IJTRET "Voice of Innovative Minds"
doi.org/10.54473/IJTRET.2022.6406
International Journal of Trendy Research in Engineering and Technology
Volume 6 Issue 4 August 2022
ISSN NO 2582-0958

AUTOMATIC MICROBES' INDICATOR

NAVEEN K S, SURAMANJARI G G, HARI KRISHNA M K, KANNAN C
Department of Electrical and Electronics Engineering,
Dr. Mahalingam College of Engineering and Technology, Pollachi, Tamil Nadu, India

ABSTRACT

The main objective of this project is to determine the microbes present in the hand and intimate to the public and make awareness in the prevention of covid-19 disease by encouraging proper sanitizing of their hands. In our project, we are determining the presence of microbes in hand by using a temperature sensor, gas sensor, and color sensor. All the above-mentioned sensors are connected to the microcontroller unit and the signals obtained from the sensors are further processed and decoded to determine the microbes' intensity present in the hand. Once our system identifies the microbes present in the hand, it will automatically dispense the sanitizer spray and it will intimate the presence of microbes in the hand to the public through a 16x2 LCD display.

Keywords— Touchless sanitizer Dispenser; Automatic bacteria detector; Temperature detector; Covid-19 Saniti1zer; Covid19, Corona Virus detector; microbe detector

I. INTRODUCTION

During Covid-19 pandemic it has mandatory to safeguard ourselves from the dreadful disease-causing microbes[1]. Usage of sanitizer dispensers available in public places itself has higher chances of getting infected. Though the dispenser is kept for killing germs, when many public are involved in dispensing hands, the dreadful disease-causing microbes may spread from one person to another due to physical contact with the sanitizer dispenser. Hence to over come this issue several techniques of sanitizer dispensing systems without contact have been developed[2]. However, even contactless dispensing systems have some drawbacks. In the present work, we have newly developed a system based on other reports in which microbes are detected using different type of sensors[3,4]. In the present study, we have used three different sensors. The three forms of sensor used for detecting microorganisms apart from the temperature sensor which is used for detecting Human frame temperature are disused in the following section. The Colour sensor- a mild sensor works by shining an item after which recording the shaded region. OH sensor - a fueloline detector which is a tool to detect the presence of gases in a place, A fueloline detector can sound an alarm to operators inside the work place where a leak is occurring and give them the caution to leave. Some microbe will produce odor, so by use of fueloline sensor microbes can be detected. An alcohol sensor(MQ303A) is a semiconductor sensor for Alcohol detection. It has superb sensitivity and rapid reaction to alcohol. Some microbes will produce rotten odor or alcohol odor so the detection of the odor informs us of the presence/ absence of microbes in our hand. If the odor reaches a threshold it may produce a beep sound and the value can be seen in LCD display. To measure the body temperature – an LM35 temperature sensor is used in the present study.

The microcontroller used in this study is an Arduino uno board. Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins. Six can be used as PWM outputs, 6 analog inputs. It has a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller. It can be simply connected to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. For programming the microcontroller, an open source Arduino software IDE is used. It makes it easier to write code and upload it to the board A detailed description of the construction and working of microbes' detection system is presented in this paper.

II. EXISTING SYSTEM

In the existing systems, we take sanitizer from an automatic hand sanitizer dispenser, which is by the noncontact method by using ultrasonic sensors. When the person keeps the hand near the sanitizer dispenser means, it senses the hand and it will automatically dispense the sanitizer to the hand of the person. However, the existing system lacks the identification of disease-causing microbes in the hand and it will dispense an equal amount of hand sanitizer for every person who keeps the hand in the hand sanitizer dispenser. Hence by using the above method, the persons who have more microbes infection and the person who doesn't have microbes infection will get the same amount of hand sanitizer dispensing. Thus using the existing method the presence of microbes that causes the infection is not identified

III. PROPOSED SYSTEM

In the proposed system the disease-causing microbes are identified and categorized into three types based on the severity of the microbes present in the hand. When the temperature alone is high, in our project we have taken 35 degrees centigrade as a threshold value. Our project will automatically dispense the single dose of sanitizer dispenser to the public. When the alcohol sensor founds the alcohol formation due to microbes present in the hand, it will dispense the two dosages of the sanitizer dispenser and intimates the public regarding the microbes present in the hand. When the color sensor identifies the reddish color in hand due to infection caused by microbes, the three dosages of the sanitizer dispenser is provided as the condition is severe. And hence by this process based on the microbes present in hand, the sanitizer dispenser and the public are made aware of the microbes present in hand.

