DIGITAL MONITORING FOR HEALTH AND HYGIENE USING IOT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE DEGREE OF BACHELOR OF ENGINEERING

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Abstract—Now a day's health care has become technology orientated.covid19 pandemic caused by novel coronavirus is continuously spreading until now all over the world. Humans face a drag of sudden death because of lack of medical health care at pandemic time. many precautionary measures have been taken to reduce the spread of this disease .In such areas where the epidemic is spread it always a better idea to monitor these patients using remote health monitoring technology. Therefore, there's a desire to develop health and hygiene observation system. In this paper we restrict the growth of corona by finding out people who are not wearing a mask, who have high body temperature .So internet of things(IOT) based health monitoring system is current solution for it. Within the projected system, the sensors can sense the body temperature while mask detection is performed by computer vision techniques on camera equipped Raspberry Pi. Temperature and mask of coming body and this knowledge area unit transferred to computer through Raspberry Pi. The projected system is portable since it permits person to move freely and yet be monitored continuously. If any parameter values goas beyond the threshold value an alert is given to person .The model deals with detects mask in facial image and checks body temperature allows entry of people into facility. It is hoped that our study would be useful tool to reduce the spread of this disease for many countries in the world.
Keywords- Covid19, sensors, raspberry pi, computer vision, body temperature ,facial mask-detection

I. INTRODUCTION

Digital Monitoring For Health And Hygiene Using IOT is one of the initiatives for controlling COVID-19 and maintaining patient safety[Ref 1]. Studies show that the poor hygiene practices in Health Institutions such as hospitals, clinics, schools and nursing homes is the most likely cause of the spread of Corona Virus. People all over the world are facing challenging situations due to this pandemic. Everyday large number of people are infected and died [Ref 2].This number is increasing day by day. Covid19 is a disease that spread from human to human which can be controlled by ensuring proper use of facial mask and hand hygiene[Ref 3]. Proper Hygiene is single biggest defense against spread of Diseases and therefore Care Giver's compliance with Hygiene is an effective tool in preventing Virus Infections. It is found that the people are not obeying the rules so our project can be a solution in reducing the spread of corona virus [Ref 4]. We propose a system to monitor health and hygiene at public places. Since the last days of the previous year the occurrence of corona virus disease has affected globally. It was discovered in China but spread quickly to the world in just few weeks. The usage of face mask and sanitizers has shown positive result when it comes to disease spread reduction [Ref 5]. However, the lack of approved vaccine and medication. Due to these facts many protection and safety measures were taken by governments to reduce the spread such as social distancing, self-isolation, limiting crowd, cancellation of huge public events and gatherings [Ref 6]. In this paper, cost effective portable IOT based system aiming to help organizations respect the COVID safety rules and guidelines in order to reduce the disease spread is presented. We focus on common indoor measures-people with high body temperature should stay at home, wearing mask is obligatory and sanitation protocols[Ref 7]. For this scenario Arduino UNO Raspberry PI IOT based system with contactless temp sensor is used, while we

rely on raspberry pi single board computer equipped with camera making use of computer vision techniques for other two scenarios. We decided to use this device due to their small size and affordability [Ref 8].

II. METHODOLOGY

We proposed an automated smart framework for screening persons who are not using a face mask and checking body temperature beyond the limit. In this paper, in the public places they are monitored by CCTV cameras which will capture the images from public places then then there images are feed into the system that identifies if any   person without mask appears in the image and also sensors will sense the body temperature and give an alert if temperature is beyond the limit. A disinfectant tunnel will be built with attached pi camera and Contactless sensor to its left pillar. Anyone who is to enter the tunnel has to produce himself in front of these sensors and the pi cam. The pi camera will help to detect if person is wearing mask or not with The help of machine learning models while the contactless sensor would give information about body temperature to raspberry pi. The jet nozzle (a small spray bottle) will be attached to a servo motor which will sanitize the person inside the chamber when a small button is pressed regardless of the sensory data. If the body temperature is above a specific threshold or the person has not worn any mask. The gates which would be attached to a servo motor would not open. While if all the parameters are correct. The gate will let the user pass. Maintaining the Integrity of the Specifications

