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An Efficient IoT based HR Management System using Node MCU

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ABSTRACT: The worldwide imprisonment of companies and industries that were enforced and mandated to curb the unfold of the Covid 19 virus generated a distinctive and significant challenges for both workers and employers across the world. The employees around the world were over night turned into many categories like "Remote Employees", "Essential Employees", "Health Workers", "Emergency Workers" etc. But the safety of these workforce which comes physically to work in the workspace are not clearly defined. Hence adding up to the risk of the spread of Infectious Diseases.

This project automates the entry/exit of the workers in any trade or geographic point, by detecting their body temperature mechanically when the worker checks in, maintain and analyse the information for future reference.
It provides an affordable hardware integrated solution for worker management system particularly throughout Pandemic state of affairs. This automatic solution permits the Employer to establish of a secure operating setting for his or her workers, sporadically check his workers health knowledge, their vaccination details etc.

KEYWORDS: Automation, Body Temperature Sensing, LM35, Health Security, NodeMCU, IoT.

I. INTRODUCTION

Certain Businessesare required to run even in the pandemic, struggle to pay attentionto the health history of their staff. There are many systems for maintaining the worker database, but current pandemic situation has created a need for maintaining the health history of the employee and continuously monitor the same to keep check on probable danger of any contagion spread.

In 2019, not even 10% of business leaders from developed republics considered the spread of any viruses as a universal risk. Nor were companies anticipating that an epidemic might test their public repute as a responsible employer. Yet in early 2020 all administrations started facing a big catastrophe and the need to address the urgent apprehensions of various categories of workers like those who can and continue to work remotely, non-remote workers who can work remotely with proper support, those that cannot work for a spread of reasons and people who still work in person. Moreover, many companies, across many sectors, had not implemented flexible or distant working arrangements. Even many companies struggle in establishing and maintaining a safe working atmosphere for their non-remote working population. In the current situation, most businesses are in necessity to put in place new measures for their workforces rapidly – often with no previous comparable experiences.

During a pandemic, wellbeing assumes a new urgency. An employer's actions in supporting wellbeing are critical to putting together and sustaining workforce resiliency and sending the message that employees' matter.
Companies got to support employees through clear communication during all phases of an organization's response to COVID-19. They need to maintain a very safer workspace for their resources to come and work efficiently. And companies must seek to maximise the coverage of all employees, including those in roles where remote work is feasible also as non-mobile employees (e.g., customer-facing retail and repair workers). Henceforth, an integrated system to check and maintain the employee health history is all that is the need of the hour and world indeed.

II.SYSTEM MODEL AND ASSUMPTIONS

It is a temperature sensing system integrated with computer that measures and maintains the vital sign of the worker primarily Temperature. The worker will sign in with a QR code provided in his ID card, which can be scanned by the QR Scanner of the System. It validates the identity of the worker and checks his body temperature. By processing the temperature with internal algorithms, the system permits the Entry of the worker if: - His Temperature is normal AND

His health check-up is up to date. If any of thecondition isn't met, then the person is denied entry and therefore the notification is sent to the unit Manager.

Temperature sensing is done with Non-contact Temperature sensing device to take care of hygiene. this method maintains the health history of the worker in conjunction with the attendance details. It's assumed that in the Pandemic state of affairs, associate worker is predicted to take up regular health check-ups which knowledge conjointly ought to be maintained within the official records.

This project consists of a system with temperature as the control parameter, that keeps check on the entry and exit of the worker.
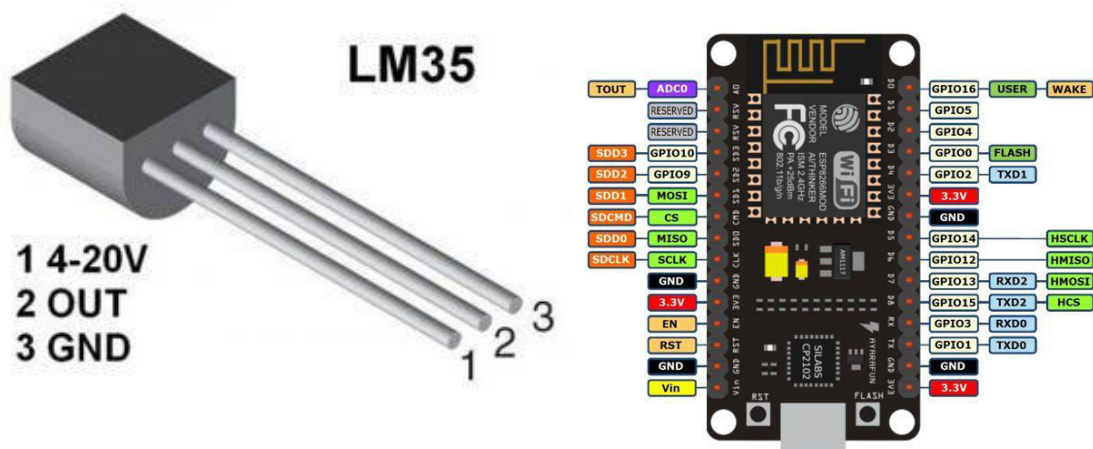

