ORIGINAL RESEARCH PAPER

Engineering

AUTOMATIC SANITIZER DISPENSER BASED ON ATMEL ATMEGA 328P ARDUINO MICROCONTROLLER

KEY WORDS:
Microcontroller, Sanitizer, Covid-19, Dispenser, Sensors.

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ABSTRACT

In the global outbreak of the covid-19 pandemic the cleaning of hands has become most necessary which helps in prevention of germs which indirectly helps in reducing the cause of the diseases not only the covid-19 but various diseases because most of the germs reaches our body through hands while we touch our face of eat something with dirty hands. Now as prescribed by the WORLD HEALTH ORGANIZATION {WHO} to reduce the spreads we have to wash hands thoroughly with soap and water regularly as well as we have to sanitize our hands with the help of the sanitization liquids or gels. The most preferable form of the sanitization of the hands is considered as the use of sanitization liquids as compared to washing hands with soap because sanitizers are much more effective as compared to soaps and can be carried anywhere and can be used just by pouring in hands and rubbing thoroughly without the use of any water. And in another lateral thinking way it is not only helps in reducing the germs but also helps in saving the water. Since squeezing the sanitization bottle at times after times is considered unnecessary and unhygienic automation of the sanitization comes into picture.

INTRODUCTION:

As per the today's scenario the lives of people is affected due to the covid-19 and hence it is advised by all the organizations to wash the hands thoroughly through soap and water of through the help of hand sanitizers which doesn't need any water for application. These sanitizers are the miracles of the medical sector which can kill most of the bacteria's and germs by just rubbing in hands without the use of water.

So it is fore most important to sanitize the hands before doing anything .Hence in this research article it is described the use of sensors in making of a small prototype of an automatic sanitizer dispenser. This type of gadgets is equipped with some of the sensors which are beneficial to detect the hand and will give the Boolean logic inputs to the microcontroller and according to the program driven the microcontroller will analyze it and give the resulting output to the relay to dispense the liquid. And these type of the smart gadgets can be utilized any where such as schools; colleges; hospitals; public places and many more.

BILL OF MATERIALS (BOM):

To recognize the cost and the cost effectiveness it is required to have a total bill of materials and in most of the tasks it is required for minimizing the cost and maximizing the profit.

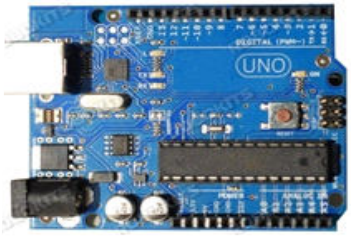
TABULATION 1.1 SHOWING THE BOM FOR THE PROJECTWORK:

S.NO	EQUIPMENT NAME	QUANTITY	COST
1.	Arduino Uno 328P	1	450
2.	Ultrasonics Sensor	1	100
3.	Pump	1	90
4.	Relay 5V	1	50
5.	Pipe	1(45 cms)	20
6.	Some LEDs	1 Set	50
7.	Jumper wires	1 Set	150
8.	Tape and Glues	1/1	50
9.	Card board	1	250
10.	Glue gun	1	170
11.	Soldering Iron	1	150
12.	TOTAL COST	----------	1600

The table above shows the list of electronic and non-electronic components that are being utilized in completion of the research.

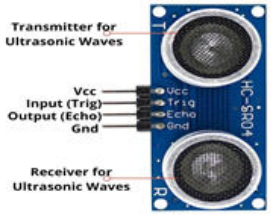
COMPONENTS DESCRIPTION:

1) ARDUINO UNO (source : https://en.wikipedia.org/wiki/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.[1] 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.

2) ULTRASONIC SENSOR (source : internet)



The HC-SR04 ultrasonic distance sensor uses sonar to determine distance to an object with stable readings and high accuracy of 3mm. The module includes ultrasonic transmitter,

receiver and control circuit.

3) PUMP (source : internet)

Micro Submersible Water Pump DC 3V-5V, can be easily integrate to your water system project. The water pump works using water suction methods which drain the water through its inlet and released it through the outlet.

4) RELAY (source : https://en.wikipedia.org/wiki/Relay)

A **relay** is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.

LITERATURE REVIEW:

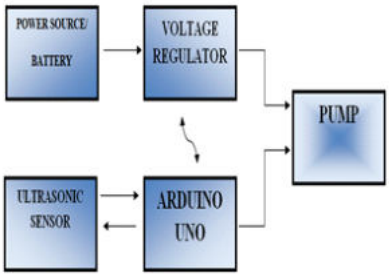
REVIEW ON AUTOMATIC SANITIZER DISPENSING MACHINE, BY AKSHAY SHARMA AS, ON 07-JULY-2020.