Followings are the functions carried out by out project:
1) Device will monitor whether the entering person is having Face Mask or not. If a person found without Face Mask he gets automatically Denied and a message will display on system.
 2) If person is with mask, then system will check his temperature. If temperature is below 95 degrees then entry Of that person will be denied.
3) If person's Body Temperature is less than that of mentioned then person is allowed in the room.
4) Person is allowed for further Hygiene Procedures :
A) When person will put his hands under Sanitizer Dispenser his hands get cleaned.
B) To prevent the spread of Corona of Infectious Virus we are doing Shoe Sanitation.

III. WORKING PRINCIPLE-

The health care is vast area requiring continuous measurement of patient parameters such as heart rate and respiratory rate, blood pressure, blood- oxygen saturation and, many other parameters have become a common feature utilized in major health care systems. When accurate and immediate decision-making are crucial, electronic monitors have be extensively used to collect and display physiological data. Also there are scenarios where people are not ready to wait in the queue in public places for the check-up and also constant monitoring of their health. Usually patient monitoring system detects for and also warns against serious or life-threatening events in patients or critically ill. Patient monitoring system can be rigorously defined as repeated or continuous observations of the patients physiological function. In the existing system the transmission of data received from sensors is intermittent. If any critical parameter is recorded it sends an alert message. Testing the patient cause delays in providing treatment. The proposed work aims in developing a health monitoring system that integrates IOT and Raspberry Pi. The Internet of Things (IOT) is the internetworking of physical devices, vehicle, buildings and other items embedded with electronics, software, sensors and network connectivity which enable these objects to collect data .Patient health monitoring system using computer is used to monitor the different parameters of patients remotely and simultaneously. We are making an alert system if person body temperature is beyond the threshold value so that infectious person won't be allowed in crowd place. We were to generate accurate face masks for human objects from RGB channel images containing localized objects. We demonstrated our results on multi human parsing dataset with mean pixel accuracy. Also the problem of erroneous predictions has been solved and a proper bounding box has been drawn around the segmented region. Proposed network can detect non frontal faces and multiple faces from single image. The method can find applications in advanced tasks such as facial part detection.
In this system the authorities can monitor different parameters of patients in any room and even when he is away from the patient. In this work an attempt is made to check the parameters such as body temperature, face mask detection ,hand sanitation and recommend a course of action based on these data . The system contains a face mask detection where a camera is used to detect the mask on face. The system strictly imposethe use of face mask in public places. It checks the temperature of entering person and give an alert to grant the permission.
This work presented a proof of concept Raspberry Pi based face mask detection system for automatic entry and access control into a facility. The photos captured at the entrance to recognize whether a person is wearing a mask or not. In case the model detects the person wearing the mask. The Proposed system allows entry into the facility, only if he wear mask. If the body is having temperature beyond decided limit then access is denied and hand sanitation is done automatically.

In this paper, detail survey of various approaches for Health Monitoring System is done. The paper also concludes with future conclusion. Our system relies on both open hardware and free software, being definite and desirable advantage for such systems. In future it is planned to experiment with various deep learning and computer vision framework for objects detection on raspberry pi in order to achieve higher framerate. Finally the ultimate goal is to integrate the framework for efficient resource planning during pandemic crisis in order to enable efficient security personnel scheduling and mask allocation, together with risk assessment based on statistics about respecting the safety guidelines

