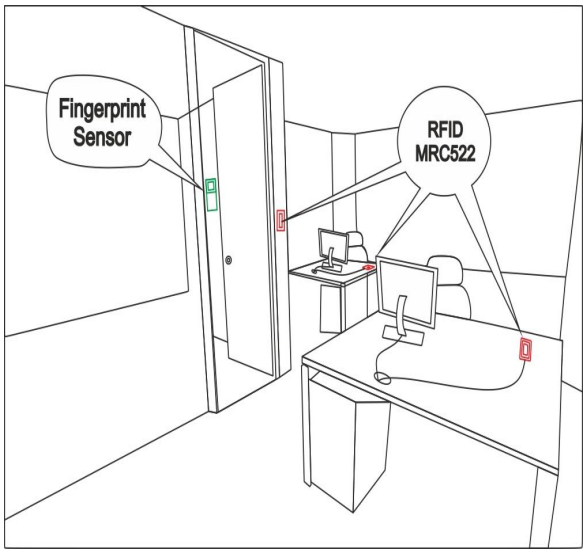


Fig. 1 Realtime view of project

Here we create a database of all the employee's working in the given premises containing data such as his name, age, designation, and his fingerprint etc. The fingerprint used here can store 1649 unique fingerprints. In this we are using two RFID mrc522 which will be placed on the employees desk and will be continuously scanning for the presence of his id card on the desk and update that data on the website accordingly. There is also an rfid on the door to which will open the gate only on successfully verifying the id card so that employee can enter or leave. The fingerprint on the door is used to make sure that only valid person can enter the premises in which he or she is assigned. The above figure shows the schematics and placements of all the components.

III. BLOCK DIAGRAM

The figure 1 show below as a block diagram is pretty simple which consist of basic components which describes that it is efficient in generating the results as required.

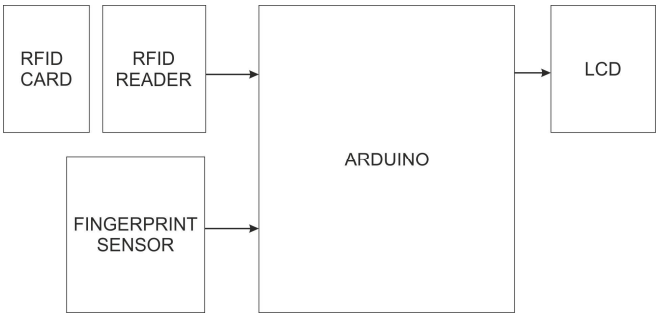


Fig. 2 Block diagram of the system

The input required is the real time RFID data which will position of the employee and it is further carried through Arduino which is interfaced with IOT which update the data of the employee on web.If any RFID are not detected then it is processed to identify if the employee is present or not. Finally, the output is generated.

IV. COMPONENT USED

A. Wemos D1 R2:

WeMOS D1 R2 Wi-Fi is an integrated ESP8266 based Wi-Fi enabled microprocessor unit + 32Mb flash memory on a Arduino-UNO pinout. The WeMos D1 R2 Uno based ESP8266 a wireless 802.11 (Wi-Fi) microcontroller development board compatible with the Arduino IDE. It turns the very popular ESP8266 wireless (Wi-Fi) module into a fully-fledged development board. The layout of this board is based on a standard Arduino hardware design with similar proportions to the Arduino Uno and Leonardo. It also includes a set of standard Arduino headers which means many existing Arduino shields can be plugged directly into the board.

The development board also includes a CH340 USB to serial interface giving it the ability to be connected and programmed directly from your computer and requiring only a common micro USB cable – no additional interface hardware or configuring is required. Once connected to the computer, and drivers have been installed, the WeMos D1 will appear as a standard serial COM port. The WeMos D1 can be programmed directly from the Arduino Integrated Development Environment (IDE).

