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Face Mask & Temperature Detection for Covid Safety using IOT & Deep Learning

M.Viji¹, B.Nandini²

Assistant Professor, Department of Electronics and Communication, Jaya Engineering College, Thiruninravur,
Tamilnadu, India¹

PG Student, Department of Electronics and Communication, Jaya Engineering College, Thiruninravur,
Tamilnadu, India²

ABSTRACT: Infectious diseases such as influenza and coronavirus disease 19 covid-19 cause millions of deaths around the world. The pathogens of such diseases are mainly spread by droplets or aerosols as a result of cough, sneeze, etc. Today's technology has enabled some areas such as schools to continue in operation, but there are some other areas or jobs that still require face-to-face contact, for instance, hospitals. To reactivate the economy, a certain level of on-site or face-to-face activity is needed, but always observing healthcare regulations such as wearing a face mask. The IoT together with AI techniques could work to provide interesting solutions for the covid-19 pandemic. The COVID-19 pandemic has underscored the critical importance of safety measures in public spaces to mitigate the spread of the virus. In response to this global challenge, we present a cutting-edge solution—Face Mask & Temperature Detection for COVID Safety—integrating Internet of Things (IoT) technology and deep learning algorithms. This innovative system is designed to enhance safety in public and private environments by automatically identifying individuals wearing face masks and accurately measuring their body temperatures, reducing the risk of viral transmission. IoT devices equipped with thermal sensors, cameras, and connectivity capabilities. The methodology comprises the following key components IoT devices, strategically placed at entry points or high-traffic areas, capture real-time data related to individuals' body temperatures and facial attributes.

KEYWORDS: Raspberry pi, GPS, GSM, Drowsiness, Vibration Sensors.

I.INTRODUCTION

A new and deadly virus known as sars-cov-2, which is responsible for the coronavirus disease (covid-19), is spreading rapidly around the world causing more than 4 million deaths. Hence, there is an urgent need to find new and innovative ways to reduce the likelihood of infection. One of the most common ways of catching the virus is by being in contact with droplets delivered by a sick person. The risk can be reduced by wearing a face mask as suggested by the world health organization (who), especially in closed environments such as classrooms, hospitals, and supermarkets. However, people hesitate to use a face mask leading to an increase in the risk of spreading the disease, moreover when the face mask is used, sometimes it is worn in the wrong way. In this work, an autonomic facemask detection system with deep learning and powered by the image tracking technique used for the augmented reality development is proposed as a mechanism to request the correct use of face masks to grant access to people to critical areas. To achieve this, a machine learning model based on convolutional neural networks was built on top of an IoT framework to enforce the correct use of the face mask in required areas as it is requested by law in some regions.

The outcome and benefits

A body temperature monitor and alert system that is utilized in hospitals was created by chen yu et al. The suggested system makes use of USB communication interface technology, 1-wire bus temperature sensor DS18B20, and humidity sensor HS1101. This effectively keeps track of the patients' body temperatures on each ward. M.N Mohammed et al. [8] proposed the development of a system that uses a mounted thermal imaging system mounted on a smart helmet to automatically identify the coronavirus from the thermal image with minimal human interaction. In order to monitor the screening procedure and obtain real-time data, the thermal camera technology is integrated into the smart helmet and linked with IoT technology. The suggested system also has facial recognition technology, can show the pedestrian's personal information, and can take their temperature automatically. Mohamed Loey et al. Offered a strategy to stop the spread of COVID-19 by spotting people without face masks. The model is based on both traditional machine learning

classifiers and deep transfer learning. Deep transfer learning and conventional machine learning techniques were used to create the model. In a different paper, Arjay das et al. Described a method that accurately recognizes the face in the image before determining whether or not the image has a mask. A face and a mask can both be detected while they are in motion. 2 datasets were used in this strategy. Images of people wearing face masks are in dataset 1, whereas pictures of people without face masks are in dataset 2.

