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Automatic Machine of Hand Sanitizer with Face Mask Detection

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Abstract

Today, the demand of sanitizer is very high because of this Covid-19. In everywhere people use sanitizer bottle, when one presses the bottle, a large amount of sanitizer is spread-out, which gets wasted and an infected person hands over or trigger the sanitizer bottle. So, there will be chances of someone else getting the virus from it. That's why this paper suggest about, how this things has been made easy by this machine. An automatic hand sanitizer machine was designed in two stages, the first stage tells about the face mask detection and the second stage tells about the hardware part that is called hand sanitizer machine. The goal of this project is to use as many people as possible and make this machine portable and easily workable and also to give best automatic machine which is available for every person. In this machine, both modules- first is face mask detection and second is hand sanitizer doing great work. To classify whether or not a person is catch it wearing mask so, they easily catch it and also in hand sanitizer machine they sanitize the person one by one by using sensor.

Keywords: Automatic System, Machine, Sanitizer, Detection.

I. Introduction

Today, there is a lot of demand for sanitizer due to Covid-19. Usually in everywhere people use sanitizer bottle, when one presses the bottle, a large amount of sanitizer is spread-out, which gets wasted and an infected person hands over or trigger the sanitizer bottle. So, there will be chances of someone else getting the virus from it. That's why this paper suggest about, how this things has been made easy by this machine. In this machine many different features are present and some of them are as follows:

- Instant sanitization

- Smart sensor Touch free
- Easy to install
- User friendly
- Low power consumption

As we know, in market this machine is already available but we are making this machine extra-ordinary. As we can see, there is a separate machine for face mask detection and hand sanitizer system present in the market. But we make a machine by combining the both separate machines that's why we named it "Automatic Hand Sanitizer Machine with Face Mask Detection System. In appearance, it will be smaller than the rest of the machines, due to which we can fix it easily anywhere and also can be take anywhere it means it is portable. There are many different types of application of this Automatic Sanitizer Machine -

- Hospitals
- Colleges
- Schools
- Airports
- Banks

We can easily install this machine in different places and it is very safe and easily usable.

II. Modules

This project is divided into two modules-

A. Face Mask Detection System.

The first module that we created is mask detection. We all knows that before this pandemic the mask are not essential to all but now the mask is very essential, without wearing mask we are not going anywhere, So for that reason we are introducing this module. In this we are using some tensor flow external libraries, webcam, numpy-imutils, CV2, haar-cascated files and so on, by using this we are writing a code in python for face mask detection. When we run the program we getting output i.e. Find who have wearing a mask in a work place and who have not wearing a mask.

- **Design of Face Mask Detection System.**

As we can see in both figure, in first image that the person is not wearing a mask, an in second image that the person is wearing a mask and these whole process is detected by this detection system. So it can be easily detect who wear a mask and who not wear a mask, which is proved by this figures.

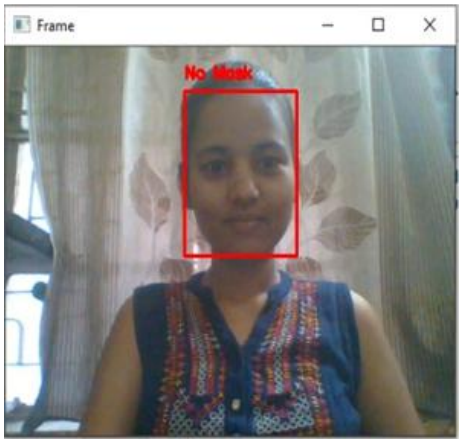


Figure:-1

Image of Without Face Mask Detection

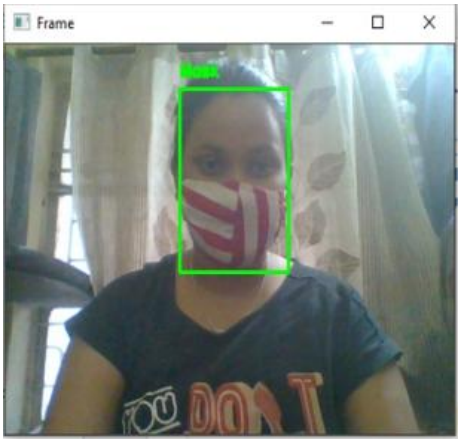


Figure:-2

Image of With Face Mask Detection

-In Face Mask Detection we used some files, libraries and algorithms, which are given below:-