Direct Arduino IDE support for this development board can be added with just a few mouse clicks via the built-in board manager feature. Programming the WeMos D1 via the IDE is then as straight-forward as programming any standard Arduino development board. Many of the default Arduino commands will work including digital and analogue pin functions and many examples are included in the IDE which demonstrate how to take advantage of the ESP8266s Wi-Fi capabilities. These examples range from simply blinking an LED to turning the WeMos D1 into a stand-alone web server.

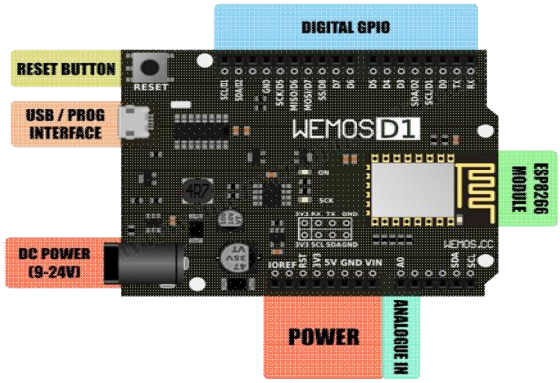


Fig.3 WeMOS D1 R2

B. Fingerprint Sensor:-

The fingerprint sensor used here is the FPM10 fingerprint sensor module but most of the software and connections are compatible with the R305 and ZFM-20 modules. The module performs fingerprint enrolment, image processing, fingerprint matching and searching and template storage. It can perform 1:1 matching or 1:N matching. It employs the UART protocol to communicate with the host MCU. The default baud rate is usually 57600 bps though the module can support from 9600 to 115200 bps.

The module makes use of an image buffer and two 512-byte character file buffers, which are volatile, and non-volatile flash memory for storing fingerprint templates and permanent settings

Fig.4 Fingerprint Sensor

C. RFID Reader: -

The MFRC522 is a highly integrated reader/writer IC for contactless communication at 13.56 MHz. The MFRC522

reader supports ISO/IEC 14443 A/MIFARE and NTAG. The MFRC522's internal transmitter is able to drive a reader/writer antenna designed to communicate with ISO/IEC 14443 A/MIFARE cards and transponders without additional active circuitry.

The receiver module provides a robust and efficient implementation for demodulating and decoding signals from ISO/IEC 14443 A/MIFARE compatible cards and transponders. The digital module manages the complete ISO/IEC 14443 A framing and error detection (parity and CRC) functionality. The MFRC522 supports MF1xxS20, MF1xxS70 and MF1xxS50 products. The MFRC522 supports contactless communication and uses MIFARE higher transfer speeds up to 848 kBd in both directions

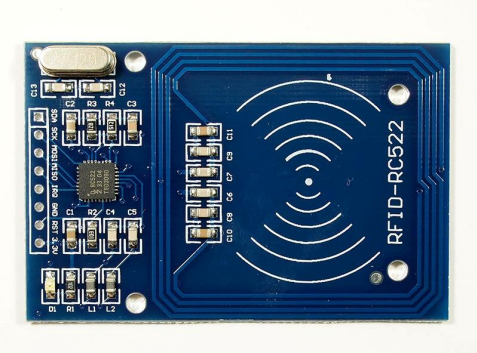
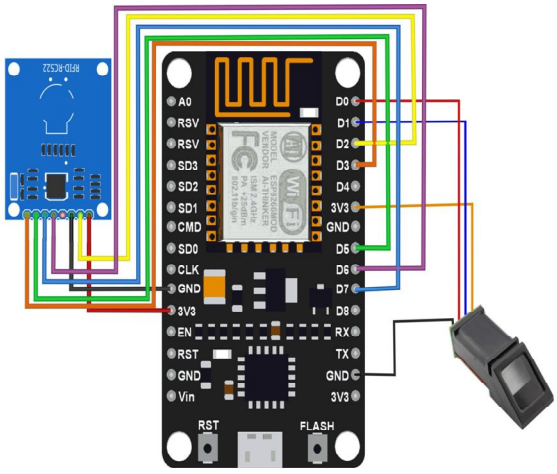


Fig.5 RFID Reader

SOFTWARE

The softwares used to interface all the components are ArduinoUno ,C and C++.the libraries of fingerprint scanner,RFID mrc522 and display were imported on Arduino. The circuit diagram design is done on coral draw software.

