International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 05 | May 2021 www.irjet.net p-ISSN: 2395-0072

DESIGN OF A SMART CAP AND WRIST BAND FOR COVID USING IMAGE PROCESSING

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Abstract - *Devotion towards own body is one of the important factor considered in this era. The equipments which provide results at run time and also accuracy maintained are provided by the electronic engineers. With the help of new technology of Raspberry Pi, health care system can be monitored. In this type of technology we have to monitor multiple persons using the different type of sensors and prevent the spread of covid-19. Wireless communication is done through Bluetooth module which provides flexibility and extendibility. In this paper basic parameters like body temperature and distance between the surrounding people is monitored and is transferred on wrist band to make it visible to the person to take necessary precautions to avoid the infection.*

***Key Words*: Health care systems, Raspberry Pi, Bluetooth module, Wireless communication, Arduino.**

1.INTRODUCTION

By providing facilities, technology makes life easier. It is not possible to manually measure each patient's health parameter every time. As a result, various technologies that provide facilities are used to keep the health sound and maintained. To overcome such a delay in temperature measurement, we can connect an electronic device to the person body that reads physical quantities such as temperature and senses it to monitor. Previously, the health-care system relied on an analogue input system, with output from the signal displayed on a CRO or any computer screen. The output data could be analogue or digital. ADC and DAC converters are required for this type of input and output data. In addition, systems relied on a wired network. This network is constructed using RS232 and RS485. Following that, communication is carried out using a protocol such as TCP/IP. These protocols, such as the I2C bus protocol, were further developed. The wired network requires stationary cable connectivity, and system extension was not possible due to a critical condition. In addition, wired network links are more expensive than wireless network links. Also, with the use of a wireless network, connectivity can be extended, providing flexibility. In the past, a computer system was required to monitor the patient, but new technology, such as the Raspberry Pi, which is a mini computer, has solved this problem. A single kit can manipulate multiple people who are being monitored, both those who are healthy and those who have the common symptoms of covid-19. The actual system overview is mentioned in this paper.

2.LITERATURE REVIEW

2.1 [1] Raspberry pi and computers based face detection and recognition system

The major overview of this arrangement is detection and recognition of faces using multiple servers to reduce the time

delay in processing and detection in different areas of utilization.

2.1.1 Advantages

1 This system is more efficient that the CCTV graphical processor.

2 It uses multiple servers which will increase the speed and accuracy of the process.

2.1.2 Disadvantages

1 It is complex as we use computer graphical processing unit.

2 There is a need of complex servers as we process more information with good speed in real time implementation.

2.2 [2] Smart cap for prevention of contagious diseases and social distancing using Arduino

This design collects the information of temperature and distance and ensures that distance between the person to person is not less that 1m and the temperature is at a desired range.

2.2.1 Advantages

1 Made with very general used sensors and boards which is very cost efficient.

2 Very easy to manufacture as it is designed with less complexity

3 And use of GSM module to alert the user is very feasible.

2.2.2 Disadvantages

1 Outdated technology.

2 The PIR sensor used can not only detect humans it can detect any heat emitting body.

3 There is no mask detection which is the major factor of prevention of covid-19.

2.3 [3] Successful role of smart technology to combat covid-19

It is a combination of many technologies like satellite monitoring, facial recognition powered by CCTV cameras, autonomous vehicles that can be used in the process of fight against the corona virus.

2.3.1 Advantages

1 The technologies mentioned uses smart technologies which is very efficient.

2 Implementation of these technologies at most reduces the impact of spreading of virus.

2.3.2 Disadvantages

1 As most technologies uses new technologies which are still need to be studied and improved.

2 These systems are high maintenance systems.

2.4 [4] Wearable devices for the detection of covid-19

This explanation brings us different devices that can be mounted on our body which prevent, detect covid- 19 this also makes a point regarding the increased interest of these wearable devices after this massive outbreak.

2.4.1 Advantages

1 The devices can be used in early detection and prevention from the covid-19.

2 These are easily mounted and can be used comfortably.

2.4.2 Disadvantages

1 Use of multiple devices for multiple uses in the process of prevention and detection.

2 They may be less accurate especially for the devices used for early devices.

3 They may be costly and uncomfortable to wear multiple devices.

3.SYSTEM OVERVIEW AND WORKING

Nowadays, more emphasis is placed on disease prevention and early detection, as well as the optimal management of chronic conditions. New location-independent technologies are frequently used to augment these functions. The below figures depicts a block diagram for a health monitoring system used in the design of a smart cap and wrist band for covid-19 using image processing. At run time, the system is designed to read the person's body temperature and distance and detects the mask of the person. The system's primary goal was to collect physical parameters, which were then made available to multiple users. The collected data or results are sent to multiple users who are connected to the same local area network. Because the program is a user interface, when the user operates his system, he will receive information that is automatically updated. Because the collected data is now available to users, it can be used to determine the health status of patients. Because the system is automatically updated after a set period of time, the data is refreshed, and if an abnormality occurs, it can be detected and updated in the wrist band. The detected values should be available OLED display for every time it is updated, for this the detected values should be made local by uploading them on particular information in to LCD display. Ultrasonic sensor and temperature sensor continuously monitor the distance and person body temperature values are refreshed in every second which shows detected values at runtime. It will contain the basic information of the person and the determined values of body temperature and distance of the infected person (which are refreshed at every second) and weather he is having mask or not. The python code is written for creating list of the persons who are masked / unmasked. For restarting and stopping the program the commands in LX Terminal can be operated and manually stopping the program is possible. For controlling the GPIO pins Wiring Pi C is used. Interfacing of different measurement units with Raspberry Pi Python is used. Since the programming in Python is similar to that of C language and also user friendly library is available. To share the same area network VNC viewer is used. In this VNC viewer the IP address of Raspberry Pi model is shared by maximum 4-5 users at a time. The value of temperature is displayed up to two decimal digits. The parameters are updated after every second. The abrupt occurring abnormality can be detected from the previous value. This paper is based on basic parameter monitoring without using any bulky system. Only the credit card sized board supplied with power is placed and the results are seen on the computer screen which is in same area network.