a. Python

- It is an interpreted high level general purpose programming language. It supports modules and packages. For face recognition we writing a coding in this language.
- In python we used Py-charm. Py-charm is a most famous integrated development environment specifically for the python scripting language. It is machine learning and it allows many tools such as Anaconda.

b. Haar Casted Files

By using this we can recognize one or more faces. It is based on machine learning. This classifier detect the images as a positive and negative image. Haar like features is to recognize the digital image, it is a set of two adjacent rectangle that lie above the eye and cheek region

c. Mask Detection.XML

It is known for the detection of mask. XML file is markup language file. It is used to structure the data for storage and transport.

d. Convolutional Neural Network(CNN Algorithm)

CNN Algorithm is a Deep Learning algorithm. It is used for analyzing visual imaginary things. CNN's use relatingly compare to other image classification algorithms.

e. Webcam

It is a video camera that streams and image or video in real time through the internet. Webcam is used to face detection and open-cv python.

f. Tensor flow.keras

It is computer vision technique. These are the external libraries for the backend purpose. It helps to detect the location and tracing and object form image.

g. Import Numpy

It finds the position of webcam. It is the most popular python package and in our project by using Numpy we can find the position of webcam i.e., where is our face that is left or right

h. Import imutils

We are importing this package for capturing the image or face with the use of webcam. It is also used for translation, resizing, rotation, displaying of the image in python.

i. Import CV2 Package

This CV2 package is help to open the webcam, and also CV2 is used to open the webcam frame, and after opening the webcam frame then its starts to recognize the face.

B. Hand Sanitizer System.

The second module of our project is hand sanitizer machine. In this module, we are design a touchless machine, which includes some hardware devices are as follow. This system is based on Arduino-Uno.

- **Design of Hand Sanitizer System.**

This is the hardware part of this machine in that we used various types of components , which are play an important role in this system, and the figure given below.

