

“Employee/Student Attendance Temperature Monitoring Using RFID Cards”

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ABSTRACT: A Fingerprint sensor based attendance monitoring systems will have to be replaced or a back-up system is necessary in times of pandemic. Temperature Monitoring needs to be carried out as high temperature is one of the important symptom of Covid-19.

Sanitization - Irrespective of the disease, we must comply high hygiene standards and in this pandemic we have observed that sanitization of hands is very important to avoid spread of virus through surfaces to others as well as for our own safety. Daily tracking & monitoring of staff attendance with temperature shall ensure that the premises is kept clean and safe for people to work. The Corona Virus wave although has reduced to a great extent but we have also seen it's relapse with a stronger wave in UK. Hence we need to ensure that we are well equipped with technology to be safe and sound in the pandemic.

1. INTRODUCTION

Generally attendance and monitoring systems are designed with Biometric recognition features such as fingerprint IDs etc. Manual attendance has quite a lot of disadvantages and demand of automated attendance monitoring systems has increased quite a lot in this decade but this COVID-19 pandemic made us realize the importance of contactless attendance and monitoring systems such as RFID based attendance systems. Generally fingerprint based attendance systems are more popular in the market owing to its cost advantage and technology feasibility, but in the recent times this contact based attendance system had to be disabled due to the rapid spread of virus on surface contact basis. Any system that has to be used in technological terms has to keep in mind all the parameters and scenario where it has to be used in practical application. This gave rise to designing a contactless system where RFID tags are allotted to each employee/person and RFID reader helps to read this tag ID and authenticate the person using programming. The proposed system uses contactless temperature monitoring sensor which records this reading each time and with the help of controller and saves it in allotted sheet.

If the temperature of a person is greater than the threshold value then the entrance lock will not open for that person and also an alert through buzzer will be generated to indicate the people around or guard about the person's high temperature to avoid spread of infection. Temperature monitoring is an important part for avoiding spread of many diseases. In this project, it is proposed to use a low cost temperature sensor based on the paradigm of passive RFID tag antenna based sensing. A simple mechanical method to permanently induce changes in RFID tag power characteristics upon exposure to temperatures greater than a threshold is presented. The controller has an inbuilt WIFI module to send and store data over cloud using IOT. The received data will be stored in Google sheets. Another important factor for health safety and avoiding spread of contagious disease is to maintain hand sanitization and hence a sanitization module has been added in this project which will ensure that all the people enter the premises with clean hands.

The entrance of the premises will be automated in such a manner that it will open only for persons who have normal body temperature in order to curb spread of viral infections and help the company/schools/colleges maintain safe and hygienic premises. The designed project will be a prototype to indicate an efficient design for bulk manufacturing.

2. LITERATURE REVIEW

Title 1:-Attendance system based on RFID and Biometrics

Khwala A. Al Majjar, Omar Hegy IEEE 201, India

In this paper face recognition, fingerprint recognition and face recognition has been combined to remove the problems arising due to manual attendance systems. Two biometric features have been used in this paper to avoid failure chances of any system. If in case fingerprint is not detected, RFID system can be used as a backup.

Title 2:-An improved version of Student attendance management system based on RFID,

Daniel Mijic ,IEEE 2019

A web based application and RFID system is used to manage attendance of students, it also records necessary data and generates periodical data. This system is intended to be used in schools and only maintains the record of attendance. A web based application is designed separately to monitor the data and maintain its record for future use.

Title 3:-Enhanced Attendance management system: A Biometric system of identification based on fingerprint, Jian P. ,IEEE 2018

In this paper an advanced fingerprint based system has been proposed which records and stores attendance on daily basis and also generates reports periodically. It has been implemented with advanced software to add up extra features.

3. COMPONENTS USED

1. NodeMCU (ESP8266)
2. RFID Readers and Tags
3. Connectors
4. Resistors
5. Capacitors
6. Connection Cables
7. Connection wires
8. LED
9. Temperature Sensor
10. Relay
11. IR Sensor
12. Solenoid Lock
- 13.

1. NodeMCU (ESP8266):

NodeMCU has ESP-12 based serial WIFI integrated on board to provide GPIO, PWM, ADC, I2C and one wire resources at your finger tip, built in USB-TTL serial with super reliable industrial strength CS340 for superior stability on supported platform this module is one the cheapest WIFI module in the market. The NodeMCU is an open source from where and development kit but helps use to prototype IOT product and feed up IOT application development process. It has advanced API for hardware IO which can dramatically reduce the redundant work for configuring and manipulating hardware.



