



Sanitizer Vending Machine

Project



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Project Proposal

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**SANT LONGOWAL INSTITUTE OF ENGINEERING AND
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SANGRUR, PUNJAB**

Forwarding Letter

February 09, 2021

Dr. Anupama Marwaha
Head of Department (HOD),
Department of Electronics and Communication,
Sant Longowal Institute of Engineering and Technology, Longowal
Sangrur, Punjab

Subject : Project Proposal on Automatic Sanitizer Vending Machine

Dear Ma'am,

With due respect and our humble submission, we are undersigned student of 2018 batch having a project proposal on "Automatic Sanitizer Vending Machine" under the mentorship of student guide Atish Deepankar and Panikar.

Over the last months the COVID-19 pandemic has been spreading chaos all around the world. There are countless infections and unfortunately many casualties. One of the most important measures suggested by the World Health Organization is constant hand washing with either soap or hand sanitizers. But one of the most significant problems is the way we do it and that is by physically touching the dispenser which eliminates the whole purpose of the action and even creates a great risk of infection.

Therefore, we are developing a way through which we can get the sanitizer or hand-wash without touching the dispenser. We are making an accessory that can be attached to the dispenser which make fog/mist of hand sanitizer/soap and turn them completely hands-free and automatic through sensors, microcontrollers and motors. Also, this project is cheap and cost effective, which we can able to be attached to many dispensers easily, quickly and effectively.

Yours' Sincerely,

Kshitiz - GEE/1840176
Amresh Kumar - GEC/1840073
Praveen Kumar - GEC/1840072
Dhanesh Kumar - GEC/1840061
Siddharth Kumar - GWT/1840367

Abstract

COVID-19 or **Coronavirus disease 2019** is a infectious disease which firstly started in December 2019. This virus is simply transferrable through touch and contact. In this COVID-19 pandemic period which is a global outbreak, hand hygiene is the core preventive measure in the spread of the disease as advised by WHO (World Health Organization) which includes washing hands with water and soap regularly, hand sanitizing using hand sanitizers, etc. Hygiene refers to the practices conducive to maintaining health and preventing disease especially through cleanliness such as washing hands, coughing in the elbow etc. Hand washing helps to prevent any diseases that spread through contact.

Even when hand washing or sanitizing is done, the most significant problem is the way we do it and that is by physically touching the dispenser which eliminates the whole purpose of the action and even creates a great risk of infection.

So, to recover from this problem is only to make the dispenser automatic. when the dispenser is automatic then the problem of physically touching is completely over and no risk of infection.

In this project, we propose a novel design of touch-less sanitizer machine to reduce the risk due to contact. The system can sense the proximity with the help of sensor and sends signal to microcontroller. The controller processes the sensor data & actuates the pump and solenoid valve. The sanitizer liquid dispenses through mist nozzle. It requires sensors, microcontrollers, motors, etc.

The whole project is cheap and cost effective, which we can able to be attached to many dispensers easily, quickly and effectively. Also, we can we use this for marketing purpose and nowadays the market potential of Automatic Sanitizer Vending Machine is excellent. So, this equipment will work very good in market.

But, currently we are making this project only for our College/Institution. In future, we will think about marketing purpose of this project .