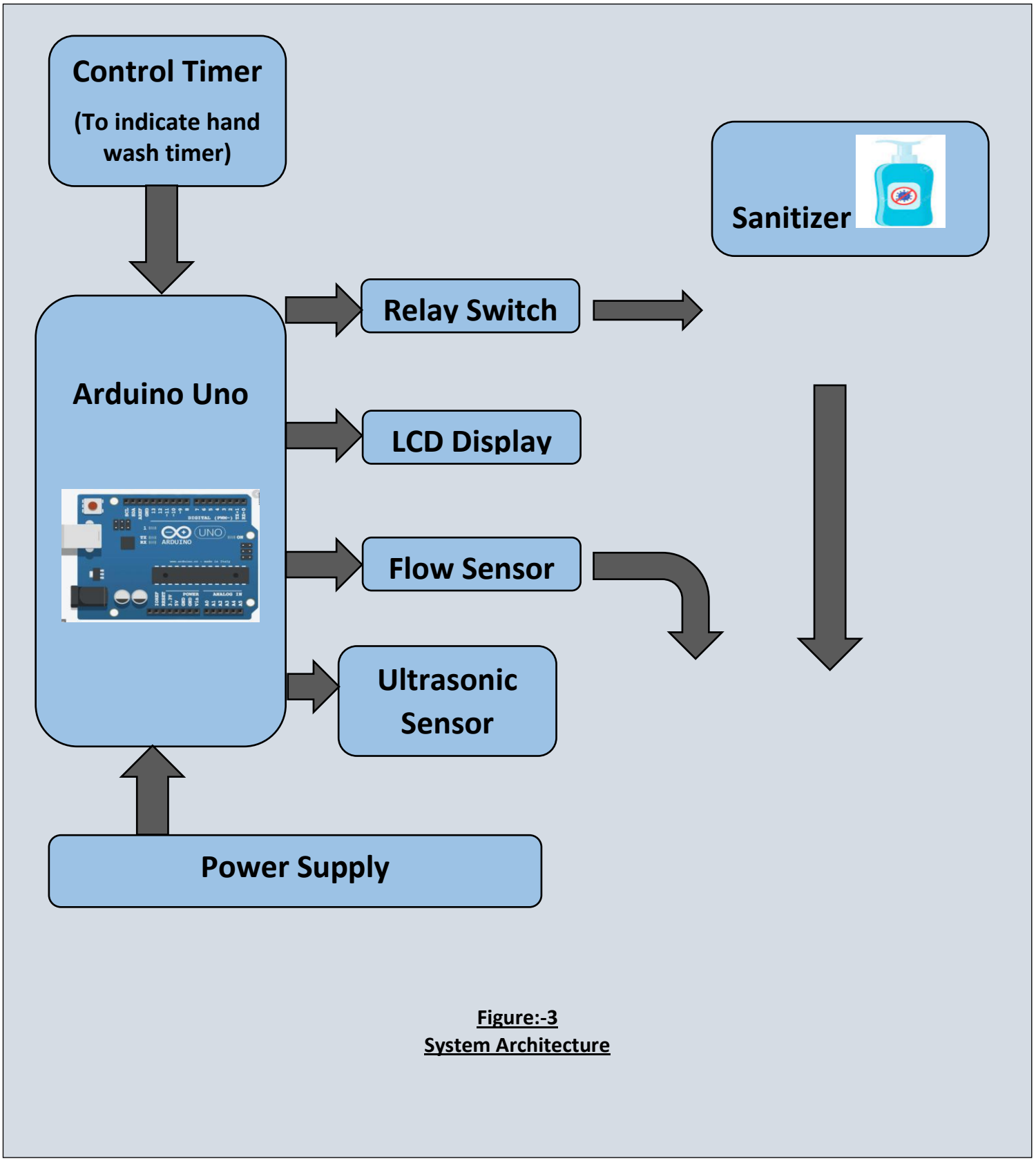
