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PLC and HMI Based Covid-19 Disinfection Chamber

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***Abstract* - The main aim of our project is to disinfect the object completely by fighting against the virus present on it through PLC and HMI based covid-19 disinfection chamber. In this project mainly four operations are been performed through Covid-19 disinfection chamber. After going through all the process the object is completely disinfected and ready to use.**

Keywords: PLC, HMI, Covid-19, Disinfection Chamber.

I. INTRODUCTION

Due to immense crisis the Global Pandemic Covid-19 in nearly all the sectors including Technology, Hospitality, Industrial Manufacturing, Tourism, Education etc. Everyone is making a immense effort on invent something that can avert, Tackle or get rid of the Virus and start with the work again.

Similarly, as we belong to the Manufacturing Industry, we are looking towards developing an Automated Chamber for Disinfecting the Tools, Materials, and Products which are frequently handled by multiple workers

We all are conscious about the fact that virus can deposit on any material including Plastic, Wood, Metal, Fibre etc. &If the infected person handles that material, there is a 95% chance of virus getting deposited on that Object and can transmit the virus to all others who handle those materials.

We are looking towards developing a PLC & Industrial IOT Machine that will perform the following process in Machine Tending Manner.

II. METHODOLOGY OF PROJECT

Sensor 1 = LOW → Clean Water Wash Pump = LOW
Sensor 1 = HIGH → Clean Water Wash Pump = HIGH

Sensor 2 = LOW → Sanitizer Pump = LOW
Sensor 2 = HIGH → Sanitizer Pump = HIGH

Sensor 3 = LOW → HOT Air-Gun = LOW
Sensor 3= HIGH → HOT Air-Gun = HIGH

Sensor 4 = LOW → UV LIGHT = LOW
Sensor 4 = HIGH → UV LIGHT = HIGH

III. PROBLEM DEFINITION, OBJECTIVES & SCOPE OF PROJECT

The Setup will be a complete enclosed chamber with Transparent Covering to all the stations.

- There is a Fully Automatic Disinfection chamber which will carry the Object from one process to another process
- In the 1st process, the Water will be sprayed the objects for certain time.
- In the 2nd process, the Sanitization is done on objects for certain time
- In the 3rd process the Object travel through the Hot Air Gun and the Virus gets killed at high temperature through this hot air
- In the 4th process the Objects travel through the UV Light which kills the Virus.
- The Entire Process will be Monitored and Controlled using IOT
- Once all the process is completed, the disinfected object is ready to use.

IV. LITERATURE REVIEW

The worldwide struggle against COVID-19 has seen automation play an extremely important role to assist humans in containing the spread of the virus and manage the existing cases. One of the important technologies that have made a lot of difference on the ground is robotics. Many hospitals around the world are recently using robots to assist both the healthcare staff and patients.

In the UK's Edinberg, robotic experts are developing on what they declare would be the first healthcare robot that will consult with more than one individual at the same time. The project has been developing to help seniors. Specialists believe the progress could help in working with upcoming disease outbreak like the ongoing widespread someday.

In US, the affected patients are being kept in confined areas with two beds at the Providence Regional Medical Center in Washington. Doctors are taking the help of a robot, which is equipped with a micron, stethoscope and camera. This approach, doctors can treat patients without touching them directly.

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With the transition, just like other development, robots also play an important aspect to deal with diseases like COVID-19. In the case of a disruption, the robot automation can play a major role in not just helping the patients but also keeping the doctor and healthcare staff preventing from diseases.

V. TECHNICAL ASPECTS

- Sensors-Sensors act as a input to plc. In this project we have use capacitive proximity sensor.
- PLC-Programmable logic controller receives input from sensor and actuates the output devices automatically whenever necessary.
- Mitsubishi GOC-Plc with HMI in build.
- MCB-Used for over current, short circuit.
- Relay Board-Relays are connected to PLC output port which provides ease of switching of external load like pumps, motors.
- Hot air gun-It is connected to output 3 through relay 3.The function of this blower is to blow hot air on object when sensor 3 senses the plc stops the conveyer.
- Ultraviolet light-It is connected to output 4 through relay 4.Ultraviolet lights exist within the spectrum of light between 10 to 400nm.
- Conveyer system-It is mainly used to transfer the object from one station to another.
- Sanitizer pump-It is connected to output 2of plc through relay 2.It is used to sanitize object.
- Clean water pump-It is connected to output 1 of plc through relay 1 .It is use to spray clean water on the object.

VI. CONCLUSION

The simulation of project is executed successfully implemented and running in proper condition.

- When start P.B is pressed and conveyer turns ON.
- When the object reaches the 1st sensor water motor turns ON.
- When object reaches 2nd sensor, sanitizer spray turns ON.
- When object reaches 3rd sensor, hot UV light turns ON.
- When object reaches sensor 4th, hot air gun turns ON.
- Visualization is a form of SCADA.

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