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Automatic Hand Sanitizer Dispenser with Body Temperature Sensing

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ABSTRACT: An automatic hand sanitizer dispenser with body temperature sensing machine is automatic, touch-free, alcohol based hand sanitizer dispenser and body temperature sensor. Now a days we are facing a big non visible enemy called Corona virus which is sprayed over the world. As Covid-19 is spread in our community we will stay safe by taking some precautions such as wearing mask, physical distancing, cleaning hands. So to maintain hygiene contact with any object we designed an automatic hand sanitizer dispenser with body temperature sensing machine. Viruses such as COVID-19 are transferrable through touch and contact. There are WHO guidelines to clean or sanitize hands regularly to reduce the risk of infection. Dispensing of sanitizer from bottle or any storage would require manual intervention so, to avoid touch and contact, in this paper we propose a novel design of An automatic hand sanitizer dispenser with body temperature sensing machine to reduce the risk due to contact. The system can sense the proximity with the help of IR Sensor The sensor senses the proximity of hands when placed under the machine. The sanitizer liquid dispenses through solenoid valve with mist nozzle. Here, an IR proximity sensor senses the hand placed near it, and the Arduino uno is used as a microcontroller, IR Temperature sensor which detects the temperature of an object or body and gives signal to the arduino uno board then temperature displays on LCD display

KEYWORDS: Sanitizer, Pump, Alcohol, Corona virus, Relay, Automatic dispenser, IR sensor, Sanitizer machine, Mist nozzle.

I. INTRODUCTION

Hygiene is an important aspect to remain healthy. There are various aspects of hygiene. A clean hand is one of them. Hands generally are touched at various surfaces and can be exposed to direct contamination. Cleaning hands at regular interval is recommended by various health organizations including WHO.

Respiratory Syndrome Corona virus 2 (SARS-CoV-2) is the virus that was first reported in Wuhan, China on December 31, 2019, and was announced as a pandemic by the World Health Organization on March 11, 2020. The need of touch-less automatic dispenser is identified after observing that it is the point of contact for contamination. In this paper we present a novel design of automatic hand sanitizer dispenser.

Body temperature may be read in a number of ways and using a variety of contact and non-contact devices. The need of touch-less automatic dispenser is identified after observing that it is the point of contact for contamination. In this paper we present a novel design of automatic hand sanitizer dispenser. The paper says about emergence of the novel Corona virus (SARS-CoV-2), which has caused unexpected challenges to health of the people of this world, the paper also aims at reducing the transmission rate of the disease.

1.1 Objective

With the above stated aspects , the design has been done for easy installation of the hardware in every possible places across the globe .

The design encompasses few parameters to be calculated and taken as priority, such as –

- Installation of temperature sensor.
- Installation of I2C LCD display to display the sensed temperature.
- Installation of IR Proximity and IR Temperature sensors.
- Installation of Booster pump.
- Synchronizing IR proximity sensors with Relay and IR Temperature sensor with Arduino UNO R3 microcontroller.

The circuit connection of the device are easy to design. Proper safety measure has been taken to overcome any kind of fault in consideration of over-voltage, short circuit, excessive current flow etc.

1.2 Components

Sr. No.	Name Of Material	Specifications	Quantity
1 .	Booster Pump	24v	1
2.	Solenoid Valve	24v	1
3.	IR Proximity Sensor	10-30v(2 feet range) NPN Type	1
4.	Relay	24 v Dual Pole(4CH)	1
5.	Power Supply	24v-AC	1
6.	Power Indicator	-	1
7.	LED	-	2
8.	Resistor	10k,100k	1
9.	Diode	-	1
10.	Nozzle	-	1
11.	MLX90614ESF Temperature Sensor	3.6v-5v	1
12.	16*2 I2C LCD Display	3v ~ 5v DC	1
13.	Arduino Uno	7-12V	1

III. PROPOSED SYSTEM



Fig -1: Proposed Model

We designed an automatic hand sanitizer dispenser with body temperature sensing machine which is designed in the plastic cabinet as shown in figure1. In this we used IR Temperature sensor MLX 90614 which senses the temperature of the body and displays it on the LCD display when we are in the range of temperature sensor. Also we used IR Proximity sensor which senses the object like hands when placed near or under the machine. After that sanitizer dispenses through solenoid valve with mist nozzle. Originally the plastic cabinet was fabricated for water RO system and has been modified for the automatic hand sanitizer dispenser with body temperature. A booster pump is a high-pressure pump which has an impeller inside which improves its water flow and pressure. Most water pressure pumps consist of a pump, inlet and outlet, impeller, and a pressure monitoring device. A water booster pump provides pressure to move water from a storage tank or throughout a whole house or commercial facility. Solenoid valves are the most frequently used control elements in fluidics. Their tasks are to shut off, release, dose, distribute or mix fluids. Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal. Relays were first used in long-distance telegraph circuits as signal repeaters: they refresh the signal coming in from one circuit by transmitting it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