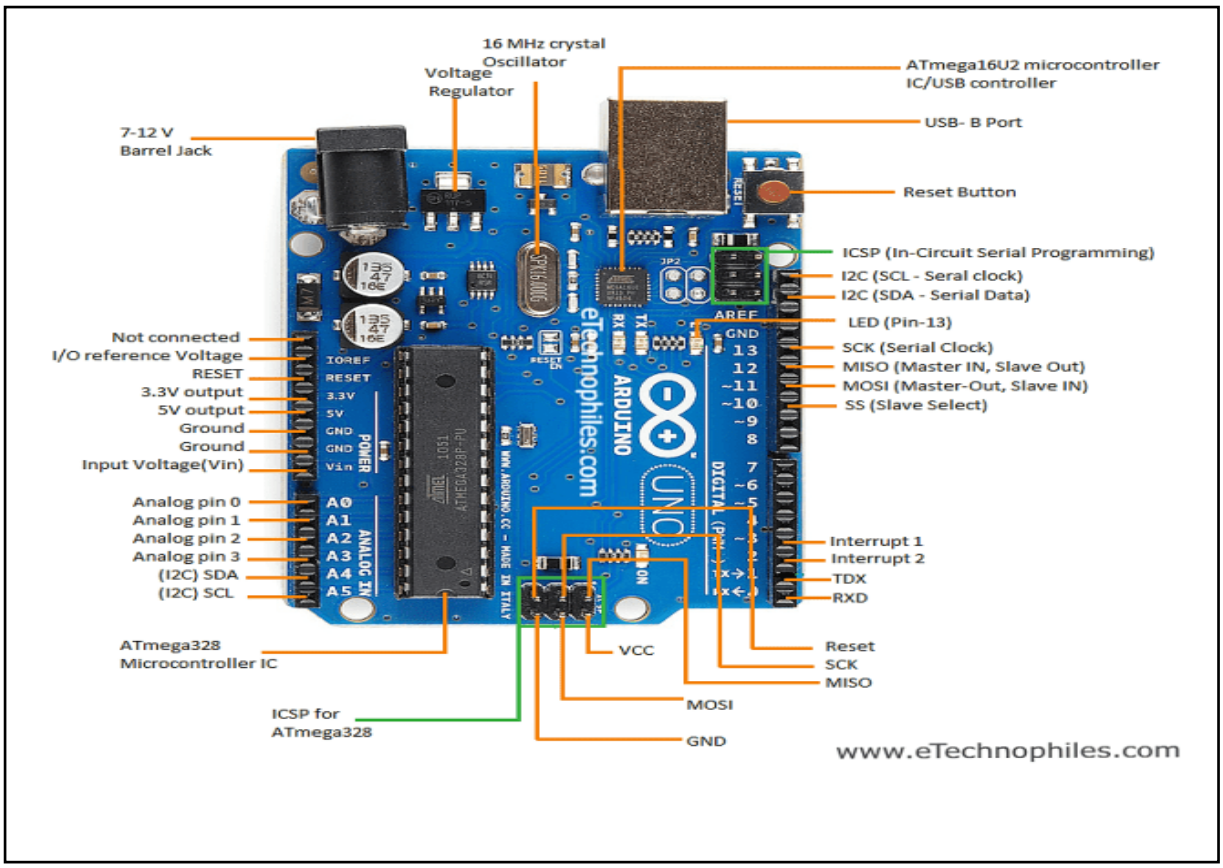