IV. BLOCK DIAGRAM

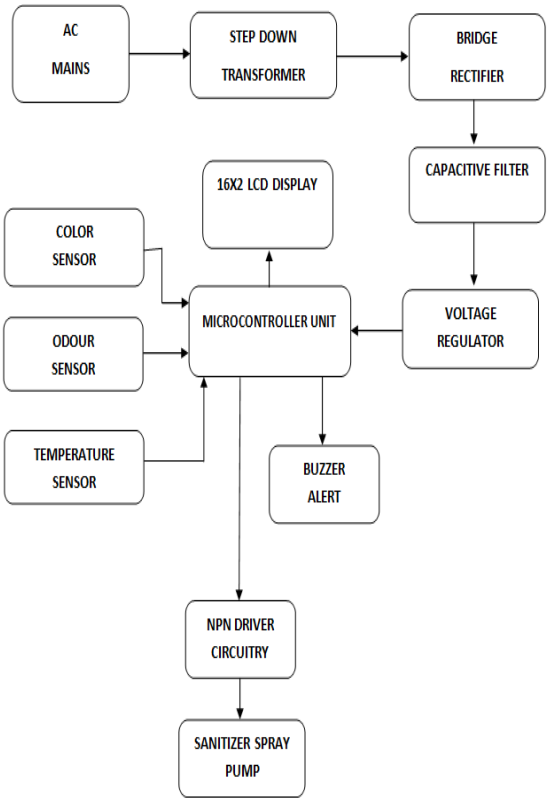

Figure 1: Dataflow Diagram

The above-shown diagram represents the overall data flow of our project "AUTOMATIC MICROBES INDICATOR". In the above-mentioned figure, the data flow is from the sensors like color sensor, odor sensor, and temperature sensor are towards the microcontroller unit and hence the microcontroller process the signal and the data flow from microcontroller is towards sanitary spray driver and piezoelectric buzzer.

International Journal of Trendy Research in Engineering and Technology
Volume 6 Issue 4 August 2022
ISSN NO 2582-0958

V. CIRCUIT DESIGN

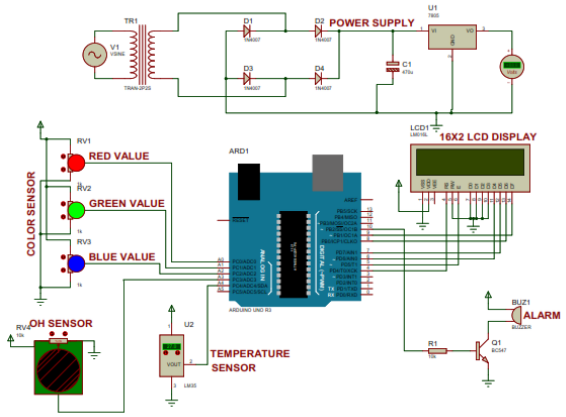

Figure 2: Circuit Diagram

The above figure represents the connection diagram of this project "AUTOMATIC MICROBES INDICATOR". In the above figure, the AC line is taken from the EB mains and hence it is processed into the required DC voltage required for the microcontroller operation. The AC supply is taken from the EB mains is passed into the step-down transformer's primary coil and as per the rating of the transformer, the input AC signal is thus reduced to the output AC signal in its amplitude.

The acquired lower amplitude AC signal is then passed to the Bridge rectifier which is constructed with the help of four 1N4007 diodes in diamond shape circuit as shown in the above figure. This process will convert the AC signal to its equivalent rippled DC signal. Since the rippled DC signal cannot be used up by the microcontroller as it requires a stable DC signal, the rippled DC signal is passed to the capacitive filter at the rating of 470uf/25V and the purest form of DC signal is obtained.

Since the acquired DC signal is an unregulated DC signal and cannot be used up for the microcontroller due to its instability, the unregulated DC signal is passed to the linear voltage regulator in order to obtain the regulated constant 5V DC supply for microcontroller operation.