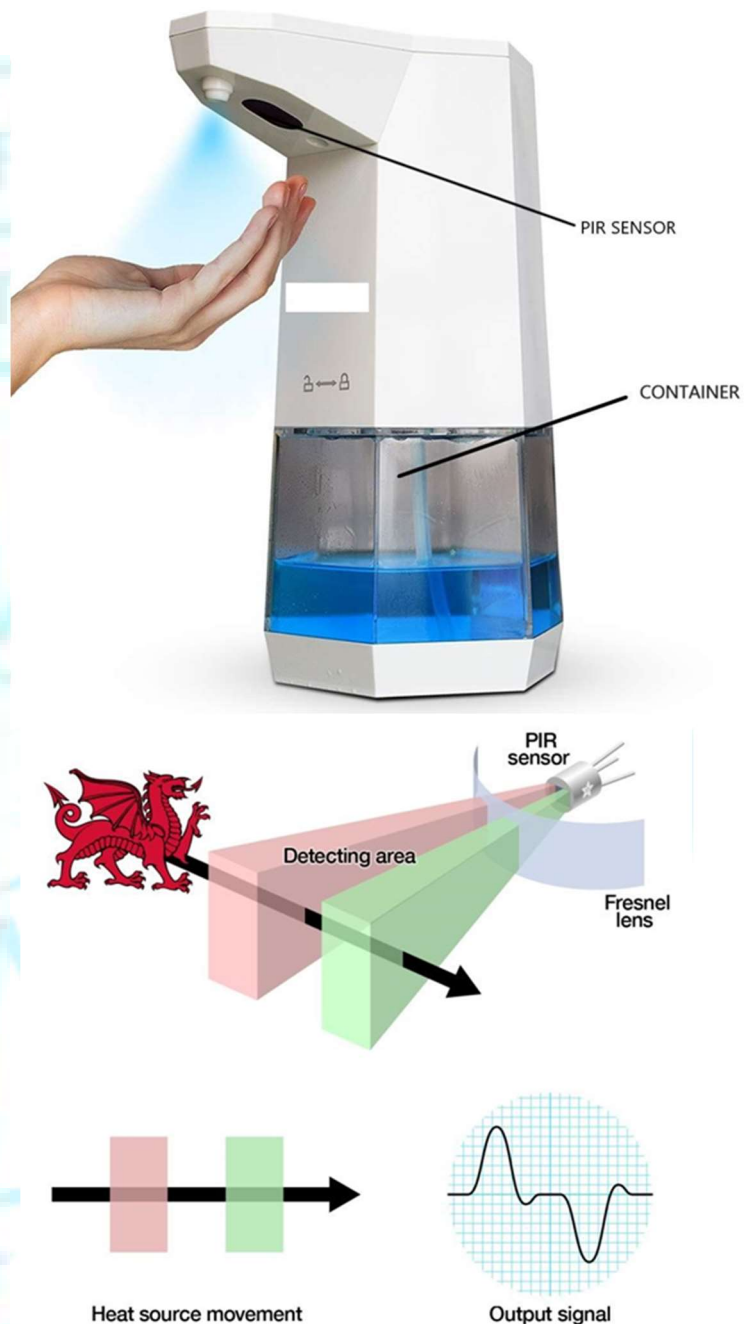
Working of Sanitizer Vending Machine

It mainly works on the application of PIR sensors. As shown in the figure the location of the PIR sensor is on the upper part of the SVM (Sanitizer Vending Machine) pointing downwards.

The function of a PIR sensor is to detect a warm body (human). The PIR sensor consists of two slots in it; each slot is made of a special material that is sensitive to IR. As shown in figure, when a warm body (Human) passes by, it detects the signal (PIR sensor activated) and sends the information to the Arduino, and we use its signal as ON and it acts as a switch to the motor. And after the motor starts, its shaft starts rotating and it is attached to a rod in a certain way so that the rod pushes the mist-atomizer and sanitizer will spray out through the mist-atomizer of the SVM in the form of mist/fog.

And when the sanitizer is sprayed out, after one second of duration the motor stops. And all other mechanical components stop working, and set back to its normal condition. The whole action is programmed in Arduino, which does the work as action happened in front of PIR Sensor.

We also use BT-module for hands free power ON/OFF operation through mobile phone. So there is no need to touch the SVM even for ON/OFF purpose.



COMPONENTS

The main components we used in this project are listed below, further we add some more components for the sake of betterment:

- **PIR sensor**: For the detection of the human body.
- **Arduino Board**: To feed the program to perform all the action in the process of sanitization.
- **Li-Po battery (12V)**: To provide Power to the circuit and all other electronic components.
- **DC Servo motor (12V)**: For opening the cap of the container.
- **Mist-Atomizer**: For conversion of liquid sanitizer in mist or fog form.
- **BT-Module**: For connecting the SVM with mobile phone for power ON/OFF purpose.
- **Voltage Regulator (e.g. LM2596)**: For adjusting/controlling the voltage output of the Li-Po battery according to the needs of the circuit and other electronic components.
- **Container**: To store the sanitizer

Utility of Sanitizing Vending Machine

Small Scale Utility:-

In small scale utility, it is used for home purposes in which it is put in the doors of home for sanitizing hand when anyone come from outside home. It is also used in cottage industry, small workshops for sanitization purpose when anyone came or went from these places. It is also used in teachers, professors, students, workers, etc. for self-utility purpose. It is used in small offices by employees and others for small use. It can also be used in other places for sanitization purposes.

Large Scale Utility:-

In large scale utility, it used for heavy use of sanitization. It can be used in Cinema Halls, 3D Halls, Miniature Halls, Shopping Complex/Malls, Voting Center, Railway Station, Police Station, Airport, Bus Stand, Public places, etc. I can be also used in small scale industry as well as large scale industry for heavy use. It can be used at traffic station for public purpose. It can be used in Examination Center, Memorial Hall, College Competition Center, Call Center, etc. Basically, anyplace , when their is a huge crowd, we need large scale vending sanitizing machine for sanitization purpose.