Figure:-3
System Architecture

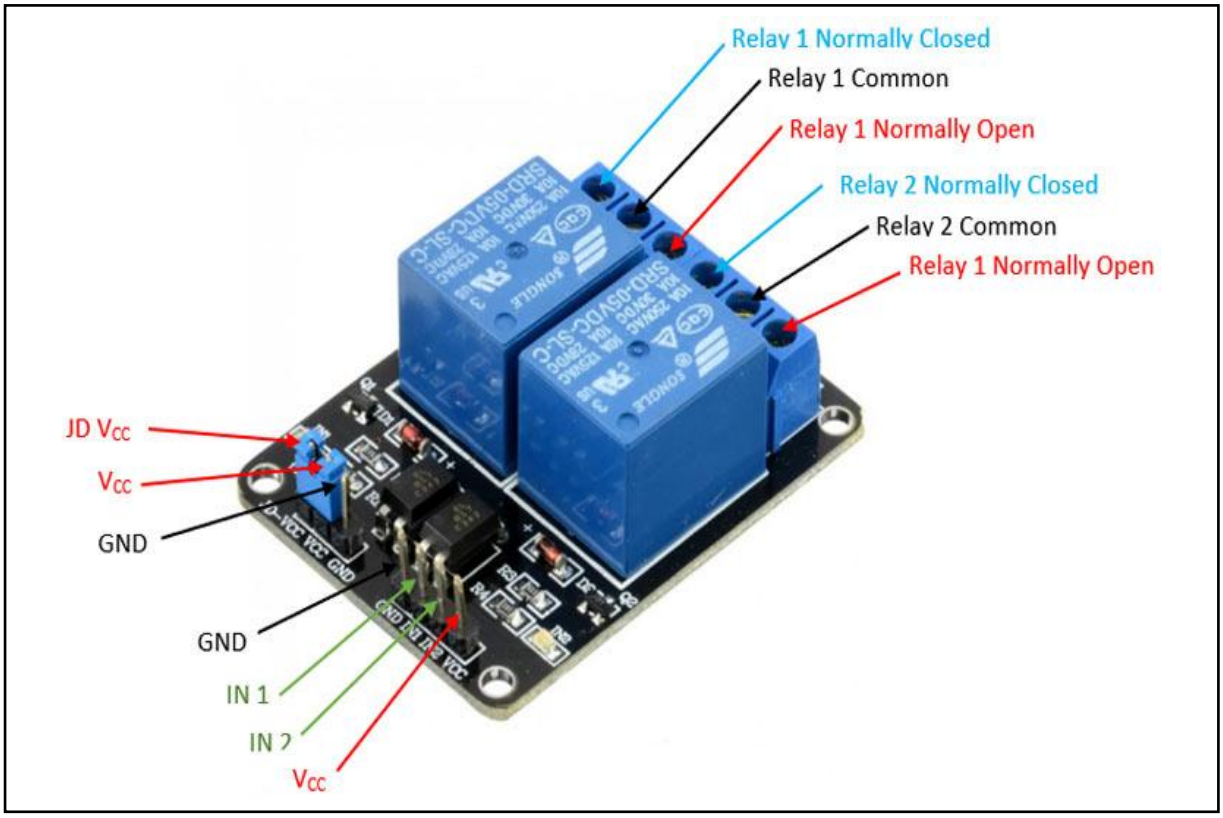
I. Arduino Uno

The Arduino Uno is an open source micro-controller board which is developed by Arduino.cc. They have digital and analog input/output pins that may be interfaced to various expansion board and circuit.



II. Relay Switcher

A relay switch is an electrically operated switch. It use to open-up the relay channel and turning on the motor pump, thereby releasing the sanitizer through the pump.



III. LCD Display

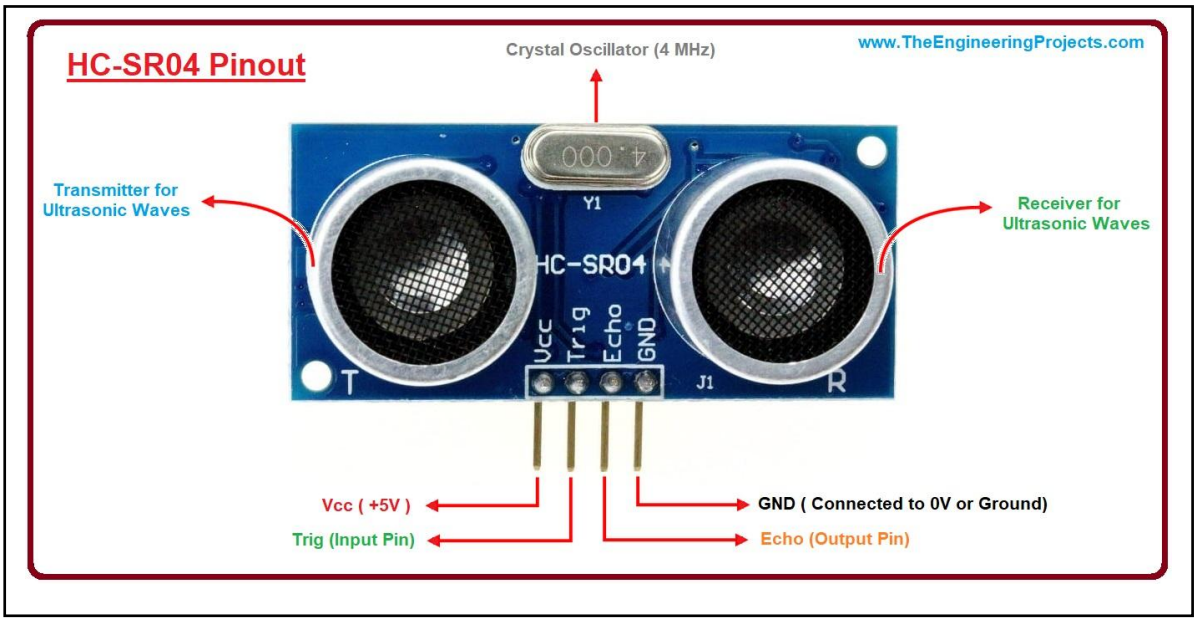
Liquid crystal Display is an electronic display device. That use the light modulating properties, so they display when face detect by face detection mask.