Figure: NodeMCU (ESP8266)

2. RFID Tags and Reader:

Co In most RFID systems, tags automatically emit their unique serial numbers upon reader interrogation without alerting their users. The challenge in providing security for RFID tags is such kinds of low-cost device unable to perform basic cryptographic operations. Basic RFID tags just have a little rewritable memory; even have no programmable-supported computing capability. At best, such RFID tags may include security functions supporting keyed reads and keyed writes which essentially just like PIN-controlled data accesses.

In this section, we show how privacy and authentication may be considerably improved in low-cost RFID tags with only a small enhancement of their capabilities.

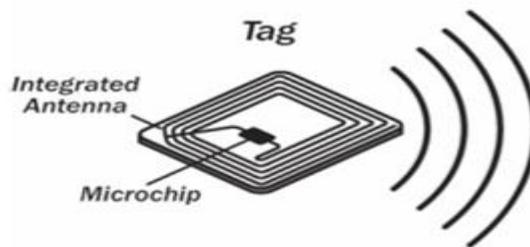


Figure :RFID Tag

3. Connectors:

The Connectors are used to provide support to our connecting wires. A connector is used to join different electrical circuits and it also called electrical connectors. They are used for multiple purposes. The connector is comprised of plugs and jacks. It also used as a temporary and permanent tool to supply electricity to any device. If two different types of connectors are used in a single device, then an adapter is used to connect them. The major used of connectors is to connect a copper wire to an electrical terminal.

There are many types of connectors. Commonly use connectors are:

- ❖ USB connectors
- ❖ Power connectors
- ❖ Blade connectors
- ❖ Plug connectors
- ❖ DC connectors



Figure :Connectors

We have used connectors on our circuit boards the simple and basic reason for using it to provide sufficient support to connecting

wires from breaking and these connectors are not so much expensive, and they are easily available in the market.

4. Resistors:

A resistor is an inactive two-terminal electrical component that executes electrical resistance as a circuit element. The current through a resistor is in the direct extent to the voltage over the resistor's terminals. This relationship is spoken by Ohm's law: $V=IR$ (3.1) Where "I" is the current through the conductor in a unit of amperes, V is the potential contrast that is measured over the conductor in units of volts, and R is the resistance of the conductor in units of ohms. Basic Reason We have used resistors on our circuit boards the simple and basic reason for the protection of current when it is exceeded the required limit.

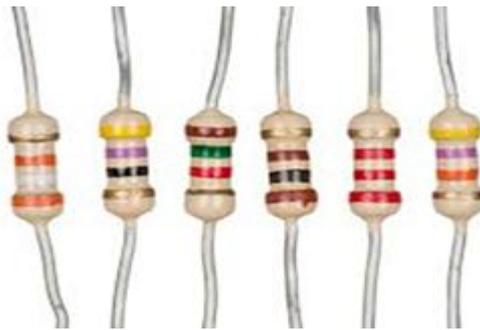


Figure :Resistors

5. Capacitors:

Capacitors are used to store electrical charge purposes. It is an inactive component whereby it has a couple of conductors that are isolated by a dielectric. Presence of a potential distinction over the conductors will make a positive charge to collect on one plate and negative charge on another plate. This energy is then put away in the electrostatic field. The mathematical form of charges stored in a capacitor is: $Q=CV$

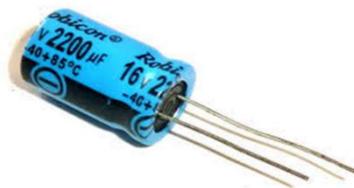


Figure :Capacitors

Basic Reason: We have used capacitors to block DC current while permitting AC current to go through and is most appropriately utilized as filtering networks (smoothing output signal) and many more.

6. Connection Cables:

A wire is a solitary, typically round and hollow, adaptable strand or bar of metal. Wires are used for holding up or to bear mechanical loads and to transport power and telecommunications signals. Wires are ordinarily formed by drawing the metal through a hole in a die or draw plate. Standard size is determined by different wire gages. The term wire is used freely to refer to a bundle of such strands, as in 'multi-stranded wire' which is all the more effectively termed a wire rope in mechanics, or a link in power.



Figure :Connection Cables

7.Connection Wires:

Connection of different electronic components is done through connecting wires or these are the path of current between different electronic components.