Novelty of Sanitizing Vending Machine

In present day, the vending machine used for different purposes are large and less compact in size. Also, the power supply given to these equipments are from house-hold supply. When the size of vending machine is large and less compact then it causes difficulty in installation process, moving from one place to another place and also risk of damage from externally as well as internally. Power Supply is also one biggest problem in installation which increases the cost of equipment. This make the vending machine very less reliable and difficult to use.

Our Automatic Sanitizer Vending machine is small in size as $15 \times 15 \times 15 \text{ cm}^3$. In simple words, it is of almost the two small tiffin box which makes the vending machine small and compact in size. When size is reduced due to this the weight of vending machine is reduced and also it works on DC Motor which takes very less power. Also, the vending machine is also and works on Li-Po Battery. The Battery Backup of vending machine is very good which makes the equipment to serve more and more. This is main reason which makes the vending machine reliable, easy to install, moving from one place to another place becomes easier and damage risk is very less. So, our vending machine is good for the use of any large and small purpose.

In present day market, the SVM present, there is a issue of ON/OFF of it. The ON/OFF of SVM is only done by touching. So, we are trying make the SVM more contactless through Bluetooth Module. The Bluetooth module is connected to the ON/OFF switch of SVM, which is controlled by Mobile Phones very easily. Also, in present day market, the SVM doesn't come with all the combination. If the SVM present in market comes with Android/Wi-Fi/Bluetooth control then it works on household supply or if it works on battery then it doesn't work on android/Wi-Fi/Bluetooth.

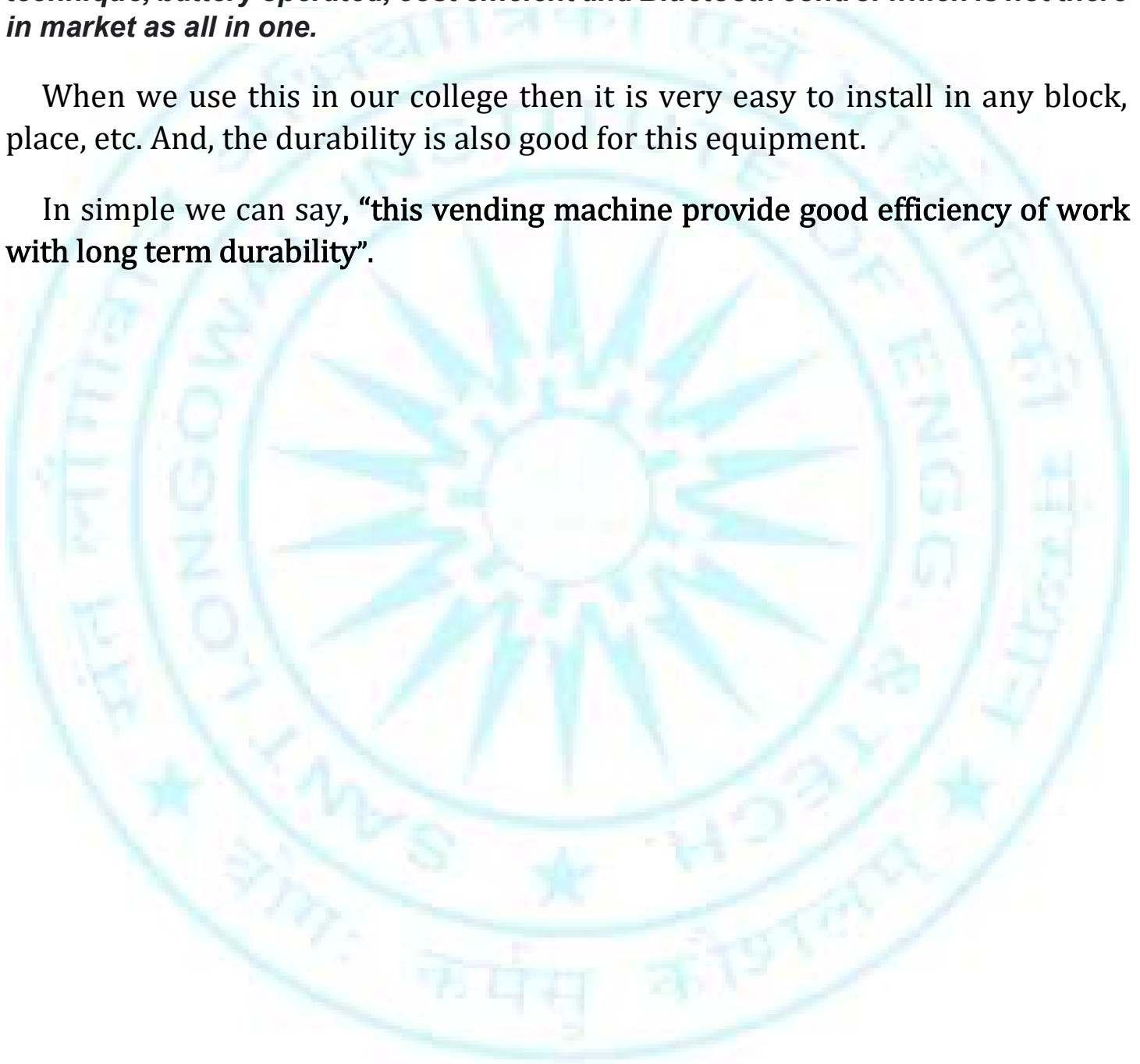
So, there is no risk of touching during the time of ON/OFF purpose and due to Bluetooth Module, the ON/OFF is done through Mobile Phones. This makes the SVM more contactless. In this SVM, due to mist dispenser, we can save 90% sanitizer and only use 10% sanitizer for sanitization purpose as compared to drop dispenser. So, the wastage of sanitizer is very less. It provides efficient

