

Automated Sanitizing Machine for Recording Thermal Detection and Hygiene Application

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Abstract

A multipurpose automatic disinfection booth is an automated, non-contact, alcohol-based disinfection station, which find its use in hospitals, work, premises, offices, schools and other relevant places. It serves multiple purposes of sanitizing not only the human body but all of the components they are carrying. By using UV lights, we sanitize the whole object or accessories which carried by person. Along with this functioning it also provides a fully automated hand sanitizing mechanism which is followed by temperature detection of the person entering the machine and it is loaded with smart sensors to take appropriate decisions. It has a security mechanism in form of a barricade to restrict the potentially unwanted person from entering. Also, it stores data of the person in form of an image for security purposes along with providing free energy

Keywords: Automated hand sanitizing dispenser, disinfection chamber, ESPN CAM, sanitization tunnel, temperature detection.

1. Introduction

Viruses such as COVID-19 are transferable through humans' interactions. There are WHO guidelines to clean or wash or sanitized hands every day to reduce the risk spreading the infection. Sanitizer storage will be manual. The corona pandemic is affecting the education system very hard. Still, after 8 months schools are unable to reopen the online system of education is not appealing to students as well as teachers as the presence of the teacher is most important for the learning process. To reopen the educational institutes, we need a strong sanitizing machine for sanitizing 1000s of the students entering premises. No such machine or arrangement is available at the Institute which sanitizes not only the person and its equipment but also mark its attendance with a face reading application. In this project, we propose a new design of a disinfectant machine without touching to reduce the risk due to contact and measurement of body temperature and various uses of the tripod or fields. Which widely seen in hospitals, workplaces, offices, schools and other relevant places. The microprocessor has received all input in terms of motion detection or capture the radiation of body, from the ultrasonic sensor which detects proximity. The microprocessor processes the sensed data which was collected by

sensors and activate the pump. The disinfectant liquid flows through the spray nozzle. Problems we find after doing research on all results we got. The Corona pandemic has impacted the world and triggered a global social and economic crisis, and science through invention and innovation hold the key to fight against this outbreak. No such machine or arrangement is available at the Institute which sanitizes not only the person and its equipment but also marks its attendance with a face reading application.

Due to the pandemic of COVID19, temperature measurement of persons became one of the major tasks to detect the affected. To do this, non-contact measurement and social distance increasingly become a temperature and off sound abnormal it gives danger alarm sound so that everyone of us may be alert.

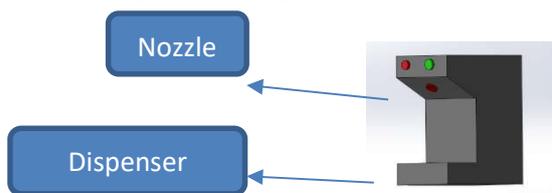
We believe in delivering sanitization services to the community with our most safety and cost efficiency to reach hygiene Expectations We strive to provide people with preventive and curative methods keeping in mind the environmental challenges come across. Provide full body sanitation service, cell phones, wallets, bags and other essentials. Some objective related to sanitization as follows:

Design or manufacture of a simple and efficient room that will be portable. To sanitize your full body while going inside any institute. To replace old techniques of sanitization. To capture the temperature of the person who is passing through the chamber and able to store the data in data base, to mark the attendance of the person. To reduce manpower requirements for personal sanitization. The booth should successfully be able to sanitize students entering the college. The attendance and count of the person should be automatically marked with the help of biometrics.

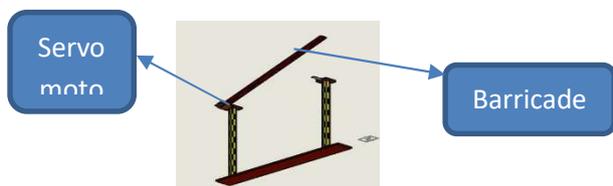
1. Construction:

Fully automated body sanitizing tunnel comprises the different applications and various functions. It comprises the various component as follow,

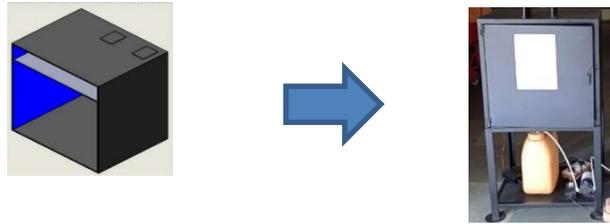
1) **Automatic hand sanitizing dispenser:** which will be used to sanitize the hand of the person who will use that machine. The purpose is to keep our machine also free from any bacteria or viruses.



2) **Automatic entry and exit gate:** The purpose of this project is to automatically open the door by detecting body temperature within range temperature door is open otherwise the door is closed.



3) **Object sanitizing container:** Which is used to sanitize all the accessories of the person who uses that machine.

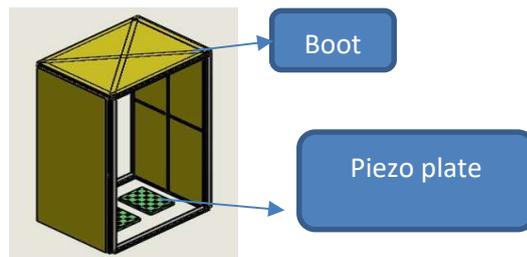


Which is to use UV radiations for sanitization purposes. Comprises paddle operated door mechanism.

