

## Smart Covid 19 Caution Kit

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**Abstract** - Today, due to pandemic of covid-19 most countries are struggling with increased number of patients and patient care per patient. All the health care system are putting their utmost and best efforts to tackle such an adverse situation. But the need of an hour is to take preventive measures in order to lessen the burden on health care systems. With the help of technology it can be made easier and economical to follows some essential preventive norms to contain this deadliest pandemic. So, the proposed system. The proposed system i.e. smart covid-19 caution kit can measure spo2 (percentage of oxygen in the blood), heart rate in BPM (Beat per minute) with MAX30100 sensor with has two LEDs, one emitting red light another emitting in infrared light. For pulse rate, only the infrared light is needed. Both the red light and infrared light is used to measure oxygen levels in the blood.

**Key Words:** Oxygen, Heart Rate, Sensor, Pulse Rate, Light Emitting Diode, Infrared Light.

### 1. INTRODUCTION

Covid-19 has affected day to day life and is slowing down the global economy and this virus can easily spread from one person to another which make it spread rapidly. This pandemic has affected thousands of people, who are either sick or face death due to spread of this virus. This being a new viral disease affecting humans. Vaccine for this disease is not yet available. So it is our duty to take care of ourselves by taking proper precautions. Precautions for this disease includes regularly washing our hands for 10 seconds, avoiding physical contact, social distancing, wearing masks, sanitize hands etc. for the safety of the people the idea brought up to make a smart covid-19 caution kit which would work on completely safety of the people.

Today, most countries are struggling with increased number of patients and increased costs of patient care per patient. This is happened because of unhealthy lifestyle, habits, including stress which increasingly leads to covid-19. Also it is difficult for doctors to monitor particular patient for total working hours. In many critical conditions such as patient is located far away from hospital or also in case of old patient who suffering with these disease continuous monitoring of patient is not possible. Normally it is difficult to keep track on abnormalities in patient itself manually. Body temperature is 37 degree Celsius for normal human being. Patients are not well with manual treatment which doctors normally used for tracking, so there must be a device which would help patient keep track on their health by themselves.

Today the world contains a hoard of new technologies and the various new techniques which really help a lot while designing a new system. Oxygen gas is necessary for human life. It is integral for countless biological processes. The transport of oxygen throughout the human body is performed by the circulatory system, and more specifically, hemoglobin in red blood cells. Critical medical information can be obtained by measuring the amount of oxygen in blood, as a percentage of the maximum capacity. Pulse oximeter is a medical instrument that can detect heart-rate and oxygen saturation as signatures of our level of health condition. It can be implemented as a small device, and therefore, has been used widely in different applications. This module deals with solving above problems. Module consists of heart rate sensor and temperature sensor which measures the heart rate and body temperature and hand sanitizer.

### 2. Proposed System

After doing lot of research and study some papers found out to be valuable resources for development of the project. All contains different methodologies and techniques which are used in smart covid 19 caution kit.

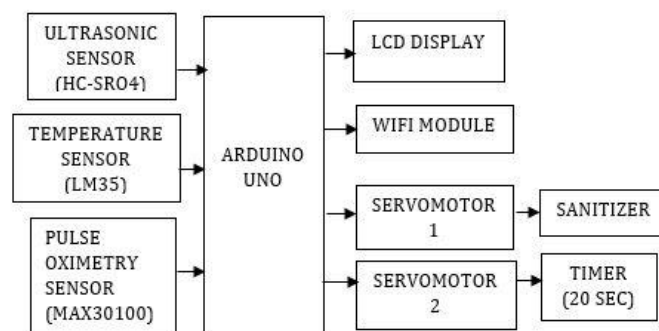


Fig 2.1 : Block Diagram

The proposed system i.e. smart covid-19 caution kit can measure spo2 (percentage of oxygen in the blood), heart rate in BPM (Beat per minute) with MAX30100 sensor. One of the important caution which is need to be considered for prevention of covid-19 is regular monitoring of human body temperature which can be done with LM35 sensor which is a temperature sensor it is designed specifically to measure the hotness or coldness of an object and is a precision IC temperature sensor with its output proportional to the temperature. However hand sanitizer and 20 seconds of handwashing within it is also foremost caution which is needed to be taken. So, we use an ultrasonic distance sensor and two servomotors to realize this implementation touchlessly.

