



# Employee/Student Temperature Monitoring Built in RFID Card.

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**ABSTRACT:** One of the criteria to measure the student performance is checking his regularity. Normally in schools and colleges attendance is marked by calling their names or register numbers and marking the attendance in register book. In laboratories log book is maintained to track the students and utilization of laboratory components. In both the cases it is time consuming and requires more paper work. Therefore institutes started using student attendance marking systems based on wireless technologies or biometric information such as finger print reading; face recognition along with RFID tags. In the present situation created by Covid-19 pandemic, the thermal screening is also very important to allow the student to attend the class. We propose an idea where along with face recognition temperature screening is also added to the attendance marking system. This system is designed using ultrasonic sensors, IR temperature sensor, camera module which is interfaced with Arduino. In this way, attendance can be marked automatically and at the same time system can scan individual student to identify potential patients of Covid-19.

**Index Terms:** biometric; finger print, face recognition, RFID tag, Covid-19

## 1. INTRODUCTION

Many smart attendance marking systems were developed. Few of them require mobile applications and other based on biometric information. Even though we have different choices as mentioned above, still new requirements are arising. Along with attendance tracking or marking, outbreak of Covid 19 imposed another concern of temperature screening on these systems. The Universities made it compulsory to scan everyone before entering the school or college. Hence, smart attendance marking system need to be implemented in place of traditional attendance marking. The objective of this paper is to propose a biometric based attendance marking system with temperature screening for schools or colleges.

## 2. LITERATURE REVIEW

Several attendance marking systems have been developed and are in use. These systems are designed either using wireless technology standards such as blue tooth low energy (BLE), Wi-Fi and Radio frequency identification(RFID) or technologies like finger print matching, face recognition, speech recognition. In Bluetooth based attendance marking systems mobile applications were implemented. The Mac Ids of student's device was mapped to fetch their identity. [1] A lecturer can take attendance by clicking the application installed in his mobile. Before starting the lecture the web service will be initiated and the session will remain active till lecture ends. Hence, lecturer can take attendance multiple times during the lecture hour and find the proxy attendance Using Bluetooth low energy beacons a smart attendance marking was proposed. [2] Beacons are small, low power transmitters which periodically broadcasts signals. These signals are universally unique identifiers recorded by mobile applications and then delivered to the web services. In each lecture student acquires a unique token upon login and mobile application sends the request for the scheduled lecture. From the beginning to end of the lecture, mobile application tracks student and device id as well as timestamp, later it is delivered to the web service. The problem with these Bluetooth based systems is students must carry Bluetooth enabled devices. If student does not have device then again we have to go back to manual attendance marking for such students. Even though some security measures were taken into consideration but still by sharing the mobile device student can give proxy.

The attendance system with finger print matching has been proposed. This system had two modules; enrolment and verification. A biometric finger print reader was interfaced with Arduino UNO. At very first time student has to enrol his fingerprint to store biometric information in database. In the later time finger print of the student was verified. A web application was used to store and access the attendance. To transmit the data to the attendance system Ethernet shield was used between Arduino and database. In this system main concern was reducing power consumption and storage as well as to provide reliable attendance marking system and temperature monitoring using RFID card.

### 3. OBJECTIVES

In the present scenario contactless attendance marking is gaining more popularity because of covid-19 pandemic. As much as possible human contact must be avoided. In the previous section we have discussed about Bluetooth based attendance marking system. This system imposes using mobile devices and applications to be installed in their device. In majority of the universities a strict rule is followed which does not allow carrying mobile phones. If we use RFID based system there one can steal their id card and gain entry into the classroom. There arises authentication problem in both Bluetooth based and RFID based systems. The next choice is biometric authentication with finger print scanning. Here either the finger print reader is passed to each student or one by one student will come to the place where device is mounted and provide their information. The main objective “contactless” is not achieved in this method. To overcome from these aforementioned problems we propose contactless attendance marking system which applies face recognition for authentication and to check the temperature of student thermal sensors are added.

### 4. METHODOLOGY

Contactless attendance marking and thermal screening system is designed using the concepts of IoT, Machine Learning and Artificial Intelligence. The entire system is divided into four major modules: Object’s proximity module, face recognition module, temperature screening module, and alert module as shown in Fig.1.

#### A) Functional Modules of proposed system

i) Object’s Proximity Module: This module identifies the student when he comes closer to the device. To find the distance from the attendance marking system ultrasonic sensors are used. An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object’s proximity. In a single ultrasonic sensor there is a Trigger and Echo, trigger emits the sound waves and echo receives the sound waves which were emitted by trigger, so the data from the ultrasonic which we receive is the time taken for the sound waves emitted from the trigger to the sound waves received back by echo, by this time taken we can calculate the distance between the sensor and the object.

