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Smart Hand Sanitizer Dispenser with Voice Announcement System

Harisha G C[1], Vikas C Yatnalli[2]

Assistant Professor, E&CE, GMIT, Davanagere, India[1,2]

Abstract: This paper aims to plan and carry out a minimal expense smart hand sanitizer dispenser with declarative framework based on Microcontroller, that can assist with settling the difficulties looked by security guards at clinic entryways and so on in upholding this hand sanitizing activity prior to giving individuals access to any place they expect to enter as certain individuals are not able to collaborate. Some look at it as a waste of their time and also sometimes these security guards can let some people in without sanitizing just because they are their friends or a family relative which is very risky. Consequently, the smart hand sanitizer is positioned at the passageway entryway and the obstacle sensor associated with the entryway. In other words, when a person(s) needs to get to the passage entryway, they should first sanitize their hands that will be announced automatically.

Keywords: Obstacle detection, Hand sanitizer, Microcontroller, Hospital, Sanitization.

I. INTRODUCTION

In this pandemic situation, due to the covid-19, usage of sanitization is the protocol in every place. People in their hurry time will forget to sanitize themselves and some people think that using sanitization process is waste of their time. Regarding this the sanitization in hospital is the major criteria because almost all the people will visit the hospital every time. Appointing an employee to instruct about the sanitization and to screening the temperature of the person manually is the common task, to make this process for everyone who are visiting the hospitals is little risk.

The major task of this paper is to awake the people for taking the safety precaution in the hospitals by announcing pre-recorded message during their entry to the hospitals. Regarding this good sanitization can reduce the spread of Covid-19[1]. Major hospitals have enforced enhanced protocols for the safety of patients and health personnel while facing the unprecedented challenge of COVID-19[2]. To attentive the people about the precaution while entering into the hospital is the important criteria. Hospitals have installed sanitizers throughout the hospitals so that patients, as well as the medical staff, can use it regularly and ensure the safety of all the people around them. By knowing this we are going to propose a system of "Disinfected Hand sanitizer with temperature sensor and voice notification".

The design depicted shows the preventive measure that can be taken during the COVID-19 pandemic in the whole world. Sanitizers have become the most significant commodities right now [3, 4]. By the new rules and regulations given by WHO vigorous sanitization is needed to survive. The design gave the solution for the problem stated. The design introduces an automatic hand sanitizer and temperature sensing system, to keep the hand sanitized whenever a person wants to do it, without a contact with the sanitizing machine [5]. The temperature sensor on touching gives the body temperature of the person [6].

The automatic hand sanitizer device proposed in this paper is ultimately expected to contribute to contactless hand disinfection in hospital and virus infection prevention. Additionally, it is economical and eco-friendly by decreasing waste emissions.

Objectives:

1. The main objective of this research paper is to design and implement a low-cost touch free smart hand sanitizer dispenser with announcement.
2. To educate the people to use the sanitizer as a precaution by pre-recorded announcement.
3. The obstacle sensor is used to identify the obstacle for the automated announcement.
4. To design a touch less hand sanitizer dispenser [6].
5. Human body temperature can be identified using the thermal sensor [4].
6. To design and implement a low power consumption system.

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II. SYSTEM DESCRIPTION

The proposed system consists of the obstacle sensor which is helping to find the obstacle (people while entering the hospital). Whenever the people enter into the hospital the obstacle sensor will sense the person then the related voice message will be announced for taking the precautions (any recorded message which has been setting up). After the announcement, the automated sanitizer dispenser will be placed nearby the door and people can place their hand on the device, the thermal sensor is integrated into the automated sanitizing device that can identify the human body temperature, and if the persons temperature is higher than the fixed value the buzzer makes the sound, if not it dispenses the sanitizer. The IR sensor will sense the placed hand and then dispenses the sanitizer with a fixed quantity.