### 3. Methodology

When a person is place his finger on each component of device then it generate following steps:

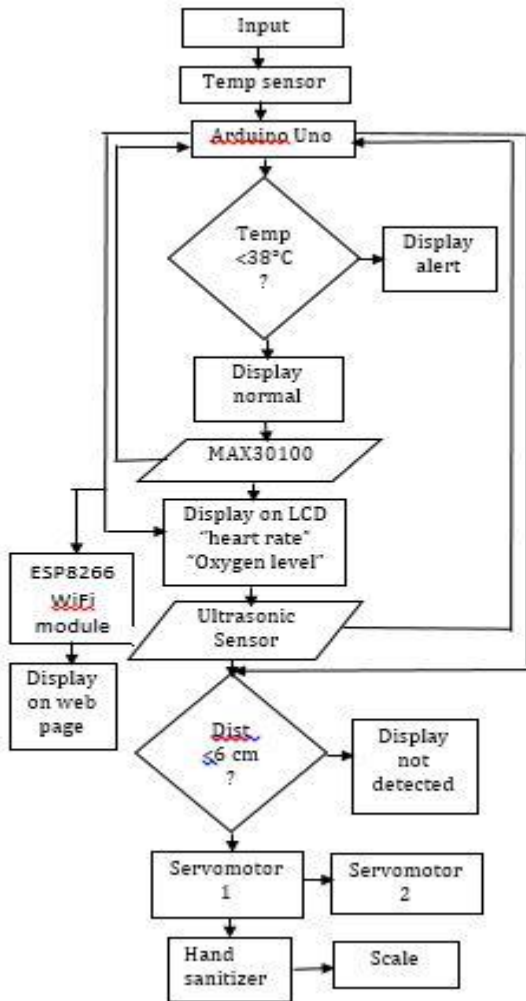


Fig 3. 1: flow chart

- On placing a finger on temperature sensor, if a temperature is  $< 38^\circ$  then normal displays on LCD screen otherwise displays alert .
- On placing a finger on MAX30100 heart rate and oxygen level is displays on LCD screen.
- ESP8266 is Wi-Fi module is used to connect the device to internet.
- On placing a finger on ultrasonic sensor if distance  $< 6\text{cm}$  then it gives command to servomotor 1 to drive hand sanitizer otherwise it gives command to servomotor 2 and scale is measured according to that person has adjust his hands .

### 4. Specifications

#### 4.1. Arduino Uno:



Fig 4.1: Arduino Uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.

#### 4.2. Temperature Sensor:

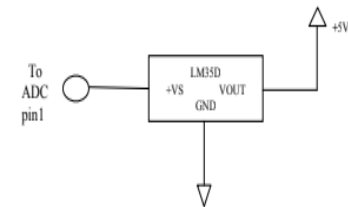


Fig 4.2: Temperature Sensor

LM35 used as temperature sensor which gives voltage variations for changes in the ambience temperature. The pin 2 which is output pin is connected at ADC0 pin of the microcontroller, while the pin 1 and 3 are Vcc and ground respectively.

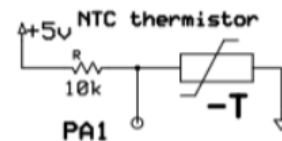


Fig 4.3: Thermistor

Thermistor 10K NTC 1% accuracy, Measuring range  $-20$  to  $+105$  degree Celsius , Cable Length 1 meter with 2.54mm pitch 2 pin JST connector. Here, one pin of the sensor is connected to the ground while other is connected to the PA1 (ADC1) pin of microcontroller via a potential divider circuit as shown in figure.

### 4.3. Pulse Oximetry Sensor



#### 4.4: Pulse Oximetry Sensor

This sensor is useful in making Pulse oximetry, which is a test that measures what proportion of the oxygen-carrying molecules in the blood (called hemoglobin).

### 4.4. Ultrasonic Sensor



#### 4.5: Ultrasonic Sensor

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

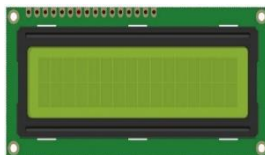
### 4.5. Servomotor



#### 4.6: Servomotor

A servomotor is a rotary actuator that allows for precise control of angular or linear position, velocity, acceleration. It consists of a suitable motor coupled to a sensor for position feedback.

### 4.6. LCD Display



#### 4.7: LCD Display

The LCD screen shall be used to continuously display various status/error information in the operation thus making us easy to debug the problems if any. Also, the LCD screen will display the actual real time sensor data. We used 16x2 text LCD screen.

### 5. Conclusion

The proposed system fulfills the objective to measure the patient's oxygen percentage and body temperature in real time if any varied change takes place it is noticed. It is also useful for monitoring heart beat. This smart kit is useful for sanitizing hands with proper distance which makes less spread of virus. In the Covid-19 pandemic this system is very useful.

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