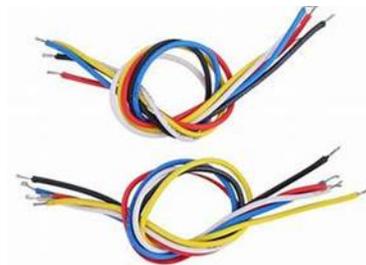


Figure :Connection Wires

8.LED:

Light emitting diode (LED) is a semiconductor device that discharges visible light when current goes through it. The light is not so bright but rather in many LEDs, it is monochromatic having a single wavelength. The yield or output of a LED can go from red (at a wavelength of approx.- 700 nanometers) to blue-violet (around 400 nanometers). A few LEDs give off infrared energy (830 nanometers or more) such a device is known as an infrared radiating diode (IRED).



Figure :LED

9.IR Temperature Sensor:

The MLX90614 is a contactless Infrared (IR) Digital Temperature Sensor from Melexis. The sensor can be used to measure the temperature of a particular object between -70°C to 382.2°C. The sensor uses IR rays to measure the temperature to the object without any physical contact.

MLX90614 sensor communicates to the microcontroller using the SMBus protocol which is similar to the I2C protocol. Thus the

sensor has 4 pins: VCC, GND, SDA & SCL. The sensor operates between 3.3V to 5V with a current requirement of 1.5mA. The accuracy of the sensor is 0.02°C. The sensor has a 17-bit ADC which allows reading the temperature with a smaller resolution of 0.0007. The best way to read the accurate sensor at a distance of 2cm-5cm with a field of view at 80°C.

Connect the VCC pin of MLX90614 & OLED Display to 3.3V Pin of NodeMCU ESP8266 & GND TO GND. Similarly connect the SDA & SCL pin of MLX90164 to D2 & D1 of NodeMCU respectively.

IoT based IR thermometer sends the sensor data on any cloud platform. The cloud platform that I selected in the blynk application. Blynk is a great IoT platform that can control hardware remotely, display sensor data, store data, visualize it.



Figure : IR Temperature Sensor

10. Relay:

Relay are switches which control (open and close) circuits electromechanically. The main operation of this device is to make or break contact with the help of a signal without any human involvement in order to switch it ON or OFF. It is mainly used to control a high-powered circuit using a low power signal. Generally, a DC signal is used to control circuit which is driven by high voltage like controlling AC home appliances with DC signals from microcontrollers. Relay Working: The relay in normally closed condition: when no voltage is applied to the core, it cannot generate any magnetic field and it doesn't act as a magnet. Therefore, it cannot attract the movable armature. Thus, the initial position itself is the armature connected in a normally closed position



Figure : Relay

11. IR Sensor:

An infrared (IR) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment. IR is invisible to the human eye, as its wavelength is longer than that of visible light. There are two types of infrared sensors: active and passive. Active infrared sensors both emit and detect infrared radiation. Active IR sensor have two parts: a light emitting diode (LED) and a receiver. When an object comes close to the sensor, the infrared light from the LED reflects off of the object and is detected by the receiver. Active IR sensor act as proximity sensors, and they are commonly used in obstacle detection systems (such as in robots).

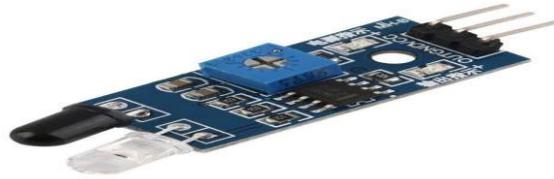


Figure: IR Sensor

12. Solenoid Lock:

The solenoid lock denotes a latch for electrical locking and unlocking. It is available in unlocking in the power-on mode type, and locking and keeping in the power-on mode type, which can be used selectively for situations. The power-on unlocking type enables unlocking only while the solenoid is powered on.



Figure: Solenoid Lock

14. ADVANTAGES

15. APPLICATION

- It can be used in schools.
- It can be used in offices .
- It can be used in collages .
- It can be used in hospitals .
- It can be used in clinics.
- It can be used in companies.
- It can be used in training centers.
- It can be used in tution classes etc .

16. CONCLUSION

This Report proposes a smart door locking system along with temperature detection and sanitization system. The advantage of this proposed system includes

- 1 Accurate monitoring and authentication of authorized person

2 Temperature detection and Automatic Sanitization.

It is easy to append more functions to this system since the system not only knows the statistical information but also the information of a special case for avoiding spread of dangerous diseases as well as the system can be easily used to communicate over internet on any device. Since the system monitors the parameters dynamically, it can also avoid biometric based authentication which uses contact based modules.

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