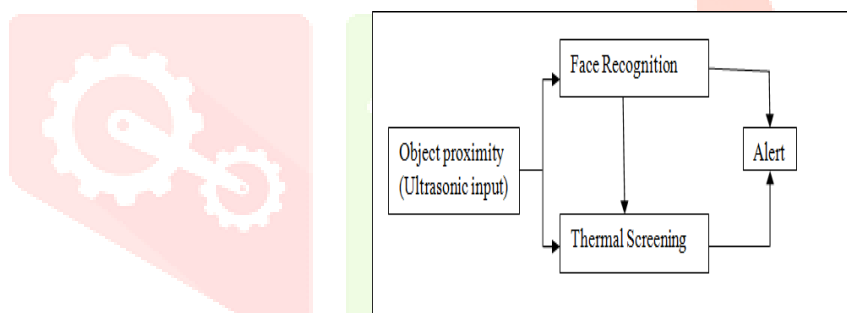


Figure1. Functional module

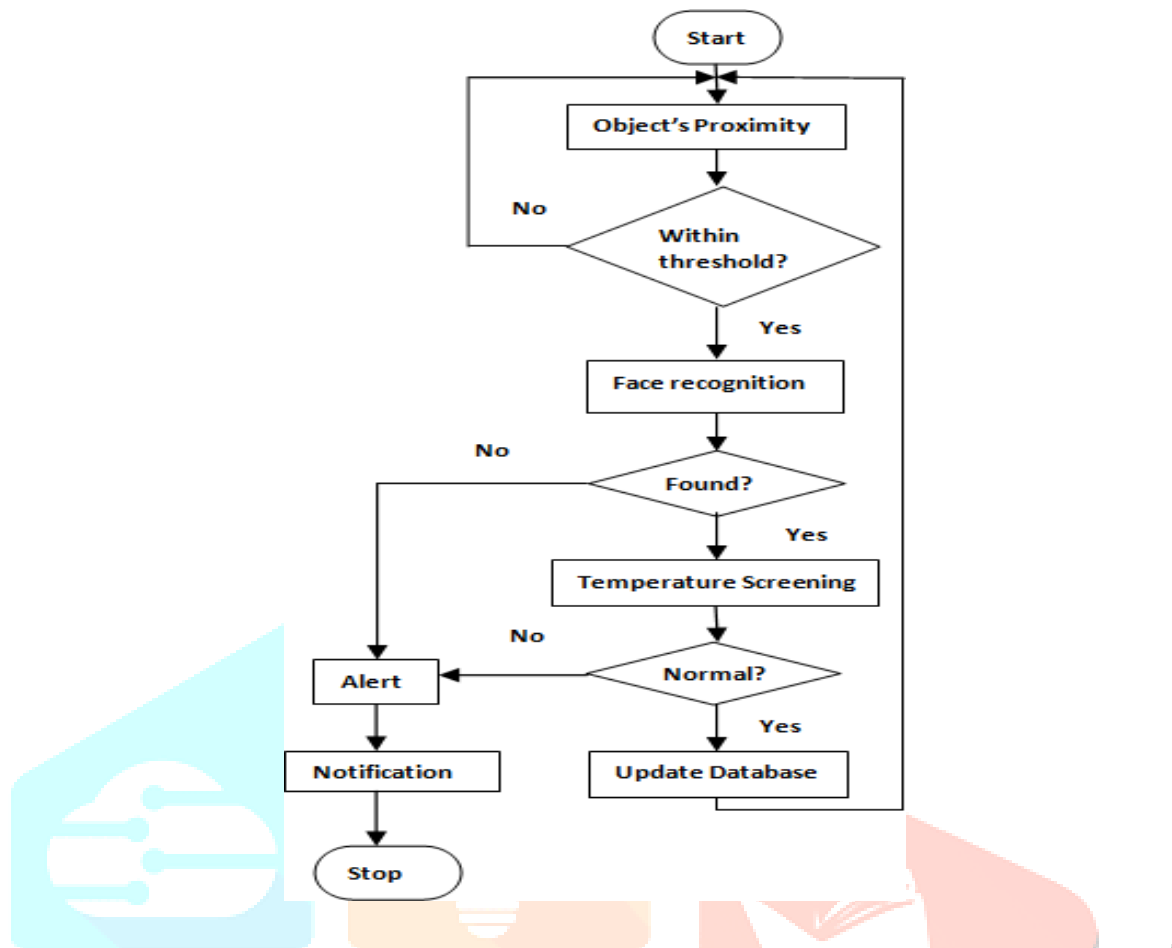
ii) Face Recognition Module – when the distance between student and the device is within the proximity set by the system, image will be captured. The face of the person is checked and compared with the face of the previously stored images of the authorized person in datasets. If it matches with stored image then it will proceed with temperature screening. Otherwise an image and SMS will be sent to the faculty. Selection: Highlight all author and affiliation lines.

iii) Temperature Screening Module – After face recognition is successful temperature screening will be done. Student’s identity, time stamp information and the temperature readings will be recorded only if temperature is not more than normal body temperature. On recognizing temperature higher than the normal temperature, buzzer is activated and generates an alarm.

iv) Alert module: As mentioned in the face recognition module, if capture image does not match with images stored in the database, and if temperature is high then warning message will be sent to the faculty. This Alert module takes advantage of some of the technologies that Mobile devices provide, technologies such as the Email and Short Message Service (SMS).

B) Workflow: Initially every student’s image will be taken and updated in the database. Fig.2 shows the flow diagram of proposed system. Accordingly, whenever student comes to attend class he has go with automatic attendance marking system. The ultrasonic sensor module finds the distance of the student from the device. If it is within the specified range then image will be captured and compared with stored information. Once the student’s face is recognized temperature will be read using thermal sensor and student’s details like identity, timestamp and

temperature will be recorded. It will continue to scan next student. In case some unknown person tries to enter into the class, SMS and email notification will be sent to the concerned faculty or admin.



**Figure2.**Flowchart of given system

These notifications are also sent when temperature of the student is above the normal body temperature.

## 5. CONCLUSION

It can be used in schools, colleges and offices where security and health is almost important. As the given contactless temperature monitoring system using Aurdino not only be used for attendance and thermal screening but also be used as pre security check. The given system will use to check the student, staff health care status.

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