Design & Fabrication of Sanitizing Machine with Gate

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Abstract: *Demand for hand sanitizers has surged since the coronavirus broke out and spread around the world. Hand sanitizers are usually applied by squirting the sanitizer liquid when one presses a pump with one's hand. This causes many people to come into contact with the pump handle, which increases the risk of viral transmission. Some hand sanitizers on the market are automatically pumped. However, because sanitizer containers and pump devices are designed to be compatible only between products produced by the same manufacturer, consumers must also repurchase the container for the liquid if they replace the hand sanitizer. Therefore, this paper suggests the design of an automatic hand sanitizer system compatible with various sanitizer containers.*

Keywords: Automatism, Internet of Things, Hand Sanitizers, Infrared Rays, Motor Skills

1. Introduction

Demand for hand sanitizers and temperature checking has increased because of COVID-19. Hand sanitizers are applied by squirting the sanitizer liquid to prevent virus. press the pump that causes viral transmission and it will infect. Every person will press the pump in different manner that will problem to refill and replacement. To this reason, the real use of pump hand sanitizers is decreased, which not help to prevent spreads.

In so many market areas the hand sanitizer is automatically pumped. Because sanitizer tins and pumped devices are designed only between products produced by the same builder, customers must also recover the hand sanitizer tins for the liquid if they replace the hand sanitizer. It is not cost-effective and it has a weak impact on the nature by increasing waste emissions. Some buyers can think that it is a difficulty to buy a hand sanitizer-containing device-united again, so they are reusing the tins and refilling with sanitizer. Sanitizers that come straight into contact with the human body are classified as medicines or nonmedical products, and they are safest to use in original tin. An automatic hand sanitizer is designed for contactless sanitizing. This task focused on flexibility of pumps and improving all people are managed to access to devices. The automatic hand sanitizers are proposed to improve contactless hand disinfection in public areas

2. Structure Design

In this structure design we use sanitizer pump, temperature sensor are in the front of the door and its controlled by an Arduino board. The device operates from temperature checking. if controller allows you, when your temperature is normal. Now, some motor control will move to release sanitizer and door will open to check-in. May if not allowed it will sanitized but door will not open. You cannot allowed inside.

3. Procedure

Components Used
3.1 Arduino
Arduino Uno is the based on microcontroller board running on ATmega23. it has 14 digital input and output pins, 6 pins of analog inputs, a usb connection, a power connection, a 16MHz ceramic resonator, a 5v voltage regulator and a reset button. ATmega23 is replaceable chip, it is not soldered to the board. The high- performance low power micro controller.
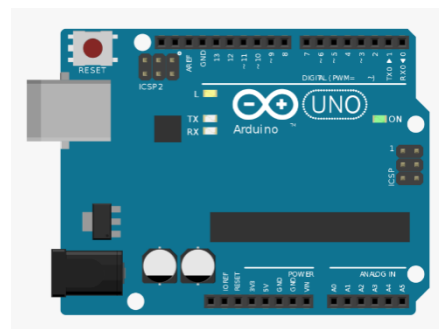

Figure: Arduino Uno Microcontroller

3.2 LM35

LM35 is a temperature sensor it is a temperature measuring device having an analog output voltage proportional to the temperature. It gives output in centigrade. The sensitivity of LM35 is 10mV/degree Celsius. As temperature increase, output voltage also increases.

Figure: LM35 temperaature sensor

3.3 IR Sensor

IR sensor is an electronic device that measures and detects infrared radiation in its surrounding environment. When ir sensor is invisible to the human eye, as its wave length is longer than that of visible light there are two types of infrared sensors are active and passive sensors when an object comes close to the sensor, infrared light from the

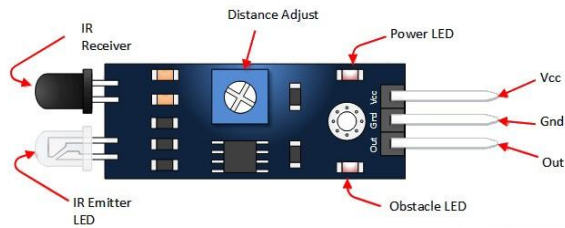LED reflects off of the object and is detected by the receiver.

Figure: IR Sensor

3.4 Relay Module

The relay is the device that open or closes the contacts to cause the operation of the other electric control. It detects the undesirable condition with an assigned area and gives the commands to the circuit breaker to disconnect the affected area through ON or OFF.

Every electromechanical relay consists of
1) Electromagnet
2) Mechanically movable contact
3) Switching points and
4) Spring

COM: Common pin
NO: Normally open– there is no contact between the common pin and the normally open pin. So, when you trigger the relay, it connects to the COM pin
NC: Normally closed – there is contact between the common pin and the normally closed pin. There is always connection between the COM and NC pins, even when the relay is turned off. When you trigger the relay, the circuit is opened and there is no supply provided to the load.

