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Internet-based Intelligent Attendance System for Employee and Contactless Temperature Monitoring System in Covid Situations

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Abstract: Following the COVID-19 epidemic, noninvasive temperature monitoring devices have become quite popular, with many of them employing an infra - red temperature sensor. This gadget detects a human's temperature without making any physical connection. We will also utilize NodeMCU and the Arduino IDE in this system to connect the MLX90614 infrared digital thermometer. So, using NodeMCU, an Infrared Temperatures, an Rf Receiver, and an Ultrasonic Sensor, we will develop an Internet - of - things Smart Workers Temperature Measurement method. It might utilize a contactless thermal sensor to monitor an employee's body temperature and broadcast the employee's identity and temperature to a web accessible from everywhere on the network. The site in a database stores the time, the item of content, and the conditions. When the distance seen between gadget and the individual is less than 20centimetres, the Ultrasonic Sensors estimate the distance between the object and the individual so that the detector can determine the temperatures with greater accuracy.

Keywords: Temperature monitoring system, Employee Attendance system, Infrared Temperature monitoring, RFID, IoT

INTRODUCTION

The pandemic caused by COVID-19 is now one of the most significant problems to world health that health authorities are facing. As of the 19th of November in the year 2020, the total number of people around the world who have been confirmed to have been infected with SARS-COV-2 is over 56.4 million. Additionally, there have been over 1.35 million deaths attributed to the coronavirus, which demonstrates that instances of COVID-19 are increasing globally [1]. The Internet of Things market has developed into a significant innovation that may be used in a variety of contexts. To be more exact, it is made up of a network of physical devices that may automatically obtain resources and interact with one another across wireless networks without the need for human involvement. Every nation is struggling to provide sufficient medical care for the patients because of the dramatic rise of COVID-19 cases that has occurred during the present phase of the outbreak. The temperature at which the skin is maintained is one of the most essential aspects of human health [2].

One of the emerging technologies that is now penetrating every part of human existence is called the Internet of Things (IoT). The Internet of Things is used most often in "smart homes," "automated businesses," "schools," "oil refineries," "environmental monitoring systems," "smart cities," and other similar applications. Adopting a smart health monitoring system that is based on the internet of things (IoT) is one way to reduce the risk of COVID-19. Covid Virus is rapidly expanding, which is quite concerning [3]. As a direct consequence of this, the health of the population has deteriorated. We are in critical need of a dependable system that can identify indicators of COVID and warn the appropriate authorities. An Internet of Things–based multiple Health Monitoring System that identifies COVID symptoms and notifies the appropriate authorities is the proposed solution. It has a contactless temperature sensor, an oxygen meter, an automated hand sanitizer, a camera module, a room occupancy limiter, and a social distancing module [4]. Additionally, it has a social distancing

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module. It is a method of assessing patients that does not involve any physical touch. The term "Internet of Things" refers to the process of connecting various devices to the internet and enabling them to interact with one another and with other devices. The information obtained from these Internet of Things-connected devices will be helpful in determining the nature of the situation and formulating an effective reaction. Because the lockdown has been lifted, it is necessary for us to provide a secure working environment for the employees in the office environment [5].

The tedious process of manually keeping track of their workers' attendance is a nuisance for most of the administrators who oversee organizational operations. The manual process of signing one's name on a piece of paper is not only unsecure but also time consuming. At these kinds of venues, an efficient attendance monitoring system really must be put in place [6]. Challenges like proxy attendance may be overcome with the use of an attendance system that uses radio frequency identification, often known as RFID. This article describes the creation of an automated attendance system based on RFID technology. This system makes use of RFID tags that are connected to ID cards to identify each employee and student in a unique manner. When compared to the method that has been used in the past, this method makes the system for recording attendance simpler, more efficient, and more reliable. This system is designed to be used in a wide range of office buildings, commercial spaces, and educational facilities, among other possible settings [7].