II. PROPOSED SYSTEM

The proposed work will keep an eye on the person's body temperature and make sure that they are wearing a mask in an effort to stop the virus from spreading. A raspberry pi single-board computer is employed in this work. It is a cheap device that connects to a computer. In this prototype, when someone gets into the PLACES, their body temperature is taken. For this, a body temperature sensor called the MLX90614 is employed. The LED display will flash a red warning light if the user's body temperature is too high and a green warning light if the temperature is normal. A raspberry pi camera is used to detect masks.

The buzzer will be audible throughout the bus if the person is found without a mask. Code is created for the MLX90614 temperature sensor, which is connected to the raspberry pi's GPIO pin. If the temperature exceeds the threshold value, the red light will be displayed as a warning. If the temperature is normal, the green light will be displayed.

Face mask recognition uses the convolution neural networks (CNN) technique, a deep learning algorithm. It is mostly utilized for image analysis and picture recognition. A final result is produced by combining around filters, and the output is then forwarded to the neural network's next layer. Utilizing the face mask detection algorithm and the tensor flow software library, the proposed solution is evaluated. In this approach, if an individual tries to enter without wearing a mask, the buzzer will be heard.

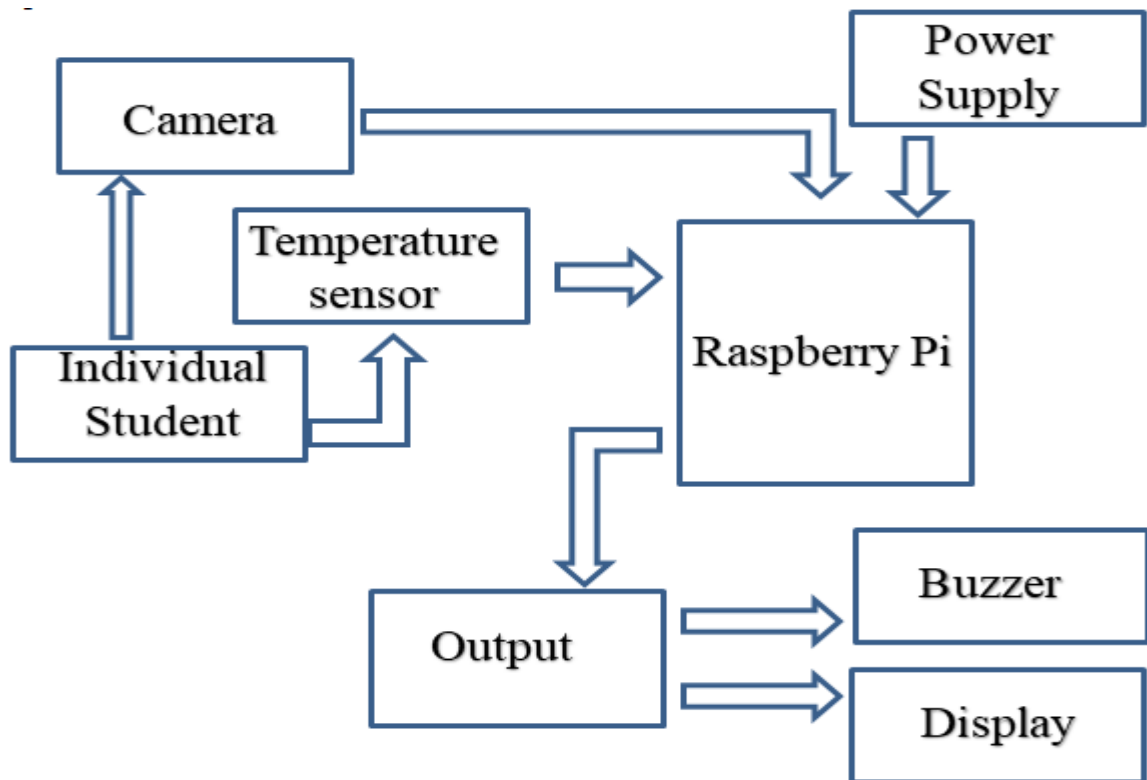


Fig. 1 Architecture of proposed system

III. WORKING FLOW

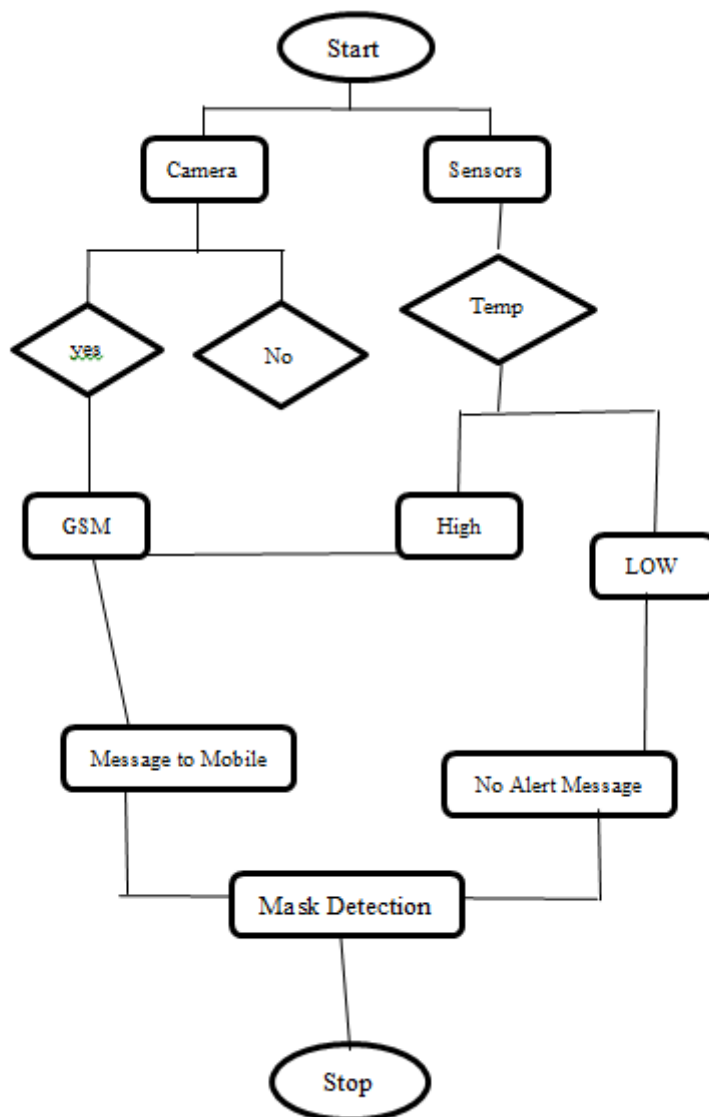


Fig. 2 Architecture of Workflow Chart

IV. COMPONENTS DISCRIPTION

Raspberry Pi Controller:

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games. The Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker projects, from music machines and parent detectors to weather stations and tweeting birdhouses with infra-red cameras. We want to see the Raspberry Pi being used by kids all over the world to learn to



program and understand how computers work.



Fig. 3 Raspberry Pi

Buzzer

A **buzzer** is a small yet efficient component to add sound features to our project/system. It is very small and compact 2-pin structure hence can be easily used on breadboard, Perf Board and even on PCBs which makes this a widely used component in most electronic applications.

There are two types are buzzers that are commonly available. The one shown here is a simple buzzer which when powered will make a Continuous Beeeeeeppp... sound, the other type is called a readymade buzzer which will look bulkier than this and will produce a Beep. Beep. Beep. Sound due to the internal oscillating circuit present inside it. But, the one shown here is most widely used because it can be customized with help of other circuits to fit easily in our application.