IV. METHODOLOGY

As we switch on the device, the sensors attached to the Arduino and Relay gets activated. We have two systems to work simultaneously to each other. First the automatic sanitizer and secondly the contacted temperature sensing. The IR Proximity sensor and IR Temperature sensor is attached to the Relay And Arduino for detection of human/object ranging and motion respectively. IR sensor has a range of around 3cm – 80cm and any detection in the specified range will activate the sanitizer and it will sanitize the Hands. The IR sensor on the other hand has been specified with a range of less than 80cm, any movement especially hand near the device will activate the booster pump and the sanitizer will sprayed through the solenoid valve with mist nozzle.

The IR temperature sensor senses the body temperature of the person as soon as it is in the range of sensor, and displays the °C in the LCD display(as it is programmed to °C temperature). The normal body temperature is between 97°F (36.1°C) and 99°F (37.2°C). Body temperature also varies from person to person according to body weight, height and other factors. If the temperature sensed is above the normal body temperature(as body temperature of 100.4° F (38°C) or higher.) then we need to meet doctors and also have to test our corona test. So on the model we displayed a chart of body temperature.

The circuit is designed in TINKERCAD software, programming is done, simulated and made to a working schematic. Figure 2 shows the circuit diagram of the system in which there is IR Temperature sensor which detects the temperature of an object or body and gives signal to the arduino board then temperature displays on LCD display.

The arduino is the master controller of the system

which control all the operation of the system it can process the given signal and gives the required signal to the output device such as the relay board and the relay board control the on-off operation of output LED.



Fig -2: Main Model

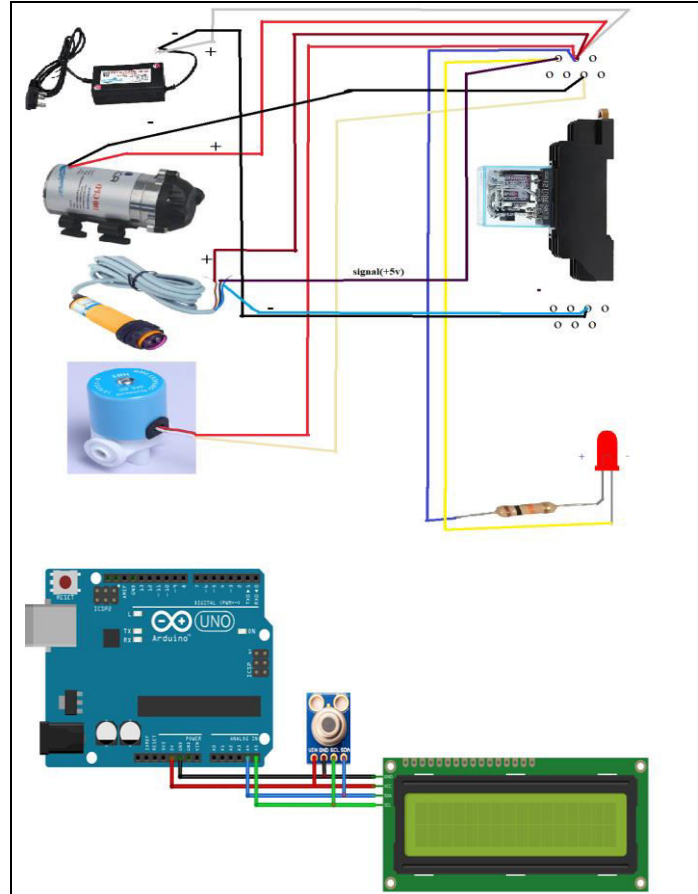


Fig -3: Schematic of the working model

The whole operation is operates on the 5volt-9volt supply voltage which is connected externally. The sensor senses the proximity of hands when placed under the machine. It works on ultrasonic waves reflection principle. Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit.

V. CONCLUSIONS

An automatic hand sanitizer dispenser with body temperature sensing machine is the best replacement of traditional sanitizer dispenser to avoid contact and touch with any object. It plays dual role that is it spray the sanitizer without any contact and also displays the body temperature.

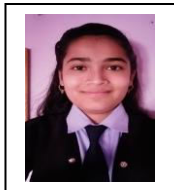
As stated earlier the device circuit is made in a software and simulated accordingly. The power consumption is very low. For each spray the maximum current consumption is 2 Ampere at 24 V. Relays must be installed to drive the spray pumps/submersible pumps. The control circuit is small in size and low cost as compared to available controllers.

From the above paper, we come to know that alcohol based hand sanitizers are more effective than soaps, and also easy to use. The paper also says that non contact dispensing is again important to prevent pathogen spreading and finally, hand hygiene is most important and must be part of our daily life. Also non contact temperature sensing is important to spread of viruses.

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