In recent decades, there's been a growth in the variety of technologies that are based on Radio Frequency Identification (RFID) technologies. These technologies have been effectively applied to many fields, including travel, health care, agriculture, and the hospitality sector, to name just a few of the many possible applications. The combination of electronic tags, either passive or active, with suitable scanners makes it possible for RFID technology to provide automatic wireless identification. In this study, an effort is made to utilize RFID technology to address the ongoing challenge of accurately monitoring attendance at lectures that occur in developing countries [8].

The time-consuming process of taking attendance and assembling data is tackled head-on in this article, which outlines a concept and a framework for collecting attendance in colleges and schools with the intention of speeding up, streamlining, and simplifying the process. Educational institutions are the target customers for this product because they have a high need for an automated system that is affordable, user-friendly, portable, energy-efficient, and secure. Because of this, this prototype provides a combined answer to the problem of updating traditional attendance systems that are already in place with embedded attendance systems. The most important advantages are its cheap cost, its compact size, and its high efficiency with low energy consumption [9].

The proposed project will be used in applications such as online study material, notices, academic progress and online exam reminders, online attendance monitoring, performance record, and parent intimation system [10]. These applications will be built using Android apps. This method enables teachers to collect attendance by smartphone and maintain student records for progressive evaluation [11]. This system sends SMS notification to students when their attendance falls below the given attendance level [12].

PROPOSED METHODOLOGY

It might utilize a non-contact infrared temperature sensor to monitor an employee's body temperature and broadcast the employee's identity and temperature to a webpage accessible from anywhere on the internet. The site in a database stores the time, the item of information, and the temperatures. When the distance seen between gadget and the individual is less than 20centimetres [17], the Ultrasonic Sensors estimate the distance between the object and the individual so that the detector can determine the temperatures with greater accuracy.

By simply connecting the two boards, we have a complete node that can be used to read and write data from the EM18 Reader. We can further expand the system by adding more modules, such as the EM12 Reader and the EM3 Reader, which would allow us to build a system capable of reading multiple RFID tags simultaneously. As you can see, building a node with the EM18 RFID module is quite straightforward.

Most microcontrollers and PCs can drive this module with a USB to a Serial converter. EM18 is an ideal choice for simple proximity system applications such as access control, retail inventory, back-office applications, and logistics. The sensor is powered by a 5V power source and is connected to the BUZ pin of the RFID Module. When you scan an RFID card on the reader module, the transponder within the card sends all the information, such as a particular ID, to the RFID Module in the form of an RF signal. This reader module also

has a BUZ pin for connecting a Buzzer to detect a genuine RFID card. The module has a UART interface for serial communication and several GPIO pins for enabling different functionalities.

