TITLE

"Advanced Health Safety Wearable: Innovations in Temperature Monitoring and Social Distancing"

ABSTRACT

Deadly disease has become more of a political issue than that of health issue, wearing a mask and keeping social distance is mandatory in public places, as properly maintain social distance offers a maximum preventive effect against viral transmission. In this present work, uses an Internet of Things (IoT) method to create a wearable shield and mask. It detects body temperature of the person using temperature sensor. It monitors the person's body temperature is below 100^{o}Fahrenheit also the temperature is shown in LCD display, mobile or computer's webpage by simply connecting the hotspot to the Node Microcontroller Unit. Finally, a face shield and mask protect the peoples from spreading the viruses.

DESCRIPTION

A wearable shield and mask with temperature monitoring is proposed to achieve the current demands of preventing effect against viral transmission. This experiment comprises, IOT (Internet of Things) method to create a wearable shield/mask and head temperature detector using Node MCU (Node Microcontroller Unit) and temperature sensor. Also, to monitor the person's body temperature in a webpage in mobile or computer by simply connecting the hotspot to the Node MCU (Node Microcontroller Unit). This paper proposes a face shield and mask which can save us and our surrounding peoples.

USER BENEFIT

1. It can use this face mask or shield in Hospital for monitoring Doctor's body temperature as well as patient body temperature.
2. It can also use this mask in School, colleges, small scale industries, large scale industries and anywhere.
3. In pandemic situations to prevent the spreading of viruses, this device can be beneficial.

EXISTING CHALLENGE

They have used deep learning object detection method to create a mask position and head temperature detector using an Arduino and temperature sensor. This existing system they have implemented algorithms have very less accuracy, take more storage and it takes more time for detection. This type of algorithm uses RGB camera and temperature sensor to generate input images and capture a person's temperature. This system is not monitor able and it detects the

temperature once at a time. So, an algorithm with efficiency greater than the current algorithm is needed.

OBJECTIVE

The objectives of this invention are IoT based face shield that contains a real-time monitoring system to meet current demand to detect the head temperature of a person regularly and display through Liquid Crystal Display (LCD). It uses Internet of Things (IOT)method to create a mask and head temperature detector using Node Microcontroller Unit (Node MCU) and temperature sensor. It uses temperature sensor and to display the person's body temperature in LCD display. The output of the sensor is transmitted to the Node MCU and we can monitor multiple person's body temperature also in our mobile or computer by simply connecting our hotspot to the Node MCU.

SOLUTION

The system consists of a Temperature sensor, a Node Microcontroller Unit (Node MCU), a Light Emitting Diode (LED) and aLiquid Crystal Display (LCD) module. In this work, the DS18B20 temperature sensor was used to detect the temperature of a person and to show the temperature to another person through Liquid Crystal Display (LCD) display. The function of the Node Microcontroller Unit U (Node MC) is to read the value from the sensor and it shows the temperature in display. Every Node Microcontroller Unit (MCU) generates its own IP (Internet Protocol) address, by connecting the Node Microcontroller Unit (MCU's)Wi-Fi module to any hotspot, we can obtain the temperature data through that IP (Internet Protocol) address.