V. CIRCUIT DIAGRAM



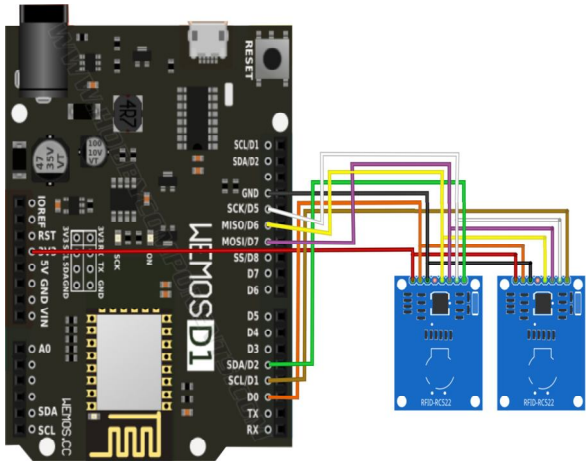


Fig.6 Circuit Diagram

VI. WORKING PRINCIPLE

The first step is to create a database of all the employee's working in the given premises containing data such as his name, age, designation, and his fingerprint etc. The fingerprint used here can store 1649 unique fingerprints. To enrol a fingerprint, one must have the finger scanned twice, with an image generated each time and stored in the image buffer. Each generated image is converted to a character file (or feature file) and stored in one of the 2-character file buffers. Next, the image processor determines if the data from both buffers came from the same finger. If this is true, then a template is generated from the combined data in both buffers stored again in both buffers. Otherwise, the module returns an error packet and does not generate a template. To finally store the template in non-volatile flash memory, one must specify a Page ID in flash memory for storing the template. This ID will also enable the user access individual templates at any time.
Here we use ESP8266 based Wi-Fi enabled microprocessor unit + 32Mb flash memory on a Arduino-UNO pinout. The WeMos D1 R2 Uno based ESP8266 a wireless 802.11 (Wi-Fi) microcontroller development board compatible with the Arduino IDE. It turns the very popular ESP8266 wireless (Wi-Fi) module into a fully-fledged development board.

