IOT BASED SANITIZATION ROBOT USING RASPBERRY PI ZERO W AND UV LAMP

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Abstract
As that's not simple to sanitise treatment room simply physical endeavour. It raises increasing risk of disease, allowing hazardous bacteria to propagate even deeper. Ultraviolet beams are being used by Ultraviolet sterilisation robotic to eliminate microbes. The live stream broadcast of the creature's environment is indeed possible. They may operate these robots through Internet, but also its Interface enables everyone to operate inside a waiting area while having to really be actually present. Most of this allows us both to sterilise the maternity ward to their specifications. Ultraviolet light kills bacteria, preventing them from multiplying by disrupting its fertility.

I. INTRODUCTION
Another purpose of green hygiene inside a surgical procedure or a client bed is really to limit germs, especially substance germs, to that of a bare max in establishing as maintaining a safe workplace for both service user and service professional.
People’s future effectively have changed dramatically as a result of something like the COVID-19 virus, but the only method to avoid this diseases from spreading further is to keep good distance as well as obey the standards set out by our individual governments. Sanitation hygiene sterilization, in particular, was becoming unrecognizable part of people's daily lives. When it comes to proper cleaning but instead sterilization, there is indeed a concern: we didn't effectively participate in the filtration even though we risk contracting a fatal disease first from polluted site. However, we could really mitigate this issue by creating a robust, productive, as well as fully independent automaton which could sterilize an area quickly often without uncovering ourself. Computers would be used in a variety of situations whereby people may be exposed. This, in just this article, we'll create an optical sterilization robot which can destroy viral coronavirus inside a facility and residential complex, but we'll use a Nintendo, several Ultraviolet light Lights, plus laser scanners to use it.

II. BACKGROUND
Currently, surgical room viruses account for 14-17% of all pathogens, whilst hospitalized diseases account for 38% of all pathogens.
As a result, regular procedural as well as postoperative scrubbing of an OR atmosphere are among the most efficient aseptic techniques for reducing the number of germs, pollen, as well as green matter in the area.

Nonetheless, because there are numerous blind spots especially unattainable regions including the interior surfaces, typical wiping routine using clean supplies for humans alone will not been capable of minimizing the quantity of these germs. A form of uv – is (uv light) has just been discovered that might help physicians in their continuing struggle to prevent bacteria in remaining in health care facilities as well as creating additional diseases.

This is a worldwide problem. Humankind has really been delayed by the influenza epidemic and quarantine. That concern of contagion from not just immediate communication but then also items believed to already be encountered by sick people had contributed to its use of anionic surfactants to disinfect packs, vessels, or even veggies. It's worth noting that ingesting dishwashing plus related compounds might cause issues for the female organism. As a result, programmed cleaning machines are needed to transport the envelopes to be sterilised on just a production line from the entering endpoint, keep those underneath Ultraviolet light for a defined amount of time, and thereafter transport out towards the output close. This mechanism will prevent washing up liquid and some other similar chemicals from accessing your female beings. The conveyor belt movement will be controlled by sensing at the entering endpoint, its storage point (within the cage), and the discharge end. During sterilization of items encased in packaging, comparable technologies will also be required in massive amount in multiple kinds of production modules, markets, and supermarkets. To just that aim, proper regulations will just be designed to incorporate conveying belts movements, Ultraviolet light bulb operation, and programmed packet/goods retention duration via device.

III. METHODOLOGY

In this chapter the block diagram of the project and design aspect of independent modules are considered. Block diagram is shown in fig.1.

Arrange all or most of the equipment on the quad rotor (UV LED, Raspberry Pi zero W, a wind turbine with batteries, Pi camera, Motor Driver) but then place your Ultraviolet rays on top of the machine. Place the Micro - controller on ahead of robotic so that the video can see why this’s next to it effectively. Later, utilizing VNC, access its window on either a faraway Computer or cell phone, and execute your Interface. The Microcontroller Board is connected to an Electric Controller in the usual sequence.

The project aims in designing a robot which is capable of monitoring and controlling from remote place. It switches on the UV lamp through which UV rays are emitted and also sanitize the surroundings. **Ultraviolet-C** Radiation, Disinfection, and Corona virus has given the current outbreak of Corona virus Disease. As there is no vaccination on the marketplace, the first and only way to survive is to take the necessary measures. It is recommended to sterilise the environment to assist slow the transmission of infection because the virus is communicated mostly by particles that arise from an affected user's nasal passage while sneeze or cough. To address these issues, we created a sanitization robot powered by a Raspberry Pi and equipped with a UV lamp. This is the internet of things (IOT) based project, where we are particularly uses the Raspberry Pi, pi camera, sanitizer ,UV lamp along with relay driver and two DC motor along with l293d motor driver with Robot chassis to build this Robotic car setup. It has a pi camera mounted over it, through which we will get live video feed and the interesting part here

is that we can control and move this robot from a web browser over the internet. The Pi cam will capture live data with regards to its surroundings and then send it to a particular IP address through internet. The user will be observing this live streaming on the mobile and according to that the user will control the robotic vehicle through the webpage and as well as control the sanitizer and UV lamp from the web page .Here relay likes as a switch to on and off the sanitizer and UV lamp.12v, 2ah battery and power bank are used to give the power supply of the robot and raspberry pi. The main controlling device of the project is raspberry pi.