Proposed Model

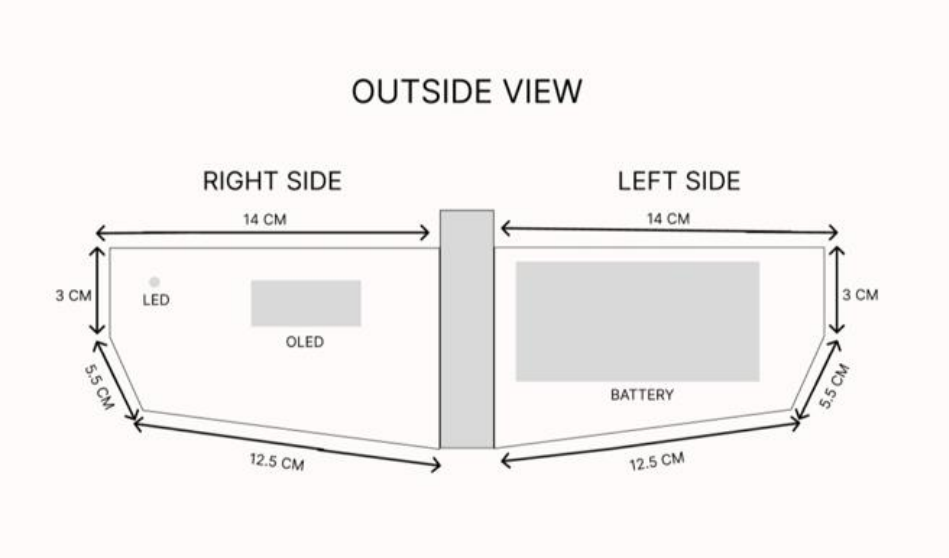

Figure.1The head temperature detector outside view with battery

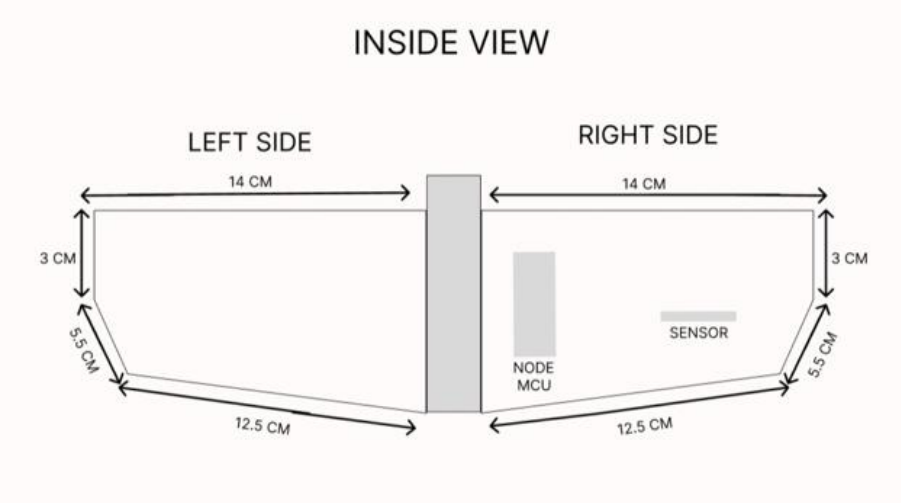

Figure.2The head temperature detector inside view with Node MCU

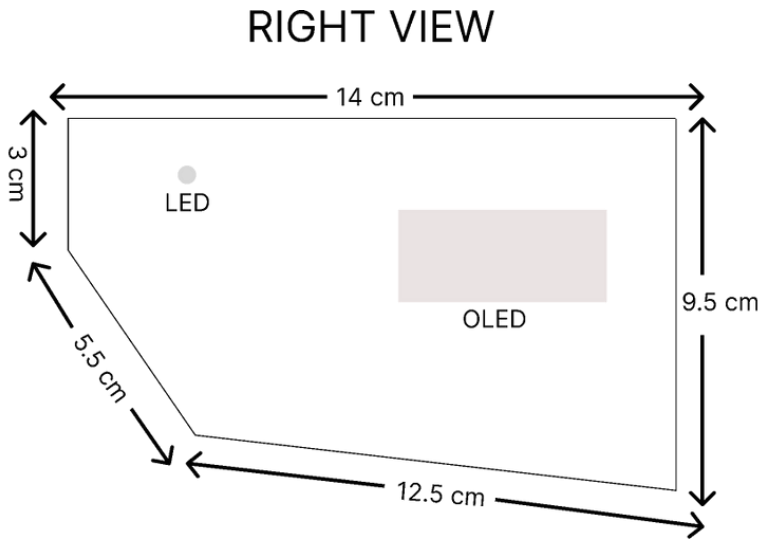

Figure.3The head temperature detector right side view with LED and OLED

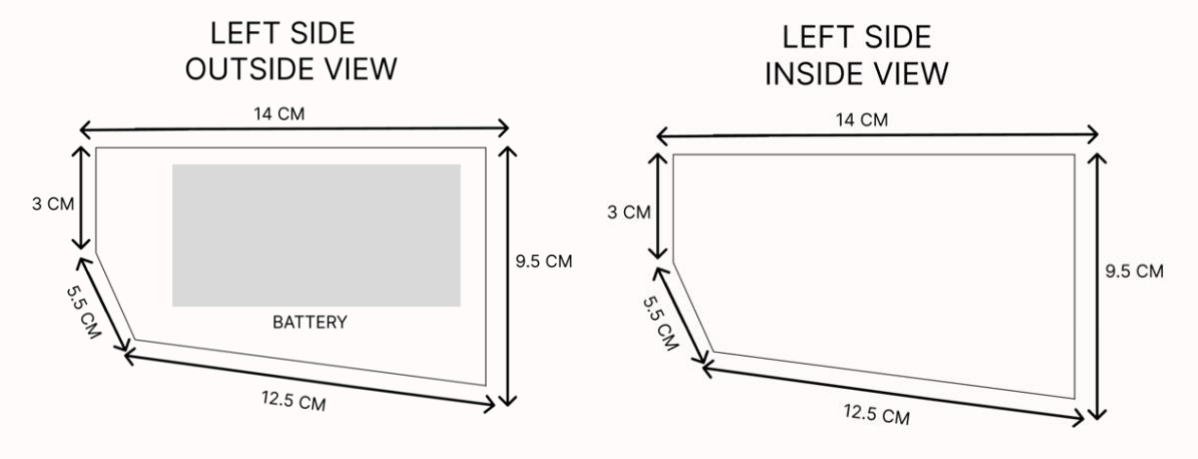

Figure.4The head temperature detector left side outside and inside view

In order to automatically detect the temperature, an Embedded C language program was developed using Arduino IDE software. When the device is switched on, the program will read the value of the sensor output and check the value is below 100^{o}Fahrenheitand if exceeds it will indicate.

The temperature was calculated using sensor. Then the device will check whether the person is greater than 100^{o}Fahrenheit from the wearer. If the temperature is greater than 100^{o}Fahrenheit, a warning light (Red light) will be produced and the temperature will be displayed on the LCD. However, if the person is in normal temperature, which is less than 100^{o}Fahrenheit, the system will display the temperature. Monitoring the distance will be continuously carried out if the system is in the operating mode.

