Automatic Body Sanitizer Machine

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Abstract **- 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, hence we have to make a Automatic Body Sanitizer Machine and also due to COVID-19 vaccine not come in market is the major thing but our safety must important therefore the sanitizer can reduce the germs. 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 body sanitizer with the help of proximity sensor that can detect the body automatically and temperature sensing system, to keep the whole body sanitized whenever a person wants to do it, without a contact with the sanitizing machine.**

Due to COVID-19 pandemic, in most of the country, especially in India, the use of sanitizer is still increasing, by using sanitizer we keep protecting our body from COVID-19 disease. When we contact with any person whose have COVID-19 traces, it is dangerous to our body and body will be get COVID-19 positive result, so when we get contact with any COVID-19 positive person, it is very important that to sanitized whole body with the help of liquid sanitizer. For that we make Automatic Body Sanitizer Machine, this machine sanitize the whole body automatically also it's detected the temperature of body and remove dirt, dust particles from the body. The idea for contract this machine as a project is comes from the increasing importance of sanitizing of hand in the COVID-19 pandemic season, but this machine is used for sanitizing our whole body, because the traces of COVID-19 traces is settled on our body that's why our purpose is to remove COVID -19 traces from not only our hand but also from our body. For this project we read various research paper and take help from internet for the information of required component and resources for the construction of course project and also doing market research for find out the total cost required for the construction of our project. After completion of Automatic Body Sanitizer Machine, by using this machine we can kept protect our body from COVID-19 disease by the help of automatic sanitization of our whole body and it also detect the temperature of human body.

Index Terms **- IR Proximity Sensor, Temperature Sensor, Microcontroller.**

I.INTRODUCTION

In year 2019, the COVID-19 virus developed in China due to the bad eating habits of Chinese people. Nearly September or October month of the 2019, the virus COVID-19 start of spreading in the Wuhan city of China. Nearly start of 2020, this COVID-19 virus starts of speedily spreading in all World through China due to which most country suffering by COVID -19 disease. In October 2020, because of this nearly 4 crore COVID-19 cases are register in the World and out of this nearly 75 lakhs cases are register in India. So, it is necessary to take a prevention which are helpful to fight against COVID-19 virus. As per suggestion given by a WHO doctors and various hospitals that uses of sanitizer, N-95 masks and social distancing plays a very important roles in order to fight against COVID-19. For a protection most of the people in various country followed the steps like maintaining social distance, hand wash by using sanitizer or soap, wearing of N-95 masks to protect the body from COVID-19 virus due to which importance and demand of masks and sanitizer is still increased in this COVID-19 pandemic season. COVID-19 vaccine is only solution to save the people of life from COVID-19 virus. By the used of COVID-19 vaccine, it is possible that the whole World will be become COVID-19 free. But it is not easy to launch COVID-19 vaccine without taking trial of the vaccine and before some month most of the country including India start trial of COVID-19 vaccine, that's why it is possible that there is a chance of launching of COVID-19 vaccine in the coming year 2021.So, till the launching of COVID-19 vaccine, it is necessary to all

followed the instruction given by the government related to COVID-19 disease. In crowded areas, there is a chance of spreading of COVID-19 virus easily. In this area, if we contact with the person who has a COVID-19 related symptom in his body, it is very harmful to us and others ones which are we were in contact. In this condition, the most effective way to remove viruses from your body is to sanitized not only our hand but also our whole body. In most of the organization such as hospitals, hotels, etc. the body sanitization machine is used but, in this machine, there is a manual contact is required for start the sanitization process, that's why this machine gives more time for body sanitization and also there is a continuously spreading of sanitizer due to which there happened is that loss of some amount of sanitizer used for the sanitization process. In order to save the time required for sanitization and loss of sanitizer, we will be developed automatic sanitizer machine Which works automatically and the methods used for sanitization in this machine is alcohol sanitization, because this method is harmless to human skin and kill most of the viruses in our body. This machine also detects the temperature of human body and record its data automatically for a use of future reference.