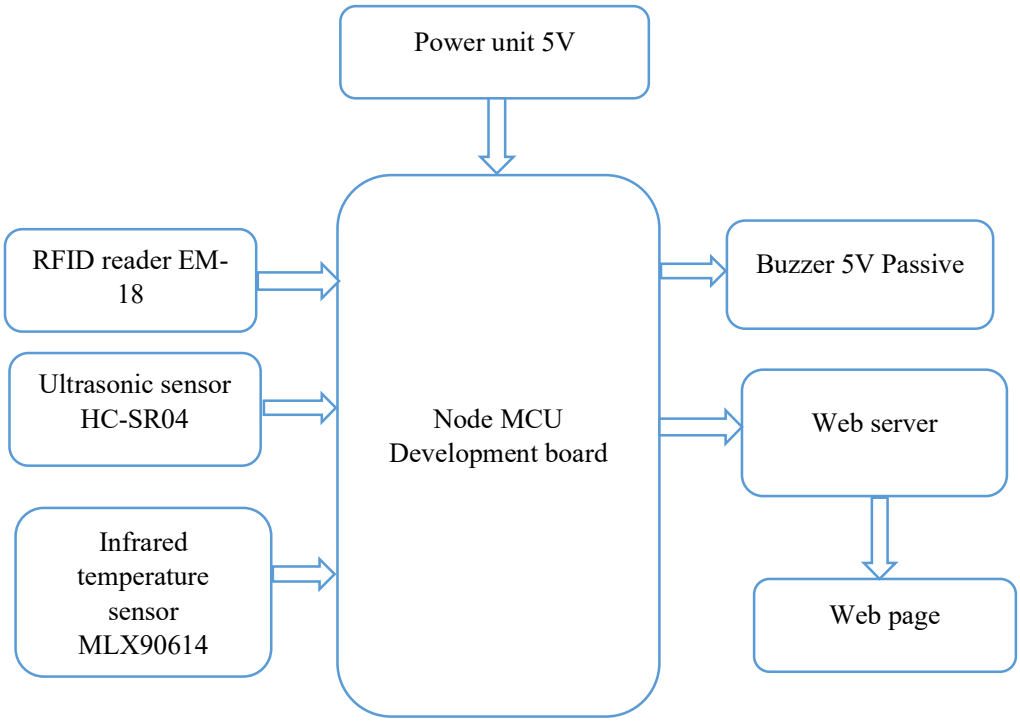

FIGURE 1. Proposed model

RESULTS AND DISCUSSION

The database server also receives the data from the RFID reader which is used to track employee or student attendance. The RFID reader is attached to the door of the rooms and is read using RFID card [14] and the data from the card is transmitted to the database server [13] and stored in the server for further processing. A mobile device is used to view the data and manage the attendance of the employees or students.

Simply placing an RFID card [15] or tag on the scanner will allow an employee or student's attendance to be recorded, as well as the individual's temperature reading for the day. This is all that is required of the employee or student. In addition, because the system is synchronized with a clock that displays accurate time, the attendance that is recorded will be more accurate [16]. Therefore, we can monitor the assembled time of the employees remotely over the internet. If the employer's temperature is higher than the predetermined threshold value, the buzzer will sound. Figure 2 depicts the actual hardware being used to create the system.

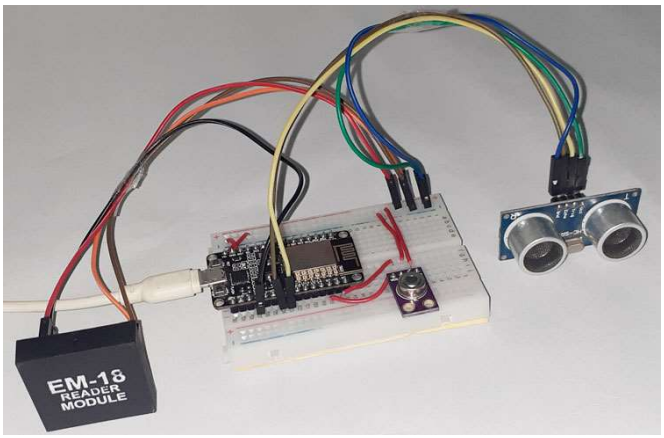

FIGURE 2. Hardware implementation

Here we used the private web server to upload the employees' details and temperature on the database. The system will upload the data in real time as shown below.

Employee Temperature Logger

Time	Name	Temperature (°C)
6:34:58 PM	Employee1	37.29
6:34:56 PM	Employee1	36.85
6:34:53 PM	Employee1	34.83
6:34:51 PM	Employee1	34.71
6:34:46 PM	Employee1	37.69
6:34:44 PM	Employee1	34.77
6:34:42 PM	Employee1	34.71

FIGURE 3. Temperature database

Figure 3 shows the database of the employees' details. Here we can see that the employee's signing time is also mentioned with the temperature data.

CONCLUSIONS

This is especially critical in healthcare, where a single minute of an employee's absence can spell disaster. With the rise in the use of smartphones and their ubiquitous availability, the use of mobile devices for this purpose is not only possible, but increasingly cost-effective. Using a mobile phone, an EM18 RF receiver, and a proximity sensor, we will develop an IoT platform that enables the automatic tracking of staff attendance. This platform will be made available through a mobile application that can be used by healthcare facilities to keep a constant check on their workforce. The proposed system is implemented using the MCU Controller, a wireless access point, an ID card, and an RFID tag and contactless temperature sensor for monitoring the temperature of the employees. The system is tested using five participants and the data collected is analyzed using the system.

The results show that the RFID-based attendance tracking system is reliable and can be used to improve the security of the school. Also, this system is easy to scale up and can be used in other schools and educational institutions.