sanitization without waste. Also due to use of Li-Po Battery, which doesn't uses normal household power, makes SVM more reliable, cheap, easy for transportation and provides long term durability.

So, in conclusive way, we are using an integration of sanitization using fog mist technique, battery operated, cost efficient and Bluetooth control which is not there in market as all in one.

When we use this in our college then it is very easy to install in any block, place, etc. And, the durability is also good for this equipment.

In simple we can say, “this vending machine provide good efficiency of work with long term durability”.



What Next or Future Upgradations

1. In Future, we are planning to add Microbes scanner to the SVM for the detection of Microbes (Bacteria, Viruses, etc.).
2. In Future, we are planning to add advanced form of Sanitizer Tank, which is basically capable to make sanitizer by itself.
3. In Future, we are planning to an air purifier to the SVM, which generally purify the air inside the room where SVM is put inside.

Process: True HEPA/UV-C

True HEPA/UV-C air purifiers combine replaceable HEPA air filters with an ultraviolet germicidal light to trap 99.97 percent of airborne allergens and 99 percent of airborne germs and odor-causing bacteria. There is a suction mechanism for the purifier through a moving fan or a static fan but taking air from all the directions.

UV-C light is responsible for the main disinfectant activity of UV-C air purification systems. All that extra energy, much more than visible light, can actually change the molecules that absorb it, and DNA is particularly susceptible to these changes. Ultraviolet light bombards microorganisms around the UV lamp and damages the DNA they need to live.

Since bacteria are only one cell, they rely on their DNA to live. This is the principle behind UV light air purifiers. If a bacterial cell's DNA is sufficiently damaged, it triggers a self-destruct mechanism, rendering it harmless.

Usually, residential units use mercury lamps that emit UV-C light at a wavelength of 254 nm, according to the EPA.

UV light air purifiers are generally a combination of a forced air system and another filter (like a HEPA filter). As a result, the UV light of the air purifier acts together with other processes to clean the air. Ambient, in-house air is forced through the unit and ventilated through a chamber with bulbs emitting light within the UV-C frequency. The UV lamp is usually placed downstream of a filter in a portable air purifier. Various factors such as the type of UV lamp, humidity and temperature can affect its performance.

UV-C lamps used in UV-C germicidal purifiers are silent, and the glow of many, depending on the casing mounted around it, is invisible to the human eye. They are generally odorless. UV bulbs may need replacing on a yearly basis, depending on the make and model.

Budget

Sl. No.	Name of Component	Quantity	Rate	Amount
1.	PIR Sensor	1 pcs.	Rs.70	Rs.70/-
2.	Arduino UNO	1 pcs.	Rs.350	Rs.350/-
3.	Voltage Regulator	1 pcs.	Rs.40	Rs.40/-
4.	D.C. Servo Motor	1 pcs.	Rs.150	Rs.150/-
5.	Li-Po Battery (2200 mAH)	1 pcs.	Rs.1550	Rs.1550/-
6.	Bread Board & Jumper Wire	Rs.150	Rs.150/-
7.	Bluetooth Module	1 pcs.	Rs.250	Rs.250/-
8.	Container as per Design	1 pcs.	Rs.2000	Rs.2000/-
9.	Mist-Atomizer	1 pcs.	Rs.393	Rs.393/-
Total				Rs.4953/-

**** The above budget is the ideal estimated figure. In the manufacturing of its first product or prototype the cost may vary by small margin. It can be more than the above estimated figure or less than the above estimated.**