II. METHODOLOGY

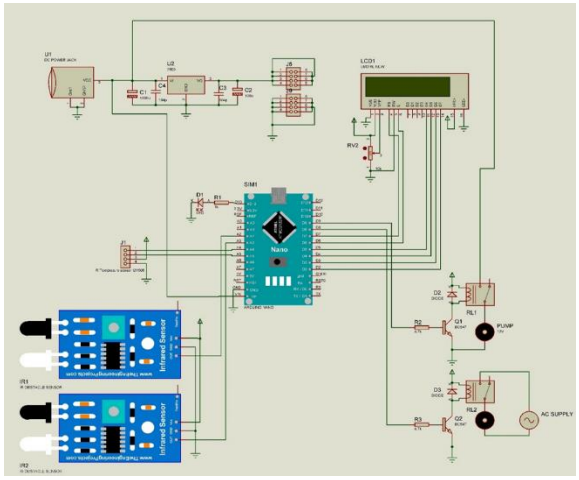

Figure 1: Block diagram of controller circuit

IN the above circuit diagram U1 is a DC Jack for connecting 12V adaptor supply. The U2 is a Voltage regulator IC which is provide stable 5V supply. The capacitor C1 and C2 is use for voltage stability capacitor and C3 and C4 for noise remover purpose. This is 5V regulated supply provide all hardware circuits.

The IR temperature Sensor J1 is connected with the Arduino pin A4 and A5 is a SCL and SDA for I2C communication with Arduino. IR proximity Sensor IR1 and UR2 is connected with A2 and A3.

The relay operates by relay driver circuit Q1 and R2 operate relay-1 and Q2 and R3 operate Relay-2, is connected with Arduino D8 and D9. Lcd display is connected with Arduino D2-D7 pin respectively. The all operation performed by the Arduino. D13 pin connected with LED1 for indication purpose.

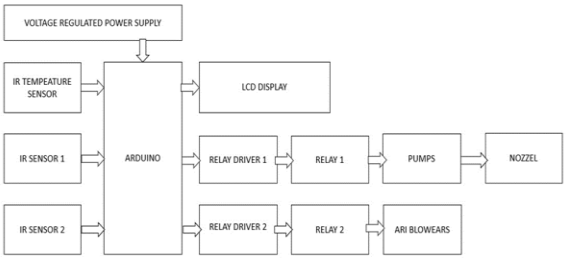

Figure 2: Block Diagram of Sanitization Tunnel

Figure 3: Metal Frame Chamber of Automatic Sanitizer Machine

IR Temperature Sensor: Infrared temperature sensors sense electromagnetic waves in the 700 nm to 14,000 nm range. While the infrared spectrum extends up to 1,000,000 nm, IR temperature sensors do not measure above 14,000 nm. These sensors work by focusing the infrared energy emitted by an object onto one or more photodetectors. These photodetectors convert that energy into an electrical signal and gives to the Arduino.

IR Sensor-1 and 2: IR, in short for infrared, detects the presence of an object by emitting a beam of infrared light. Infrared proximity sensors consist of an IR LED that emits, and a light detector for detection of reflection. We are used to detect IR sensor 1 for to initialize IR temperature and IR sensor 2 for person detect at tunnel entry and data send to the Arduino.

Arduino: The Arduino is a brain of the system which controlled input and output device it read data from IR temperature sensor and IR proximity data and activate Blowers and pump by own control signal. The also display the data on LCD display.

Relay Driver: Relay driver is a basic circuit or mediator between relays and Arduino provide ON signal to driver and drive amplify the power for rely and relay will ON/OFF.

Relays: Relay is a nothing but a mechanical electromagnetic switch. For use to operate ON/OFF Blower and PUMP.

LCD Display: An LCD (Liquid Crystal Display) screen is an electronic display module and has a wide range of applications. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix.

The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols. This LCD has two registers, namely, Command and Data. The Arduino use for display the data and operation of the project. Voltage Regulator: Voltage regulator circuit used for to provide stable 5V power supply to all the connected circuits like LCD, relay driver, relay, IRs and IR temperature Sensors.