3.5 Submersible Pump

12V DC Diaphragm Based Mini Aquarium Water Pump is an ideal non submersible pump for variety of liquid movement application. It has enough pressure to be used with nozzle to make spray system. The pump can handle heated liquids up to a temperature of 80°C and when suitably powered can suck water through the tube from up to 2m and pump water vertically for up to 3m.

Figure: Diaphragm pump

Specifications and Features of R385 6-12V DC Diaphragm
- Model : R385
- Rated Voltage : DC 6V to 12V (1 amps)
- Working current: 0.5A to 0.7A (Max)
- Power: 4W-7W
- Max Lift: 3m
- Max Suction: 2m
- Max Water Temp: 80 °C
- Pump Size: 90mm * 40mm * 35mm approx.
- Fluid: 0-100 ° C
- Input/output tube diameter: outer 8.5mm, inner 6mm approx.
- Max Current: Up to 2 Amps while starting up
- Life: up to 2500 Hours
- The maximum flow rate of up to 1 – 3L/min.

3.6 Tower Pro MG995 Metal Gear Servo

MG995 Metal Gear Servo Motor is a high-speed standard servo can rotate approximately 180 degrees (60 in each direction) used for airplane, helicopterRC-cars and many RC model. Provides 10kg/cm at 4.8V, and 12kgcm at 6V.

It is a Digital Servo Motor which receives and processes PWM signal faster and better. It equips sophisticated internal circuitry that provides good torque, holding power, and faster updates in response to external forces.

They are packed within a tight sturdy plastic case which makes them water and dust resistant which is a very useful feature in RC planes, Boats, and RC Monster Trucks etc. It equips 3-wire JR servo plug which is compatible with Futaba connectors too.

Servo motor Wire Description:
RED – Positive
Brown – Negative
Orange – Signal

Specification:
Weight: 55g
Dimension: $40.7 \times 19.7 \times 42.9$ mm
Operating Speed (4.8V no load): 20sec / 60 deg
Operating Speed (6.0V no load): 16sec / 60 deg(no load)
Stall Torque (4.8V): 10kg/cm
Stall Torque (6.0V): 12kg/cm
Operation Voltage: 4.8 - 7.2Volts
Gear Type: All Metal Gears
Stable and shock proof double ball bearing design
Dead band width: 5 µs
Temperature range: 0 ºC – 55 ºC.
Control System: Analog
Operating Angle: 120degree

Figure: Metal gear Servo motor

3.7 Nozzle for Sprayer

Lengthen Plug-in & Cleanable Mist Nozzles Sturdy Brass metal plug-in mist nozzle easy to install and pull out and makes mist nozzle more firmly when spraying. The mist nozzle can be completely disassembled easy to clean the dirty when it is blocked by impurities

Operation Pressure is 20-80kg/cm, Flow Rate 80-145ml/min

Nozzle Sprayer

4. Final Stage

Today, contactless Hand sanitizer are used worldwide. The remarkable growth of the contactless hand sanitizer that is compatible with various containers. When one move ones hand close to the device sensor, the hand sanitizer container is pumped once.
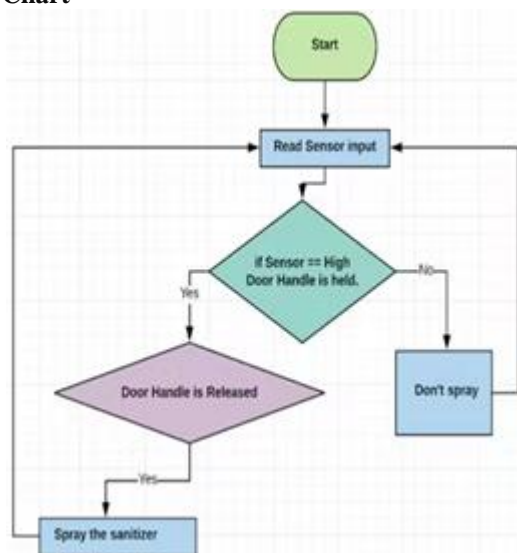
Flow Chart

Figure: Flow Chart

The above flow chart explains the clear control of sanitizing machine which checks the human temperature first and then it allows the diaphragm pump to be controlled with the relay
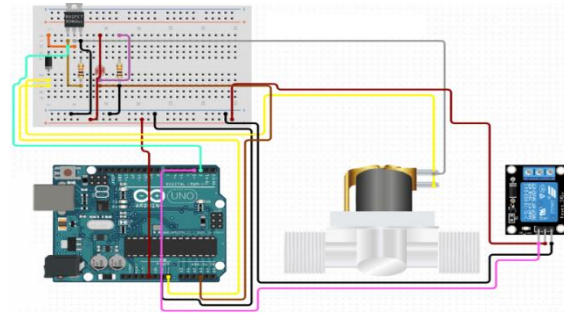

Final Fabrication

Circuit Diagram:

Figure: Interfacing Circuit Diagram

Acknowledgments

5. Conclusion

Contactless Hand sanitizers usually operate by pump sanitizer liquid when one move under the sensor. It will sense the temperature and sanitize your hands. If temperature is normal doors will open and if not, doors will not open

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