IV. Flow Sensor

A flow sensor (more commonly referred to as a “flow meter”) is an electronic device that measures the flow rate of liquids and gasses with in pipes and tubes.

V. Ultrasonic Sensor

It's an electronic device that measure the distance of a target by ultrasonic sound waves. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear).

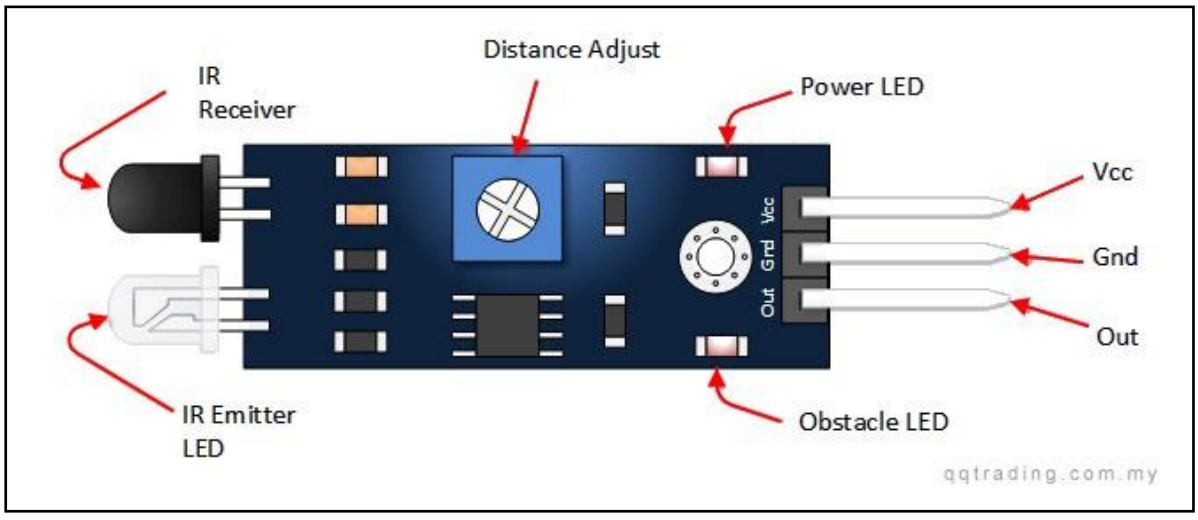


VI. Power Supply

It is nothing but it is a supply of power. It supplies to the entire machine, which makes our machine workable.

VII. IR Sensor

It is an electronic device that is infrared sensor that measure and detects infrared radiation in it surrounding.



VIII. Sanitizer Tank

The sanitizer tank which will contain alcoholic liquid, we will kill the virus by using this liquid, which will be fixed in our machine.

III. Result

In this machine, both modules- first is face mask detection and second is hand sanitizer system doing great work. To classify whether or not a person is catch it wearing mask so, they easily catch it and also in hand sanitizer machine they sanitize the person one by one by using sensor. These all things are shown in actual image of the proposed device.

Figure:-4

Real Image of Automatic Hand Sanitizer with Face Mask Detection

IV. Conclusion and Future Scope

In the Proposed face mask detection model both the training and development of the image dataset, which was divided into categories of the people having masks and people not having masks have been done successfully. The technique of Open CV deep neural networks used in this model generated fruitful results. So the all over conclusion of this project is that we have created for the people, so that people can use them well and they reduces the risk of the virus's spreading. We can install in various places also it is eco-friendly, decreasing waste emissions. So these all things are proposed by this paper.

We want to add Temperature detection in the future scope and as long as the person not wearing mask, his hands will not be sanitized. We are going to do this system in the future. Right now this system is present but even when person wearing or not wearing a mask, but still it sanitize the hand so in future we will make it even better, if today it is really successful.

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