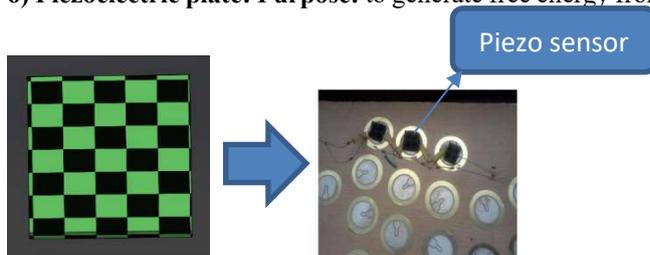
4) **ESPN32 cam motion detector:** Which will help to capture the picture of that person as well as store the info about the person like temperature, time, image, date etc. and stored into the database in our college server



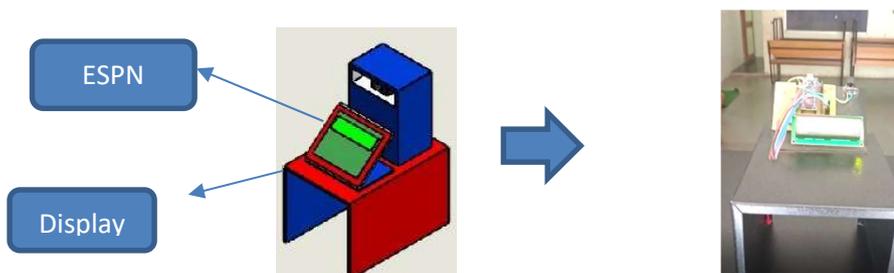
5) **Sanitizing tunnel:** Tunnel from which a person passes and body will get fully sanitized automatically with the help of the fine nozzle.



6) **Piezoelectric plate:** Purpose: to generate free energy from footsteps. Which is placed at the base of the tunnel.



7) **Temperature detection setup:** Purpose to detect the temperature of the body and take the appropriate action against the person means to allow the person to enter our department or not.



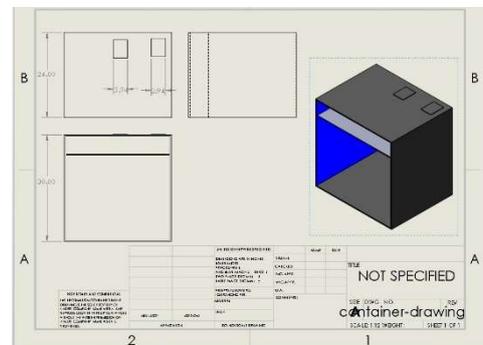
2. Working:

As we already mention the major components of our project each component has their individual function and important role in our project.

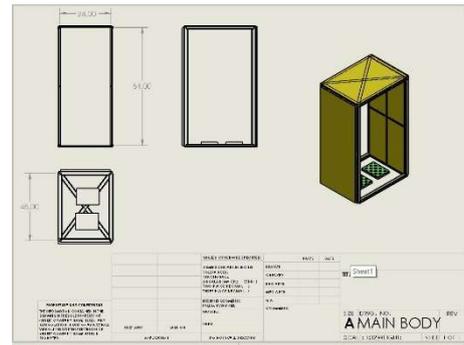
- As per workflow first component is automatic hand sanitizing dispenser who use to sanitize the hand before touching or infect our machine.
- Second step in workflow to keep the all accessories in the disinfectant chamber for sanitization purpose by using UV rays.
- Third step in workflow keep the wrist inside the temperature detection setup who will detect the temperature of the body and make the decision according to their body temperature to allow that person to inside our department or not along with that data like temperature, date, time, as well as image sent to the server or drive and stored it for security purpose.
- Fourth step in workflow plan as per the temperature range as we decided for how much value of temperature, we have to allow the person to enter to department if temperature is within the range then gate open otherwise it will remain close.
- Fifth step in workflow plan automatic sanitization tunnel which is use to spray the sanitizer on the body with the help of nozzle only up to shoulder.
- Last step after complete sanitization of the body we keep our accessories out from chamber and go inside the department.

3. DETAIL DESIGN CALCULATION

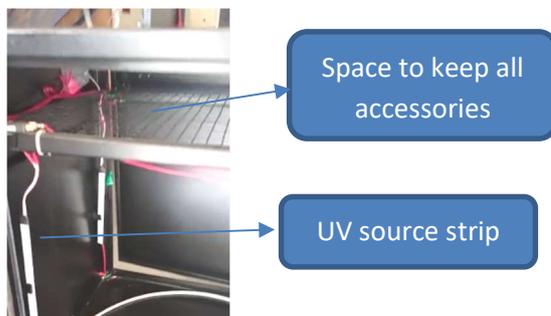
- DESIGN
- Specifications
 - ❖ Frame (CAST IRON-SQUARE ROD):2.5*3*7ft_(l*b*h)
 - ❖ UV Chamber (SHEET METAL) :2.6 * 2ft
 - ❖ Sheet Metal: Steel



- For that purpose, we consider average Height and width of a human and by practicing all possible practical ways, we came to the decision that we at least have 7 feet of height to a Human sanitizing chamber and a width of 2.5 feet and the depth of 3 feet. We fixed the joints of a frame by attaching it with Nut & Bolt system.