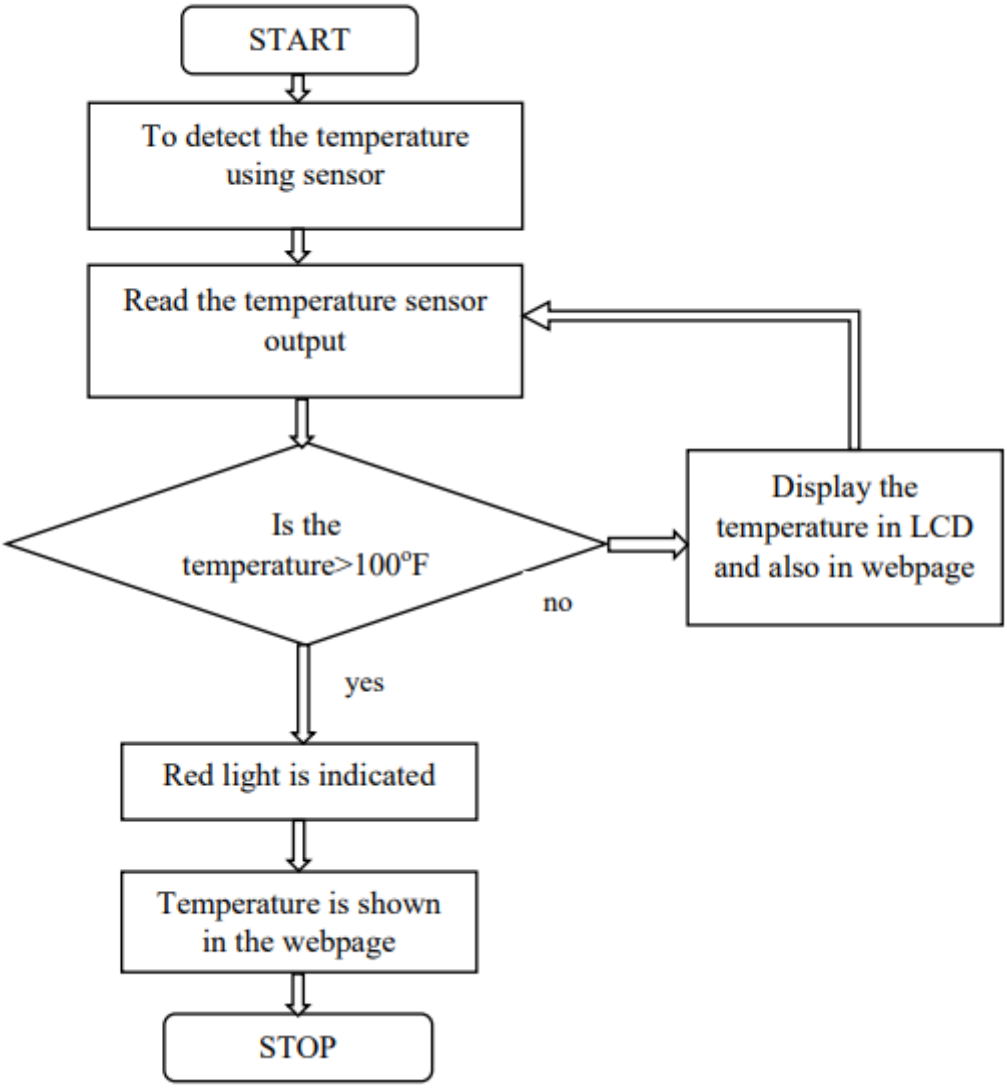

Figure.5 Process of detecting temperature

Proposed product development Chart

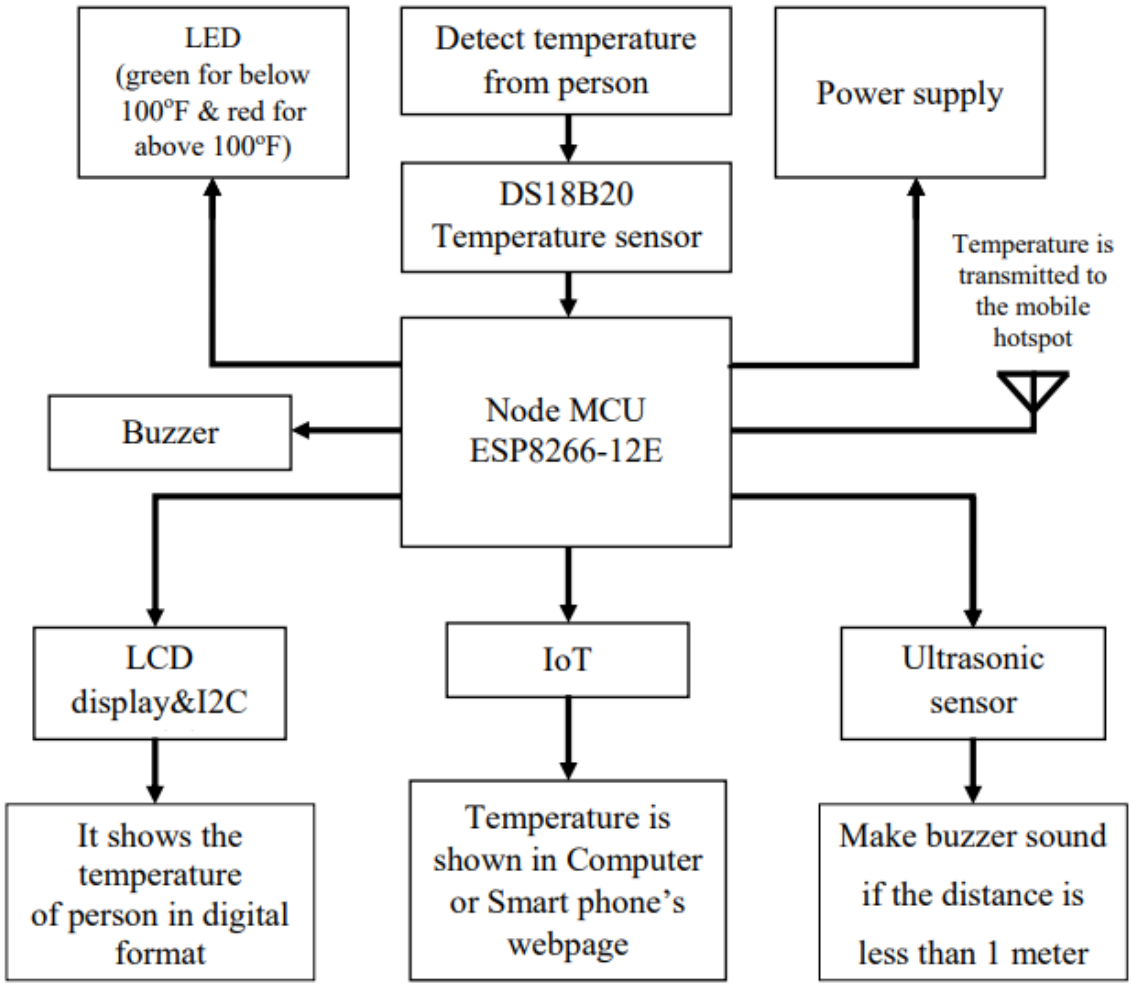

Figure.6 Block diagram of the Invention