III PROPOSED SYSTEM

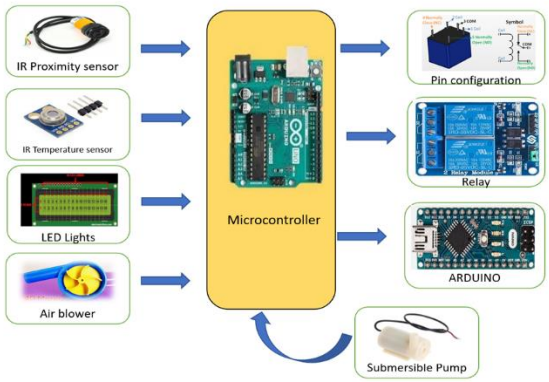

Figure 4: Block Diagram of Proposed System

IV.MODELING

CAD Model

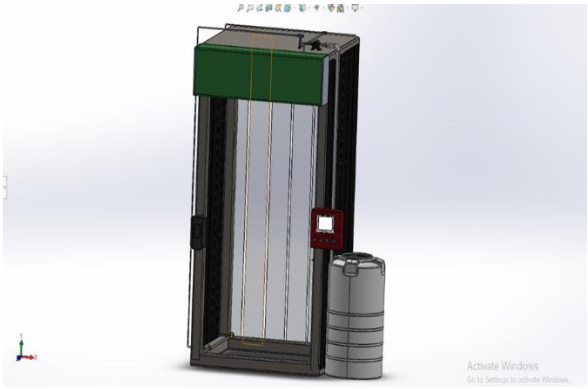

Figure 5 front view

Figure 6 : Bottom Half view

Figure 7 :-Top view

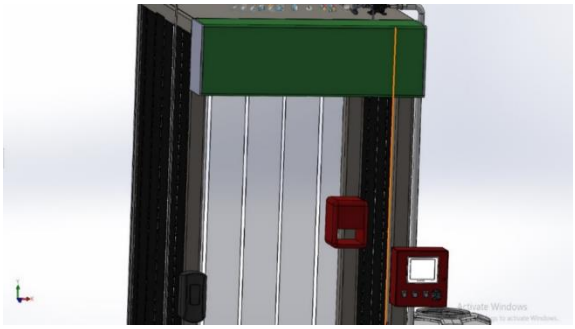

Figure 8:- Above Half section

V.RESULTS AND DISCUSSION

RESULT

1. In our project there are various kind of components are used and all component having their own individual function by which all process will smoothly and easily.
2. Nozzles are use for spraying the sanitizer liquid with proper contraction and concentrated spay with specific discharge.
3. i.e. Q=(q1+q2+q3+….qn) …….. q1+q2+q3+…. qn etc., these are the no. of nozzles discharge and there are 8 nozzles are used for spring and proper discharge.
4. Area of nozzles will be discharge=area of crossection × velocity and discharge through nozzle will be 0.04m3/sec.
5. Pump is used for lifting the hydraulic fluid energy and pressure of this pump will be approximately 8.6105 bar.
6. Velocity from an angle nozzle will be approximately 1.039 m/sec.
7. The pump is used in this machine and pump is in more efficient i.e. 84.54%
8. The given are the analytical result about this mechanism and hence all process sun smoothly and successfully.

Further if we will go for fabricating this Automatic Body Sanitizer Machine With Blower project the approximate cost for making this project is given as follow:

COST EXPENDITURE

Component	Quantity	Price
IR Proximity Sensor	4	Rs.144
Submersible Water Pump	1	Rs.250
Resistor, Power Cable	2	Rs.100
TIP32C transistor	2	Rs.200
Temperature Sensing kit	1	Rs.600
Steel frame	-	Rs.5500
Sanitizer Reserved Tank	1	Rs.2000
Sanitization Liquid	1(1 litre)	Rs.700
PVC Pipe	5m	Rs. 200

Above are the list of components with quantity and prices that we have required for fabrication the machine. Considering this expenditure, the final project fabrication will be done.