In this project we have used ARDUINO UNO as a microcontroller boards for its operation and it has powerful ATMEGA 328 8 bit microcontroller unit. It has A0 to A5 totally 6 analog input ports and D0 to D13 total 14 digital pins. It runs on the frequency of 16Mhz and has an inbuilt USB to Serial converter CH340G in order to view the desired output in the serial terminal window. The above project code runs in the microcontroller unit and hence it forms the brain of the entire project.

The 16x2 LCD used here in this project is to monitor the sensor input status and overall project status locally. The 16x2 LCD used here utilizes 4 bit mode of operation which uses only 4 data pins for communication purposes in order to save the remaining pins for other microcontroller operations. The remaining 4 data pins are grounded for this type of 4 bit mode configuration.

The color sensor used in our project is TCS34725 which works in both 5 volt input and 3.3 volt input. Based on the color of the skin, the TCS34725 sensor will give data to the microcontroller unit, and hence the controller process the color value and analyze the microbes based on the color and dispense the sanitary spray.

The MQ2 alcohol sensor is used to detect the stinking odor caused due to microbes in the skin and dispense the sanitary spray accordingly.

The LM35 temperature sensor is used here for sensing the temperature of the hand which in turn provides the buzzer alert.

VI. HARDWARE IMPLEMENTATION RESULTS

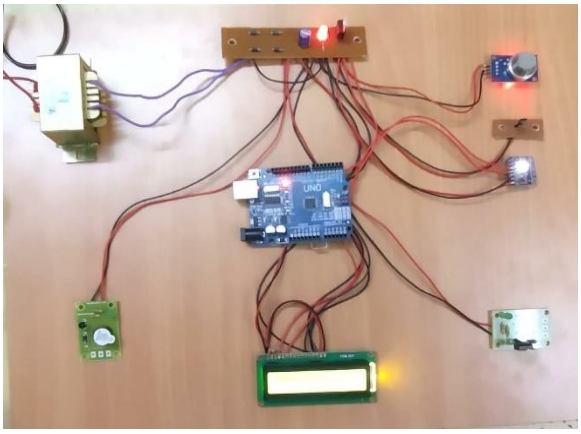

Figure 3: Hardware Implementation

The above figure represents the overall hardware implementation model of our project "AUTOMATIC MICROBES INDICATOR". As shown in the above-mentioned figure, the alcohol sensor, color sensor, and temperature sensor are grouped together right-hand top to detect the skin condition and the NPN driver for driving the sanitizer

dispense is found in the right-hand bottom. The buzzer alert is placed in the left hand bottom and the microcontroller core is placed in the center of the project.

The below figure represents the plastic semi transparent cabinet for sanitizer dispenser in which the electromagnetic solenoid valve is attached.

Figure 4: Sanitizer Dispenser

The electromagnet solenoid valve is further connected to NPN driver in order to dispense the sanitizer when it is demanded by the microcontroller unit.

VII. CONCLUSION

By using our prototype setup we can easily detect the presence of microbes in hand by analyzing the microbes characteristics by using a color sensor, alcohol sensor, and temperature sensor. Based on the sensor output the corresponding dosage of the sanitizer dispenser is provided based on the microbes present in the hand.

REFERENCES

[1]. Public Health Response to the Initiation and Spread of Pandemic COVID-19 in the United States, February 24–April 21, 2020 Weekly / May 8, 2020 / 69(18) 2020, 551–556

[2]Jonathan Lesmana , Agus Halim , Agustinus Purna Irawan, , Design of automatic hand sanitizer with ultrasonic sensor2020 IOP Conf. Ser.: Mater. Sci. Eng. 1007(2020) 012164
doi:10.1088/1757-899X/1007/1/012164

[3] Salinas Alvarez, Carlos, et al. "Detection of Volatile Compounds Emitted by Bacteria in Wounds Using Gas Sensors." Sensors 19(2019)1523.

[4] Jia, Zhiyuan, et al. "Multiplexed detection and differentiation of bacterial enzymes and bacteria by color-encoded sensor hydrogels." Bioactive materials 6 (2021)4286-4300