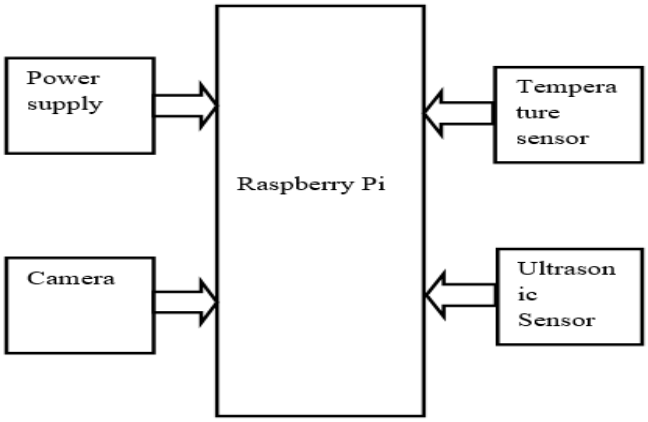


fig1. Block diagram for cap

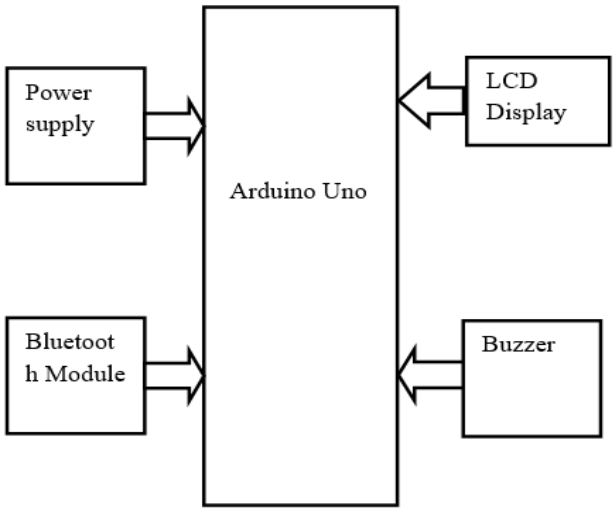
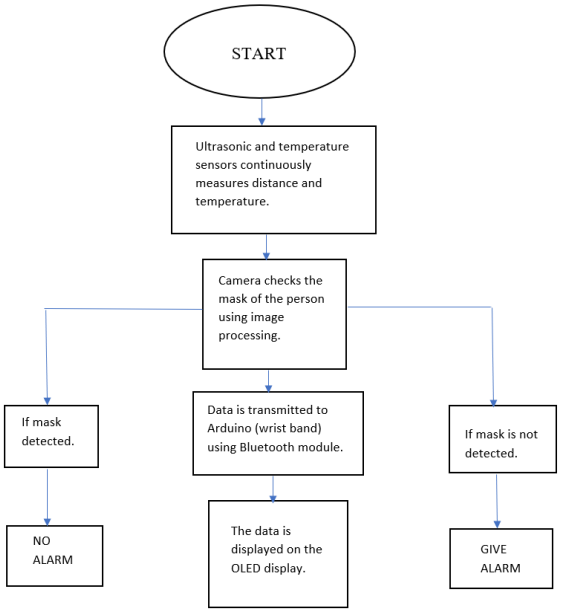


fig2. Block diagram for wrist band

4.SYSTEM FLOW CHART



5.RESULTS AND DISCUSSIONS

This project aims to prevent the spreading of the corona virus by making the person to follow certain distance , monitoring the persons temperature , and detecting the mask by using different sensors and image processing technique so that we can take necessary precautions to avoid the infections.

6. CONCLUSIONS

A wireless health-care monitoring device can be managed without using the computer system. Further different parameters can be monitored and this system can be made commercially useful in hospitals. A single Raspberry Pi board can process multiple persons data at run time and manually recording the readings can be avoided. The space required for such system is very less. With comparison with other board Raspberry pi is more advanced in terms of cost, speed, features etc. In the highly developing era, where directly or indirectly, everything is dependent on computation and information technology, Raspberry Pi proves to be a smart, economic and efficient platform for implementing the health monitoring system. With the use of comfortable wearable sensors in global areas, the proposed healthcare system promises to improve the flexibility and scalability of healthcare applications. In addition, an Android mobile healthcare application can be deployed on mobile devices, such as smart phones, tablet PCs, and laptops to monitor biomedical signals in real time for healthcare services. We can also conclude that with the evolution of network integration and the management of embedded devices operating multimodal tasks, a more precise and universal healthcare service scheme can be realized.

ACKNOWLEDGEMENT

We would like to express our sincere gratitude towards our mentor Mr. Anil Kumar Rawat for giving us support. We also thank all the people who had published their work which we used as reference in our work. We also thank every one who helped us in this project.

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