- Rest from this weal so have different frame structure for the UV CHAMBER for sanitizing the other human accessories that he/she carries with it such as wallet, bag, mobile etc.
- Material of UV Chamber– Sheet Metal

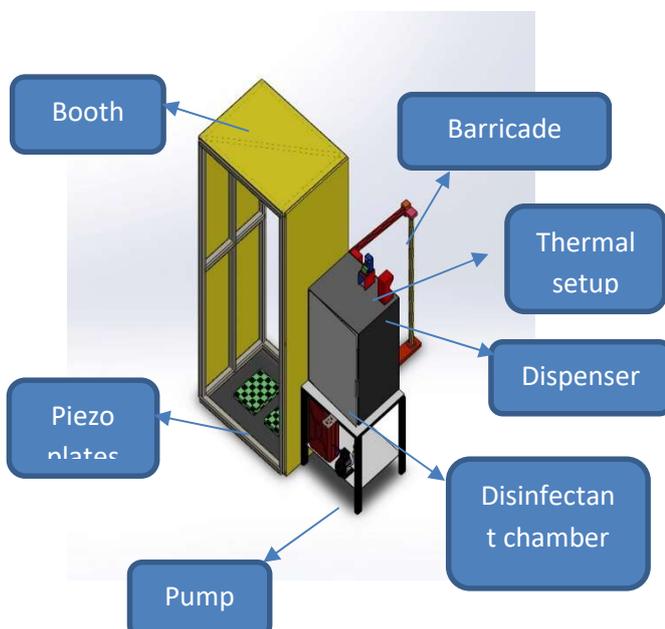


Having high strength and corrosive resistance property. Use of UV Chamber–Sanitization of Mobile Phones, Laptops, Wallets, Keys, Bags etc.

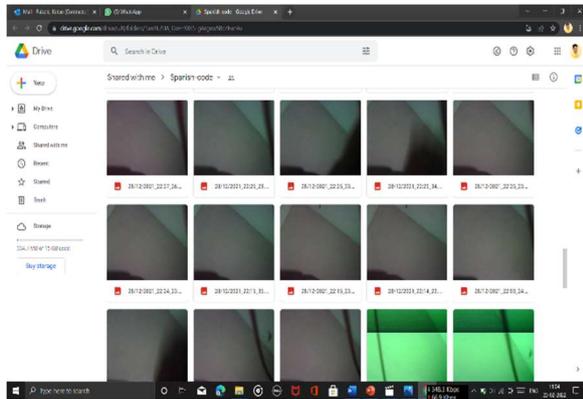
- Material use for dispenser body is corrugate shit which is light weight weighted and cheap.

4. Final results of research

We explained all the component individually with proper functioning so now it's time to assemble that all together to see how that work or help in our actual life.



As person use that setup for sanitization purpose then our sample test result comes out like that, We store the data of the person like temperature, image, date, time when he or she enter to our department in the cloud storage service like google cloud or google drive in following format:



Here is our main concern off doing that research to store the data into that format for future use so that we can identify the all-possible solutions.

4. Conclusions

. This research paper deals with the concept of multipurpose sanitizing booth mainly for colleges and offices. The booth is collapsible and can be used to curb the spread of the corona virus and help in starting the school and colleges, and big offices in full fledge which are in running in a limited capacity. This stand aims to disinfect the human body and its personal effects to the maximum reduce the risk of infections. Life and health are one of the big concerns now a days. This COVID19 pandemic has hit so hard that millions of people around the world have been affected. This is the alarming and eye-opening situation for prevention of such epidemics in coming future. Thus, our project act as a barrier between the harmful and deadly viruses to keep the human race safe. Sanitize the person as well as his other accessories and also security purpose. The person is almost safe before contacting other people. If the person is not fit and health your sanitizing booth grasp that information immediately and alert that person about his condition. This is concept is useful for corporate world.

References

- [1] <http://www.keaipublishing.com/en/journals/global-transitions-proceedings/>
- [2] <https://www.researchgate.net/publication/353331137>
- [3] Norarzemi, Umami Annisa, et al. "Development of Prototype Smart Door System with IoT Application." *Progress in Engineering Application and Technology* 1.1 (2020): 245-256.

[4] WORKING PRINCIPLE OF ARDUINO AND USING IT AS A TOOL FOR STUDY AND RESEARCH Leo Louis International Journal of Control, Automation, Communication and Systems

(IJCACS), Vol.1, No.2, April 2016

[5] International Journal of Engineering Applied Sciences and Technology, 2021

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[6] Disinfection of eggshells using ultraviolet light and hydrogen peroxide

independently and in combination 1 J. B. Wells, C. D. Coufal, H. M. Parker, and C. D. McDaniel

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