Fig1. Pinouts of LM35 and NodeMCU

Fig2. Model of the ID card with QR Code

III.WORKING AND METHODOLOGY

The entire set up is divided into two parts – Sensing System and Analytics System

1.CYE Sensing System:
This set up consists of QR Scanner andTemperature sensor. The QR scanner mounted at the sensing area where the employee scans his ID card to Check IN. Once the code is scanned, the employee's name and his ID number is displayed in the UI, then the temperature sensor senses the temperature of the Employee. The temperature data is analysed in the Analytics system, to validate the entry of that Employee. The Employee data scanned from the QR code and the temperature data is collected and stored in the data base.

2.CYE Analytics System:

This set up is the back-end algorithm of the proposed software. The temperature data collected from the sensor is analysed and determined if the employee's temperature is acceptable for entry. If any abnormal body temperature is sensed, the employee is alerted and denied entry. The HR is notified about the same, so that the required precautions can be taken to contain the infection and potential threat. The Process is entirely automatic and mobile notification is sent to the concerned official through cloud technology.
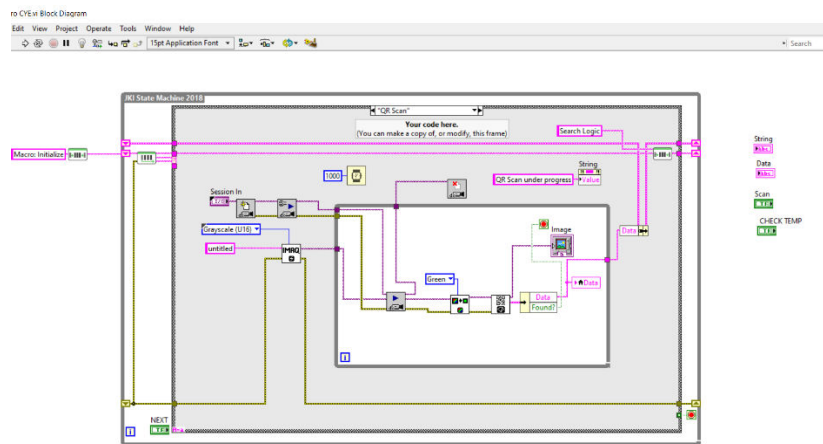

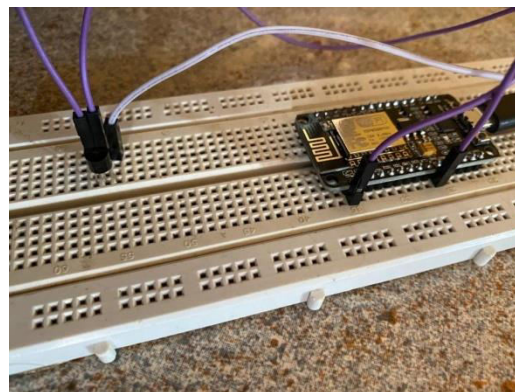Fig3. Block Diagram of the LabVIEW code

Fig 4. Hardware – Sensor Interfacing with Arduino.

IV. SIGNIFICANCE OF THE SOLUTION

Amidst this Pandemic situation, any employee working physically in a workspace tend to face the risk of infection. He might be a victim of the infection or a potential carrier who can infect to his fellow mates. To check this potential risk, minimum precaution which can be taken is to monitor the body temperature of the employee during his entry/exit to the workplace. Manually checking the temperature of the employees results in following shortcomings:

- No Data Logging
- Possibility of Manual Error
- Tedious and Repetitive Process
- Time consuming
- Difficulty in Data Maintenance

This project automates the entry/exit of the employees in any industry or workplace, by detecting their body temperature automatically as the employee checks in, maintain and analyse the data for future reference. It provides a

low-cost hardware integrated solution for employee management system especially during Pandemic Situation. Our solution proposes following features: -

1. Validates the employee check in/Check out at the entry and exit.
2. Automates the temperature checking of the employees during entry.
3. Identifies potential risky employees and alerts them.
4. Maintains the health data of the employees, thereby tracking their infection probability/possibility.

This automated solution enables the Employer to maintain a safe working environment for their employees, periodically check his Employees health data, their vaccination details, swab test reports etc.

V. RESULT AND DISCUSSION

Fig 5 shows the Front Panel of the application. The User Interface is designed using LabVIEW and the inputs include-Temperature Sensing and QR code scanning.