REFERENCES

[1]. V. Ramesh, M. Sankara mahalingam, MS Divya Bharathy, and R Aksha, 2017, "Remote temperature monitoring and control using IoT," In *2017 Int. Conf. on Computing Methodologies and Comm. (ICCMC)*, pp. 1059-1063.

[2]. C. Chakraborty, S. Roy, S. Sharma, T. Tran, P. Dwivedi, and M. Singha, 2021, "IoT Based Wearable Healthcare System: Post COVID-19," *The Impact of the COVID-19 Pandemic on Green Societies environmental Sustainability* pp. 305-321.

[3]. V. Somasundaram, M. Kannan, and V. Sriram, 2016, "Mobile based attendance management system," *Indian Journal of Science and Tech.,* **9(35)** pp. 1-4.

[4]. H. K. Nguyen, and M. T. Chew, 2017, "RFID-based attendance management system," In *2017 2nd Workshop on Recent Trends in Telecommunications Res. (RTTR)*, pp. 1-6.

[5]. M. Sindhuja, and M. Yuvaraju, 2015, "Congestion Control Using On-Board Data Units in VANET Scenar IOS," *Int. J. of MC Square Sci. Res.*, **7(1)**, pp.1-9.

[6]. C. Mertz, 2011, "Continuous Road damage detection using regular service vehicles," In *Proc. of the ITS world congress* No. s 1, pp. 5-8.

[7]. V. Pham, C. Pham, and T. Dang, 2020, "Road damage detection and classification with detectron2 and faster r-cnn," In *2020 IEEE Int. Conf. on Big Data (Big Data)* pp. 5592-5601.

[8]. S. Syaiful, and L. Lasmana, 2020, "A Study on Level of Railway Road Damage with Sustainable PCI Method," *ARPN J. of Eng. and Applied Sciences*, **15(8)**, pp.962-968.

[9]. A. Pascale, M. Nicoli, F. Deflorio, B. Dalla Chiara, and U. Spagnolini, 2012, "Wireless sensor networks for traffic management and road safety," *IET Intelligent Transport Systems*, ***6*(1)**, pp.67-77.

[10]. M. Boltze, and V. A. Tuan, 2016, "Approaches to achieve sustainability in traffic management," *Procedia engineering*, **142**, pp.205-212.

[11]. M. E. Ben-Akiva, H. N. Koutsopoulos, R. G. Mishalani, and Q. Yang, 1997, "Simulation laboratory for evaluating dynamic traffic management systems," *J. of Transportation Eng.*, **123(4)**, pp.283-289.

[12]. M. Sindhuja, and M. Yuvaraju, 2015, "Congestion Control Using On-Board Data Units in VANET Scenar IOS," *Int. J. of MC Square Sci. Res.*, ***7*(1)**, pp.1-9.

[13]. K. Dresner, and P. Stone, 2004, "Multiagent traffic management: A reservation-based intersection control mechanism," In *Autonomous Agents and Multiagent Systems, Int. Joint Conf. on*, **3**, pp. 530-537.

[14]. Y. Chen, S. T. Gurumani, Y. Liang, G. Li, D. Guo, K. Rupnow, and D. Chen, 2015, "FCUDA-NoC: A scalable and efficient network-on-chip implementation for the CUDA-to-FPGA flow," *IEEE Trans. on Very Large-Scale Integration (VLSI) Systems*, **24(6)**, pp.2220-2233.

[15]. M. Orlandić, J. Fjeldtvedt, and T. A. Johansen, 2019, "A parallel FPGA implementation of the CCSDS-123 compression algorithm," *Remote Sensing*, **11(6)**, pp. 1-19.

[16]. M. Ali, P. A. Rad, and D. Göhringer, 2020, "RISC-V based MPSoC design exploration for FPGAs: area, power and performance," In *Int. Symposium on Applied Reconfigurable Computing*, pp. 193-207.

[17]. S Murugan, A. Bhardwaj, and T. R. Ganeshbabu, 2015, "Object recognition based on empirical wavelet transform," *Int. J. of MC Square Scientific Res.* **7(1)**, pp. 74-80.