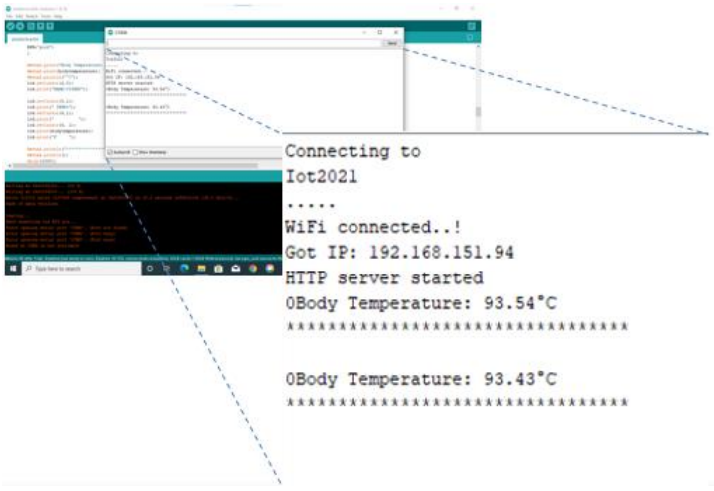

Figure.7Arduino IDE Simulation output

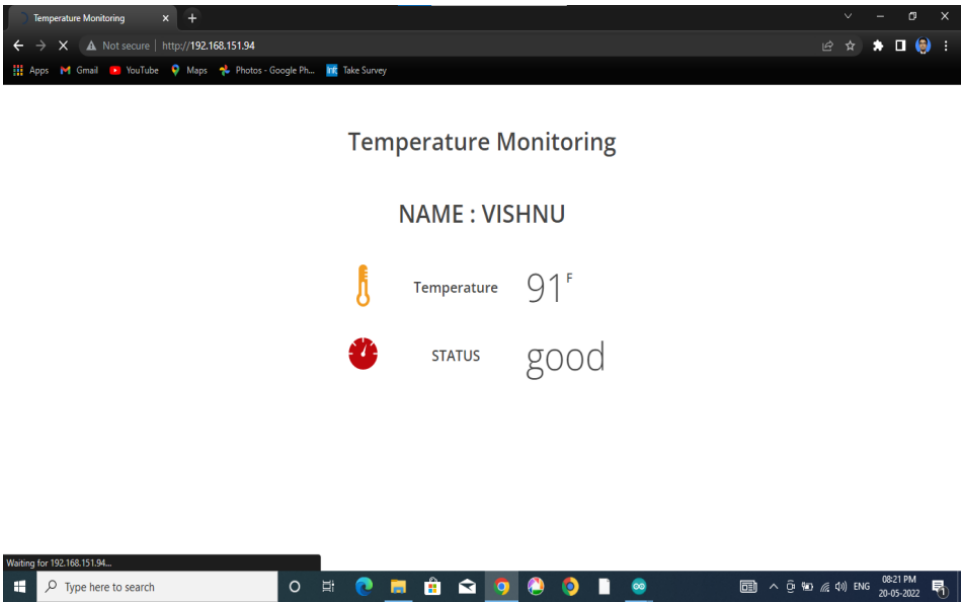

Figure.8 Webpage output (when temperature is below 100ºF)