Fig. 4 Buzzer

Power Supply:

Power supply is termed as a device which is useful to supply the electric power to the required devices through it to the electrical load. The main function of the power supply is to change the electric current and then power the load. A power supply is a component that supplies power to at least one electric load. Typically, it converts one type of electrical power to another, but it may also convert a different form of energy – such as solar, mechanical, or chemical - into electrical energy.

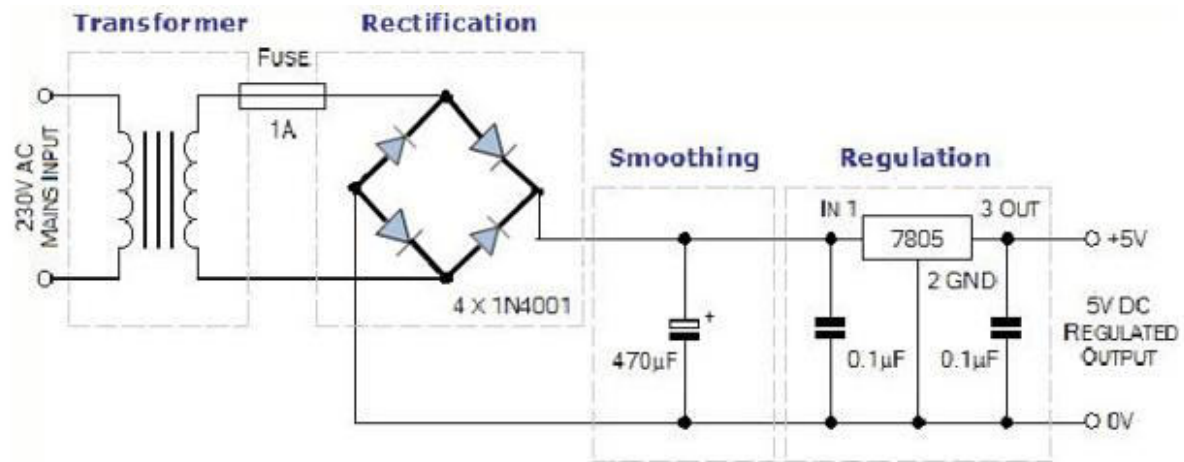


Fig. 5 Power Supply

A power supply provides components with electric power. The term usually pertains to devices integrated within the component being powered. For example, computer power supplies convert AC current to DC current and are generally located at the rear of the computer case, along with at least one fan. A power supply is also known as a power supply unit, power brick or power adapter.

MLX90614 Sensor

A non-contact infrared temperature measurement tool is the MLX90614 model. It makes use of a strong DSP processing unit with high-temperature resolution and measurement precision, a low-noise amplifier, and a 17 b A/D converter. The thermometer has a range of -40 to +125 degrees. The sensor also produces reliable digital signals that are linearly connected with temperature, simplifying the design. The sensor communicates with the microcontroller using the I2C protocol and measures the object's temperature using IR rays without making any physical contact.

Hardware Requirements:

- Raspberry pi
- Display
- Temperature sensor
- Buzzer
- Pi Camera
- Power supply

Software Requirements:

- Raspbian OS
- Python

RASPBIAN OS

There are tons of operating systems for the Raspberry Pi. While many Pi compatible OSes are Linux distributions (distros), Android, Chrome OS, and non-Linux images are available for the RasPi as well. Despite the plethora of operating system choices, the Raspberry Foundation's own Raspberry Pi OS remains a top choice as one of the best Raspberry Pi distros available. However, since its inception, the operating system formerly known as Raspbian has evolved greatly. Learn all about Raspberry Pi OS, from what it is, its history, and why you should use it! Raspberry Pi OS is a free, open-source Debian Linux-based operating system engineered for use on Pi boards. Additionally, several ARM-based single-board computers also run Raspberry Pi OS. The first version, then known as Raspbian, debuted in 2013, and from 2015 onwards the Raspberry Pi Foundation offered it as an officially-sanctioned Pi distro. Developers



Peter Green and Mike Thompson are responsible for creating Raspbian, initially an independent endeavor.