In this paper it clearly says about the various hospitals grasped infections, which has over 2 million patients per year and is also the 8th leading cause of death annually in USA. Hand washing is also an important factor as well as also effective for the hand washing steps. It also showed the effectiveness alcohol based hand sanitizers, which reduced the rate of infection by whooping rate of 30%. They also used the hand sanitizers with 60 to 70 percent ethanol as well as isopropanol for reducement of number of pathogens. This paper also showed the infection which is caused by the drug resistant micro-organisms which also increased the rate of death as well as complications, the multi-drug resistant bacteria also included methiellin resistant Staphylococcus aureus (MRSA), (ESBL) Extended Spectrum Beta - Lactamase producing bacteria, Multidrug Resistant Pseudomonas acruginosa (MDRP), which is very commonly worldwide. Personal protection equipment (PPE) in case of isolation rate of MSRA which meant that the hand hygiene is very much important in the novel coronavirus (SARS-COV-2), which also caused the challenges to the people in and around te world globally.

A NOVEL AUTOMATIC SANITIZER DISPENSER, BY RAKSHITH L AND DR. B SHIVA KUMAR, ON SPECIAL ISSUE-2020:-

John M. Boyce, M.D and Didier Pitter, M.D. talked clearly about the significance of the hand washing as well as the hygiene and individual cleanliness. Hand washer as well as cleanser has been viewed as a proportion for hygiene purpose as well as individual cleanliness. In 1822, a French drug specialist also exhibited the arrangements which is being contained by the specific proportion of the chlorides of lime as well as soft drink which can also destroy the fow smells which are related with the human bodies and such kind of arrangement is also used as the disinfectants as well as sterilizers. In 1825, the drug specialist expressed doctors and different kind of people while going to the patients who are carrying infectious illness which also profitted by soaking the patient's hand with the help of fluid chloride arrangement.They are also priced less when they are compared to any other tools (sanitizing) or dispensers. The automated hand sanitizer machines are developed in such a way they are compactile with various containers, affordable, eco-friendly as well as user friendly.

BLOCK DIAGRAM:



WORKING PRINCIPLE:

1 Algorithm for making the model.

a. Build the structure of the model.
b. Assemble all the desired components as shown in block diagram.
c. Do all the connections using jumper wires.
d. Check all the connections using multi-meter.
e. Plug the arduino to laptop using universal serial bus.
f. Upload the codes.
g. Unplug it.
h. Power it using some suitable source.
i. Completed.

2. Algorithm for functioning of dispensing machine.

a. Place the complete device on a suitable area.
b. Power it on.
c. Done.

3. Flow Chart


```
long distance;
long duration;

void setup()
{
 // put your setup code here, to run once:
pinMode(2,OUTPUT); // trigger
pinMode(3,INPUT);// echo
pinMode(4,OUTPUT);// red led
pinMode(5,OUTPUT);// green led
pinMode(6,OUTPUT);// relay
Serial.begin(9600);
pinMode(12,OUTPUT);
digitalWrite(12,HIGH);
pinMode(8,OUTPUT);
pinMode(9,OUTPUT);
digitalWrite(8,LOW);
digitalWrite(9,LOW);
}

void loop() {
 // put your main code here, to run repeatedly:
digitalWrite(2,LOW);
delayMicroseconds(2);
digitalWrite(2,HIGH);
delayMicroseconds(10);
digitalWrite(2,LOW);
duration = pulseIn(3,HIGH);
```

```
distance= duration*0.034/2;

// Prints the distance on the Serial Monitor
Serial.print("Distance:");
Serial.println(distance);

if(distance<10)
{
 digitalWrite(5,1);
 digitalWrite(4,0);
 digitalWrite(6,0);
 delay(1000);
}
else
{
 digitalWrite(5,0);
 digitalWrite(4,1);
 digitalWrite(6,1);
 delay(1000);
}
}
```

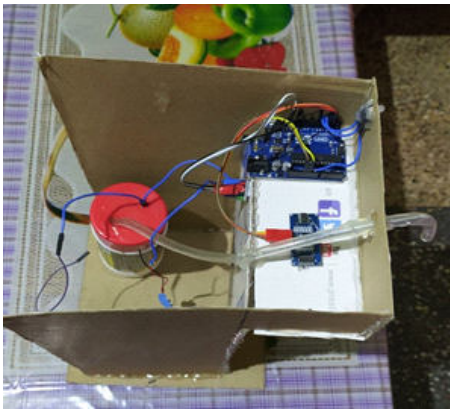
FIGURES SHOWING CODES IN ARDUINO IDE AND THE CIRCUIT DIAGRAM

5.Working Procedure.

The working procedure for this type of devices is very simple in the sense that it consists of an ultrasonic sensor which uses ultrasonic rays or waves to detect the objects and in this case the objects refers to the hands and it will send a signal to the arduino microcontroller whenever it detects hand and according to the program driven the arduino will take the decision and will dispense the sanitizing fluid and will automatically shut the pump when the hand is not detected.

6. Images of running prototype model.

The below figures shows the images that are taken of the prescribed prototype model of the device:



TOPVIEW

FRONTVIEW

SIDEVIEW

APPLICATIONS:

1) Homes.
2) Colleges.
3) Public places.
4) Anywhere it can be used for safety purpose.

CONCLUSION:

This type of sanitization facilities are very important in today's world because since COVID-19 is concerned its very useful in sanitization of hands without being touched and it not only that but it is also cost effective and economically beneficial for the consumer in many ways.

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