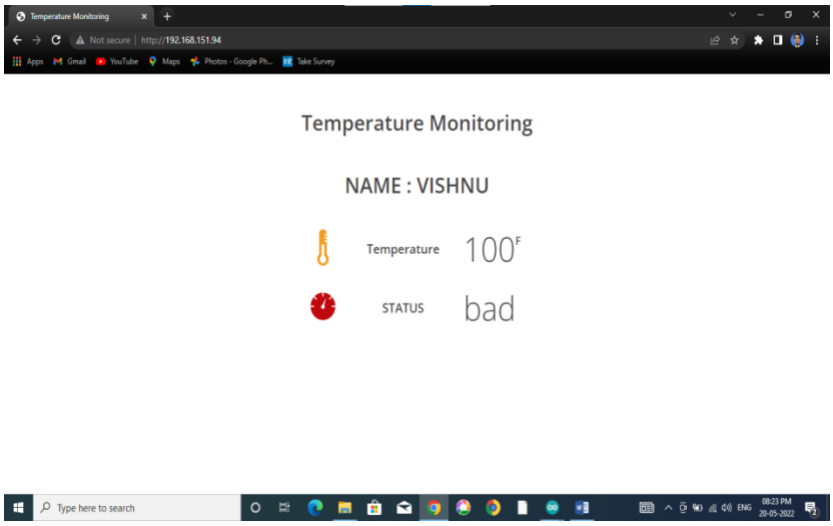

Figure.12 Webpage output (when temperature is above 100ºF)

TARGET CUSTOMER

Public Transportation: Wearable devices equipped with temperature sensors and proximity detectors could be used by commuters on buses, trains, and subways. These devices would alert passengers if they are too close to others or if someone is exhibiting an elevated temperature, helping to maintain safe distances and reduce potential exposure.

Workplaces: Offices, factories, and other workplaces could implement these solutions to ensure the health and safety of employees. Wearable devices could monitor temperatures and provide alerts if social distancing protocols are not being followed, creating a safer environment for everyone.

Schools and Universities: In educational settings, students and staff members could wear devices that monitor temperature and proximity. Alerts would help ensure that safe distances are maintained in classrooms, corridors, and common areas, contributing to a healthier learning environment

Healthcare Facilities: Hospitals, clinics, nursing homes, and healthcare centers can use these technologies to protect patients, healthcare workers, and visitors within medical settings.

Airports and Travel Industry: Airports, airlines, and other travel-related businesses can enhance passenger safety and confidence by implementing these solutions.

Emergency Services: First responders, law enforcement agencies, and emergency personnel can use these technologies to maintain safe distances while responding to crises.

Market Potential

Ongoing Health Concerns: Even as the pandemic evolves, the importance of virus protection remains relevant. The threat of new variants and future pandemics underscores the need for sustainable solutions.

Travel Industry: The travel and tourism sector is gradually recovering from the impact of the pandemic. As travel resumes, there is a growing demand for technologies that provide confidence to travelers and enhance safety during journeys.

Education Sector: Educational institutions are seeking ways to maintain in-person learning safely. Temperature monitoring and social distancing solutions can help reassure students, parents, and educators.

Healthcare Settings: Hospitals, clinics, and long-term care facilities are focused on preventing healthcare-associated infections. These solutions can enhance patient safety and minimize the risk of transmission within healthcare environments.

Workplace Adaptations: Many businesses are adopting hybrid work models. These technologies can help manage physical presence in offices while adhering to social distancing guidelines.

Technological Advancements: Advances in sensor technology, data analytics, and communication networks are making these solutions more accurate, efficient, and user-friendly.

Healthcare Innovation: The integration of temperature monitoring and social distancing technologies aligns with broader trends in digital health innovation, driving interest and investment in these solutions.

Global Reach: The need for virus protection is a global concern. As such, the market potential extends across various countries and regions.