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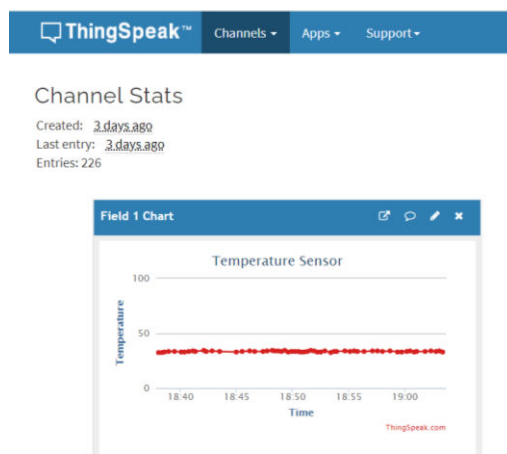Fig 5. Front Panel of the Application designed using LabVIEW

Fig 6. The temperature data of the Employee collected in the cloud.

For this Project, we have used the cloud resource from "Thingspeak" and interfaced it with LabVIEW to process the temperature data.

VI. CONCLUSION

Thus, this cohesive solution permits the Employer to automate the worker check in/Check out method throughout Pandemic in any Industry/Workspace. Also, Maintain the information of Temperature of the worker throughout entry/exit, along with the health Check-up details. Therefore, to spot the workers in risk and take necessary precautions to prevent infection spread.

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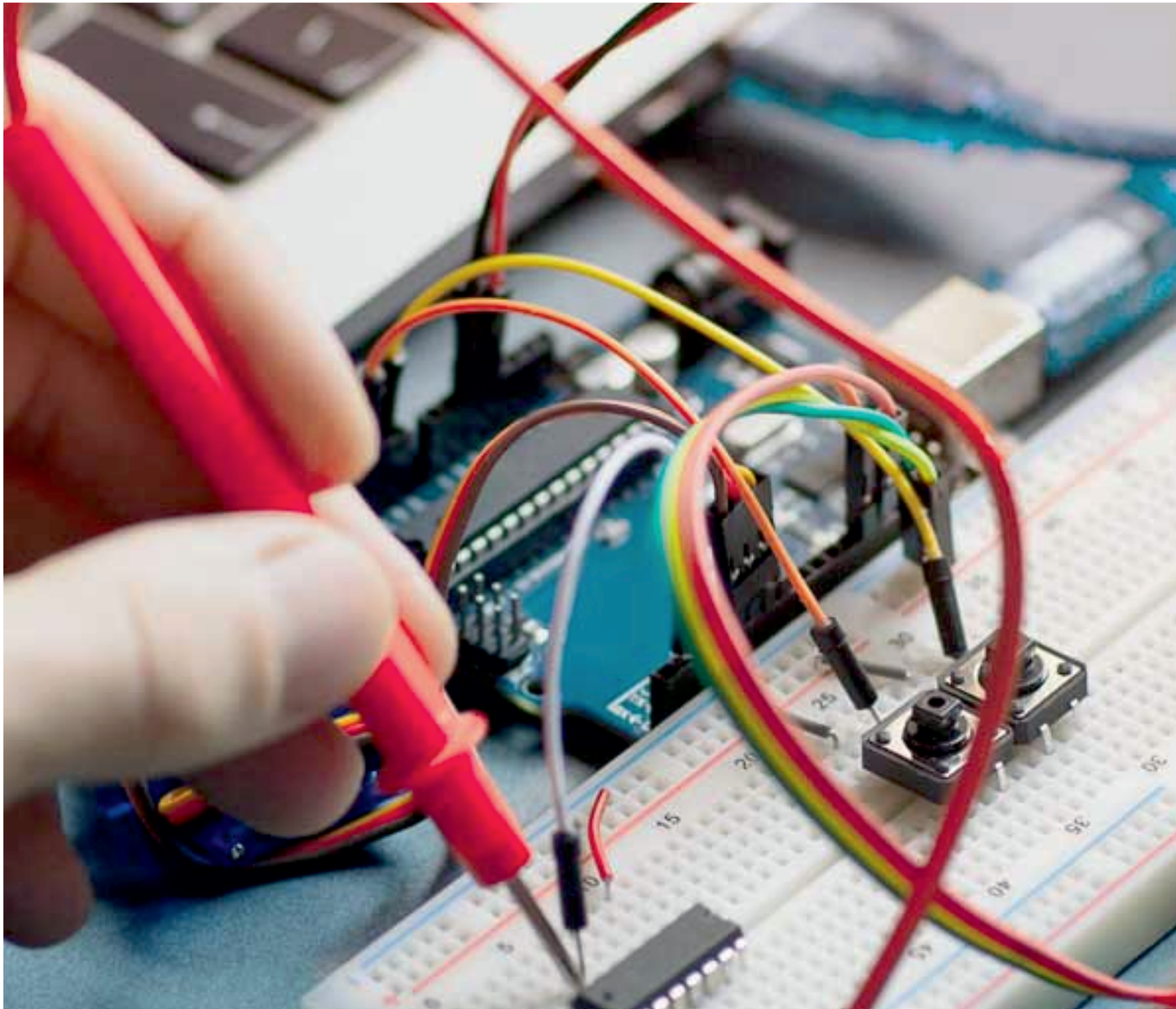
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