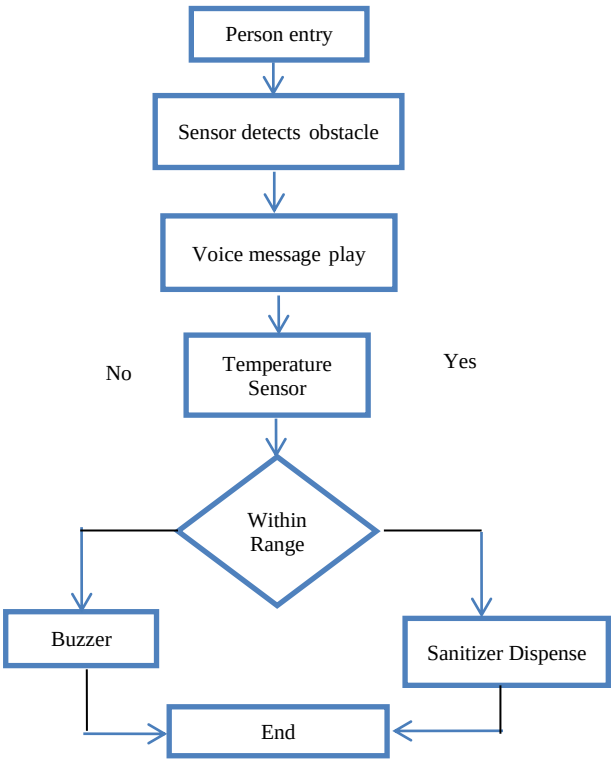
III. METHODOLOGY

1. Thermal sensor measures the temperature.
2. IR sensor is used to identify the obstacle [5].
3. When the sensor senses the hand, at a distance less than 7cm from the sensor, the Arduino gives a predefined seconds pulse from its digital output pin. The pump cannot be used directly; hence a relay is used as a switch.
4. The relay accepts the pulse from Arduino and makes the pump run. The pump operates at 3 to 6V, which pumps out a few drops of hand sanitizer on to the hands, after pumping, the distance is sensed for every 1000ms(1s) for scanning purposes.

IV. PROCESS FLOW

The process flow explains the working condition of the system in an order. When the person passed from the door the obstacle sensor detects the obstacle and the prerecorded announcement will play immediately.

Figure 1: Proposed system



The above process flow explains the working condition of the system in an order. When the person passed from the door the obstacle sensor detects the obstacle and the prerecorded announcement will play immediately. A person uses the disinfected sanitizing device by placing their hands on the device, that device can identify the temperature of the placed object, if the object's temperature is greater than the assigned temperature the buzzer makes the sounds otherwise it dispenses the sanitizer.

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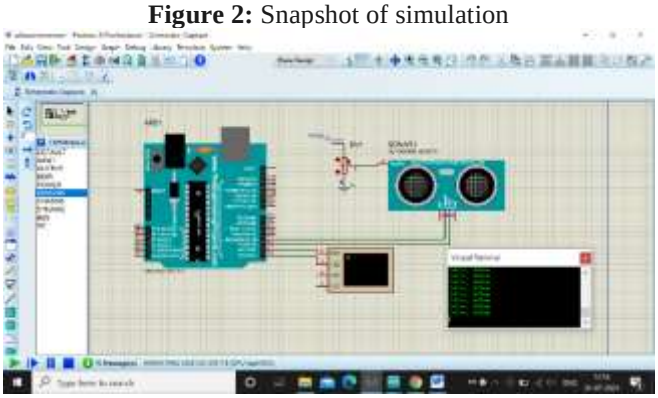
V. RESULTS AND DISCUSSION

In this proposed work arduino is used as a microcontroller for calculating the distance between the sensor and the hand placed below it, if it is less than &cm, the pump runs for 100ms through a relay and pumps out few ml of liquid alcohol-based hand sanitizer and also senses the distance for every 1000ms, components like pump, relay, arduino microcontroller were tested. We can use liquid type or gel type hand sanitizer.

Simulation using Proteus software:

In this proposed work ultrasonic sensor is used to detect the presence of hands, in ultrasonic sensor, there are two nodes in which one is transmitter while the other is receiver. The transmitter sends an ultrasonic wave and this wave strikes to any hindrance present in front of it and then bounces back. This bounced ultrasonic sensor is then captured by the receiver and on the basis of the time taken by this wave to return, the sensor calculates the distance of that obstacle from that sensor. Ultrasonic sensor is usually used for detecting the obstacle in path and also to find the distance between sensor and the obstacle. Ultrasonic sensor normally used is HC-SR04, which is also used here in this library; here we have used an extra pin on ultrasonic sensor, which is analog pin. The voltage on that pin is used to detect how close object is because it's a simulation and we cannot place an actual object in front of our laptop. A Snapshot of ultrasonic sensor simulation using Proteus software is shown in figure 2.

Figure 2: Snapshot of simulation



When we implement this project in real time, we will be able to achieve the following results

- Whenever a person places his hands below the dispenser at the center, the temperature of hands will be measured.

- If temperature is within the range then the Required quantity of of sanitizer gets pumped out of the sanitizer tank if if temperature is not in range then it will be indicated by a buzzer.

- Dispenser becomes ready for the next person quickly within few seconds.

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VI. CONCLUSION

This system will able to monitor the person's body temperature individually without any manual support it can be used in the entrance of the hospitals, this smart door with announcement message will also reduce the risk of spreading the disease. The system surely helps in implementing the hand hygiene without any challenges as it is necessary to sanitize at any entry point. It is much safer and more recommended due to its touch less property which zeros down any chances of cross contamination. This is a low-cost user-friendly system that anyone can make use of. All the devices communicate well. It can be concluded here that the system has been successfully implemented and the aim is achieved without any deviations.

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BIOGRAPHY

Harisha G C has completed B. E in the stream E&CE from BIET, davanagere and M.Tech in Digital Communication and Networking from UBDTCE, Davangere. Presently he is working as Assistant Professor in Dept of ECE in GM Institute of Technology, Davangere. His research area of interest is Image Processing and he has published one patent and five international journals.

Vikas C Yatnalli has completed B. E in the stream E&CE from SKSVMACET, Laxmeshwar and M.Tech in Digital Communication from BEC, Bagalkot. Presently he is working as Assistant Professor in Dept of ECE in GM Institute of Technology, Davangere. His research area of interest is Image Processing and he has published one patent and three international journals.