DISCUSSION

- According to the pandemic crisis of covid-19 we decided to overcome this crisis which was continuously spreading from one people to another
- So we thought about this problem and taken decision to fabricate an automatic body sanitizer machine with blower will be able to sanitize all body part and also able to use read human body temperature as well all the process will be automatically
- In this mechanism we use various types of component like microcontroller, based system , control power consumption, supply voltage, output voltage, reservoir, etc.
- The working process of this machine is that when person enter in this frame chamber object or person will detect the sensor that is proximity sensor and the temperature will be read by temperature indicator according to that sanitizer liquid will spread over all body of that person and sanitization of human body will be successfully.
- In this project we use SolidWork-2018 designing software for designing purpose of this project.
- Also, we use of software for coding purpose i.e. Arduino Nano 3.x And which is based on ATmega328 that Connected by Mini-B USB by the help of power supply dc pawer it will start.

VI. CALCULATIONS

Here we have to calculate the total discharge of sanitizer liquid that will be spared to the whole body of human being by means of pump through nozzles that we have connected inside of the metal frame chamber.

To find out the "Q"

Q is Total discharge of sanitizer liquid.

$Q=(q_1+q2+q3+...+qn)$ ……. here q1, q2...qn are the discharge through "n" nozzles

Q=AxV

Where, A=-area of cross section

V=velocity of fluid

Here number of nozzles "n" is 8 that we used in this project.

1) Discharge through Pump:

i-a) discharge pressure of pump:

Now we have to compare the discharge of pump to the nozzles Discharge pressure:

Discharge pressure = 125psi
=125×0.68
= 8.5 atm
=8.5×1.013 bar
Discharge pressure = 8.6015 bar

i-b) Discharge through Pump:

flow rate = 100 GDP

1 Gallon= 3.785litres

1gallon= 0.3785 m3/sec

2) Discharge through Nozzle:

Tip size of single nozzle is 1mm.

So,

Discharge through single nozzle "q"= o.453 litre
q= 0.0453m3/sec
Discharge through 1 nozzle = 0.0453m³/s
Discharge through 8 nozzles = 8 x 0.04531
Nozzle discharge = 0.36248 m³/s

3) To find, losses

Now, compare discharge of pump to the nozzle.

$Q_{pump} = Q_{nozzle}$ + Losses

0.3785= 0.32 +losses

Losses = 0.0585 m3/sec

4) To find out velocity of flow of liquid spray through single nozzle.

$Q = A \times V$

$0.04 = [\pi/4 \times (0.007)^2] \times V$

V=1.37 m/sec from single nozzle

V=10.96 m/sec for 8 nozzles

5) To find the pump efficiency:

Pump Efficiency= Discharge through nozzle / Discharge through pump
= 0.32/0.3785
= 0.8454×100
Pump efficiency = 84.54%

In this, All the Calculations are done and Results obtained are Theoretical due to lockdown in state. Results may differ when it is implemented practically.

VI. CONCLUSION

1. Due to COVID-19 situation in most of the organization, the hand sanitizer machine is used to remove the viruses from hand, but when our body contact with the other body if a person whose having a COVID-19 symptoms then, it is necessary to sanitized not only hand but also a whole body. So, automatic sanitizer machine we will developed for the purpose of body sanitization.
2. Nowadays in various organization, body sanitizer machine is used but mail problem in this machine is that it takes more time for sanitization process and also there is a loss of some amount of sanitizer due to continuously spraying of sanitizer in the body for sanitization.
3. The main goal behind the developing of automatic sanitizer machine is to overcome a problem occurs by using a body sanitizer machine in various organization.
4. So, when we used automatic sanitizer machine, we save the time or sanitizer required for sanitization process and also this machine having a facility of detect the temperature and oxygen level in the body by working automatically.
5. All the components are chosen after completing proper literature review, by taking account about various parameters about the components and its working. The parts were picked with cost as a boundary to improve the advancement of the framework. This machine can create a new revolution in the field of medical and product-based automation. This project can further be developed into various dimensions based upon the requirement.
6. So, we have concluded that by Using Automatic Sanitizer Machine with Blower we can save the time and sanitizer or detect the temperature and oxygen level in the human body easily.

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