Graphical representation of the model
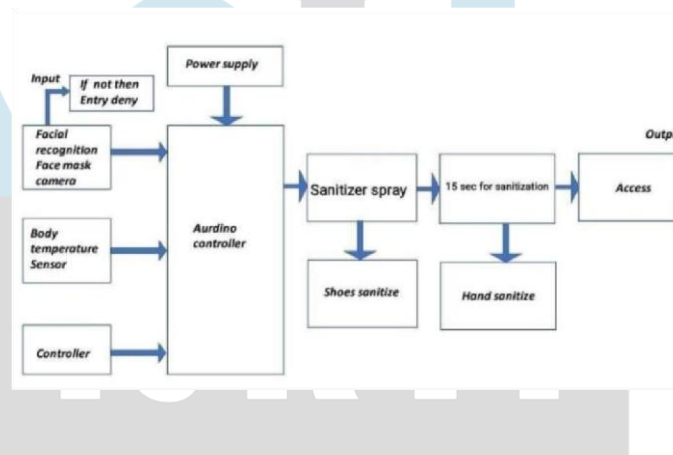
IV.REQUIREMENTOFPROPOSEDPROJECT

Hardware:
1) Raspberry pi 4B
2) Raspberry pi Camera
3) Servo
4) Breadboard
5) Temperature sensor MLX90614
6) Buzzer   7) Sanitation spray

Software:
1) Raspberry Pi Compiler
2) Python Language

1)Raspberry Pi 4B: Raspberry Pi 4 Model B is the latest product in the popular Raspberry Pi range of computers. It offers ground-breaking increases in processor speed, multimedia performance, memory and connectivity compared to the prior generation Raspberry Pi 3 Model B+, while retaining backwards compatibility and similar power consumption 15

2) Raspberry Pi Camera: The Raspberry Pi Camera Module v2 is a high quality 8-megapixel Sony IMX219 image sensor custom designed add-on board for the Raspberry Pi, featuring a fixed focus lens.

3) Servo motor: Servo Motor is nothing but a simple device which uses error-sensing feedback signals to determine and control the position of a motor shaft. Servo motor has got three connection pins, Vcc, ground and signal. It requires a 5V 1A power,

which is provided from a suitable supply source. On the Raspberry Pi board, GPIO pin number 22 is selected as the signal pin. 16

4) Breadboard: Breadboard is a plastic board with a bunch of tiny holes and is used for building and testing circuits. It has holes on them which are connected internally in a particular pattern as shown in the below picture. The holes which are connected through green line represents they are connected internally.

5) Wooden stand: It is used to build our whole structure. We use here wooden block to prevent shock or any hazards in public areas for safety purpose.

6) Sanitation Spray: We are using sanitation spray to sanitize our hands and shoes to maintain a good hygiene.

7) Temperature Sensor: MLX90614 Temperature sensor: The MLX90614 is an infrared thermometer for non-contact temperature measurements. Both the IR sensitive thermopile detector chip and the signal conditioning ASIC are integrated in the same TO-39 can.

8) Ultrasonic sensor: An Ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sounds.

9) Buzzer: When current is applied to the buzzer it causes the ceramic disk to contract or expand. Changing the this causes the surrounding disk to vibrate. That's the sound that you hear. By changing the frequency of the buzzer, the speed of the vibrations changes, which changes the pitch of the resulting sound.

V.APPLICATIONS:

- It can be used in small spaces at the entrance of any mall, shopping marts, offices etc.
- Usable in COVID-19 hospitals and in pandemic situation.

VI. CONCLUSION:

This paper presents a system to reduce the spread of coronavirus by informing the authorities about the person who is not wearing a facial mask and temperature of persons body that is a precautionary measure of covid19. The motive of the work comes from the people disobeying the rules that are mandatory to stop the spread of virus. In this paper, we introduce an moveable IOT based solution aiming to increase covid19 health and hygiene measures. covering several relevant aspects.1)mask detection2)contactless temperature sensing 3)automated hand sanitation. Contact less temperature sensing subsystem relies on IOT USING INFRARED SENSOR,WHILE mask detection is performed by computer vision techniques on camera-equipped Raspberry Pi.

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