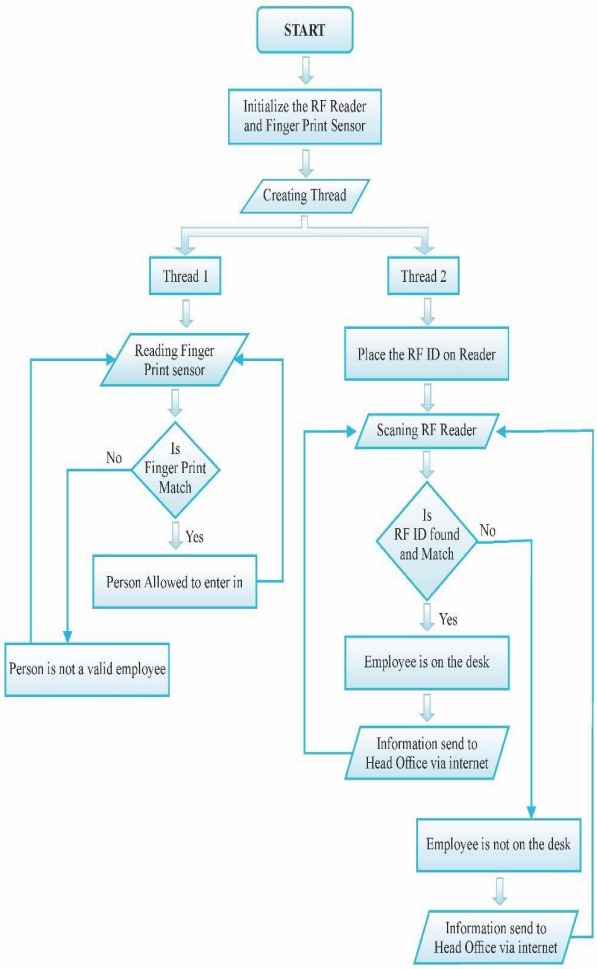


Fig.7 Flowchart of the IOT based Staff Monitoring System

The protocol that should be employed with this is given as follows:

The employee upon arrival at the office premises should use his assigned RFID tag id card at the gate to gain entry into the office. This ensures that only valid person can the premises and provides security. After this when the employee reaches at his desk he has to use his RFID id card at his assigned desk to gain access. For this he places his id card on the RFID reader if the RFID card matches only then he is granted access.at this point his time of entry at the desk is updated online at the head office website. Hence in the same way his entire days productivity and schedule is updated on the website. If the employee has to leave the office premises he has to use his RFID id card to leave the premises at this time the time which he leaves is also updated on the head office website. Hence the head office can easily manage the attendance and productivity of the employee also if the employee is missing from his desk for a long duration the his name is highlighted on the website and office manager can contact to find the exact reason for his absence. Hence this is very simple yet efficient method to track the productivity of employee from any location.

VII. RESULT

Fig.8 Web view of Result

This is how the employee's productivity and his presence on his desk will be updated on the website in real time and will be avaible to access by the employer from anywhere in the world. By using this it will be very easy to monitor employees work and award him accordingly for his efforts. We can also compare various employee's productivity to decide who deserves promotion.

VIII. CONCLUSION

In this System, IOT Based Staff Monitoring System can replace the manual system that transformation of information can be delivered without a hitch. This system will ease is school/collage/office/industries to monitor the student/staff/employees. The system can reduce manpower. Although there are different methods of tracking student/staff/employees but our system is very easy to handle and very convenient for collage/office/industries level. This system gives time saving, easy control and reliability.

IX. FUTURE SCOPE

- Using Arduino we can add voice announcement system to this project. so whenever user logs in, we can announce message like "Your attendance has been logged in" or "Your card is invalid".

- We can also use iris scanner instead of fingerprint sensor for better performance.
- We can implement GSM technology so that the user gets weekly update about his performance via text service.

REFERENCES

[1] S[1] Mahesh sutar,mahesh patil,sachin waghmare smart attendance system using rfid iniot,ijarcet,2015-2016.

[2] Z. Chalhoub, and S. EI Dahdaah, ―An RFID Attendance and Monitoring System for University Applications ‖Department of Electrical and computer and communication Engineering Notre Dame University Louaize Zouk Mosbeh, 978-1-4244-8157- 6/102010

[3] Longe O.O.(2009),‖Implementation of Student Attendance System using RFID Technology‖, B. Tech Project Report, Ladoke Akintola University of Technology, Ogbomoso, Nigeria.

[4] Dawes A.T. (2004),‖Is RFID Right for Your Library‖, Journal of Access Services, Volume 2(4), pp 7-13

[5] Mr. Tushar T. Tanpure, Mr. Harshad S. Sonawane, Mr. Chaitanya R. Sonawane, Ms. Priyanka V., ” Online Student Monitoring System Using Passive RFID”, International Journal of Innovative Research in Computer and Communication Engineering, Vol. 1, Issue 2, April 2013, page no. 409-1027, ISSN (Print) : 2320 – 9798.

[6] Rupak Kumar, Harshi Solanki, “RFID an Effective Authentication and Attendance System”, International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 6, June 2013, page no.1234-1236, ISSN: 2277 128X.