V. METHODOLOGY

Deep Learning Algorithms: Advanced deep learning models are employed to analyze the data streams from IoT sensors. These models are trained to detect faces and evaluate whether individuals are wearing face masks or not, achieving high accuracy and efficiency.

Temperature Measurement: Thermal sensors within the IoT devices enable non-contact temperature measurement. The system records body temperatures and identifies individuals with elevated temperatures, a common symptom of COVID-19.

Alerting Mechanism: When a person is detected without a mask or with an elevated temperature, the system generates automatic alerts. Notifications can be sent to on-site personnel or authorities for immediate action.

Data Visualization and Reporting: The system offers real-time data visualization, enabling users to monitor compliance with mask-wearing and temperature checks. Historical data and reports provide insights into trends and potential hotspots.

Integration with Access Control: The system can be integrated with access control mechanisms to restrict entry for individuals without masks or with abnormal temperatures, ensuring safety in controlled environments.

Face Mask & Temperature Detection for COVID Safety represents a crucial advancement in public health measures during the pandemic and beyond. It aids in enforcing mask-wearing protocols and identifying potential carriers of the virus quickly and efficiently. By leveraging IoT and deep learning technologies, our solution offers a comprehensive and proactive approach to safeguarding public health, enabling safer and more resilient communities in the face of unprecedented challenges.

VI. CONCLUSION

The parents and staffs are get aware to the students from the Covid. The students are also monitor by the staff and get information about the children. So they can understand the students health and they take more care about them. It is also used for doctors to rectify the problem from the students.

REFERENCES

- [1] Loey, M., Monogram, G., Taha, M.H.N. And khalifa, N.E.M., 2021. A hybrid deep transfer learning model with machine learning methods for face mask detection in the era of the COVID-19 pandemic. *Measurement*, 167, p.108288.
- [2] Qin, b., Li, D., 2020. Identifying facemask-wearing conditions using image super-resolution with a classification network to prevent COVID-19. *Sensors*, 20(18), p.5236.
- [3] das, a., Ansari, M.W. And basak, R., 2020, December. Covid-19 face mask detection using Tensor flow, K0 IEEE 17th India council international conference (INDICON) (pp. 1-5). IEEE.
- [4] Dell'Isola, G.B., Cosentini, E., Canale, L., Ficco, G. And Dell'isola, M., 2021. Noncontact body temperature measurement: uncertainty evaluation and screening decision rule to prevent the spread of COVID-19. *Sensors*, 21(2), p.346.
- [5] Boano, C.A., Lasagni, M., Römer, K. And Lange, T., 2011, march. Accurate temperature measurements for medical research using body sensor networks. In 2011 14th IEEE international symposium on object/component/service-oriented real-time distributed computing workshops (pp. 189-198).
- [6] Chen, Y., Zhang, H. and Wang, N., 2008, December. Body temperature monitor and alarm system used in hospital-based on 1-wire and wireless communication technology. In 2008 International Workshop on Education Technology and Training & 2008 International Workshop on Geoscience and Remote Sensing (Vol. 1, pp. 401-404). IEEE.
- [7] Singh, J., Gupta, L., Kushwaha, R., Varshney, T., and Chauhan, A., 2022. Real-Time Face Mask Detection and Analysis System. In *Proceedings of Data Analytics and Management* (pp. 11-19). Springer, Singapore.
- [8] Mohammed, M.N., Syamsudin, H., Al-Zubaidi, S., AKS, R.R. and Yusuf, E., 2020. Novel COVID-19 detection and diagnosis system using IOT-based smart helmet. *International Journal of Psychosocial Rehabilitation*, 24(7), pp.2296-2303.



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