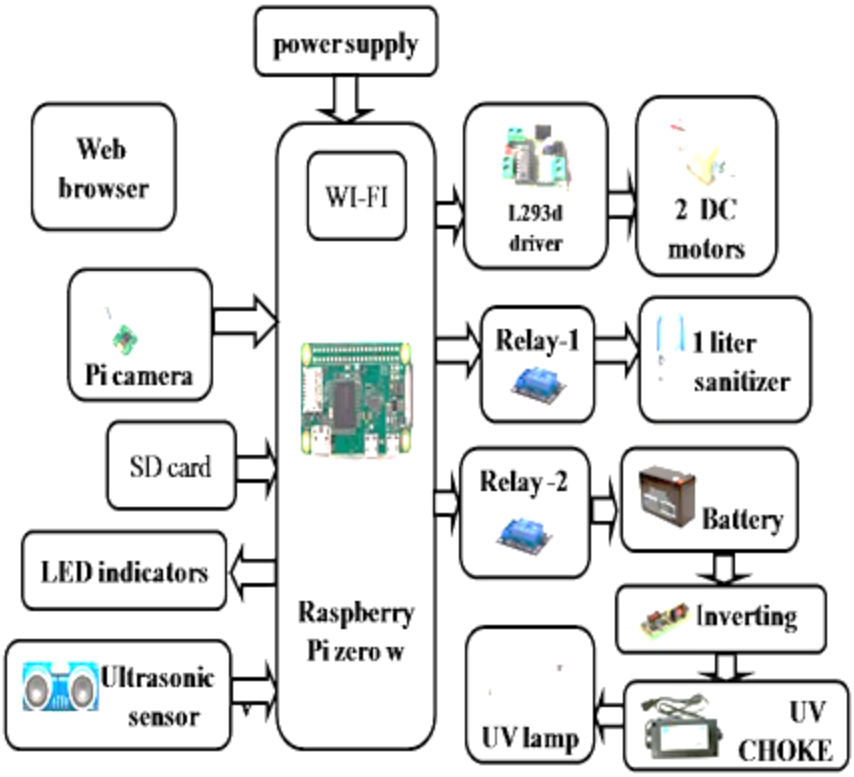

Fig 3.1: Block diagram of IOT based sanitization robot using Raspberry pi zero w and UV lamp

Hardware description

ARM processor

The Raspberry Pi Zero features a **BCM2835 chipset**, overclocked to 1 GHz with **512MB RAM**, and the same **1080p video output,** so there's plenty of oomph in that little board. It also features the same 40 pin GPIO layout as the Raspberry Pi 2/B+/A+, which you'll need to solder your own headers too. With its small form factor and reduction in connectors, the Raspberry Pi Zero **only uses ~ 140mA at 5V.**

Power supply

An AC adapter, also known as an AC/DC adapter or an AC/DC converter, is a form of external power source that is usually housed in a case that looks like an AC socket. Electrical equipment that run on electricity but doesn't have internal parts to extract the appropriate electrical power

and voltage from main grid are connected to AC adapters. An auxiliary power supply's internal circuitry is remarkably similar to the architecture of an internal power source.
External power sources should be used with technology and has no other power source as well as rechargeable batteries device, where the source could sometimes charge batteries as well as power the device when plugged in.
The need for an external power source permits battery-powered technology to be portable without any of the additional size of internal elements, and it eliminates the need to design electronics for utilization with a particular propulsion system.

UV LEDS

LEDS (Light Emitting Diode) that generates uv rays is a kind of infrared energy with wavelengths ranging from 10 (with just a velocity of roughly 30 PHz) to 400 nm (750 THz), which is longer than visible region. UV For high antimicrobial treatment, an uv - b spectrum with in spectrum of 100-400 nanometers is used. Radiation from the sun (200–280 nm), which itself is deemed the much more high antimicrobial wavelengths region based on its ability to inhibit the growth bacteria, is perhaps the most high antimicrobial wavelengths spectrum.

DC motor

The DC motor has two basic parts: the rotating part that is called the armature and the stationary part that includes coils of wire called the field coils. The stationary part is also called the stator. Figure shows a picture of a typical DC motor, Figure shows a picture of a DC armature, and Fig shows a picture of a typical stator. From the picture you can see the armature is made of coils of wire wrapped around the core, and the core has an extended shaft that rotates on bearings. You should also notice that the ends of each coil of wire on the armature are terminated at one end of the armature. The termination points are called the commutator, and this is where the brushes make electrical contact to bring electrical current from the stationary part to the rotating part of the machine.
The DC motor you will find in modem industrial applications operates very similarly to the simple DC motor described earlier in this chapter. Figure 12-9 shows an electrical diagram of a simple DC motor. Notice that the DC voltage is applied directly to the field winding and the brushes. The armature and the field are both shown as a coil of wire. In later diagrams, a field resistor will be added in series with the field to control the motor speed.
When voltage is applied to the motor, current begins to flow through the field coil from the negative terminal to the positive terminal. This sets up a strong magnetic field in the field winding. Current also begins to flow through the brushes into a commutator segment and then through an armature coil. The current continues to flow through the coil back to the brush that is attached to other end of the coil and returns to the DC power source. The current flowing in the armature coil sets up a strong magnetic field in the armature.

Motor driver

It's an embedded system semiconductor that's utilized in humanoid systems as well as embedding electronics to regulate motors. A motor driver is unquestionably anything that causes the machine to operate in accordance with the provided commands or impulses (high

and low). It takes its low power first from gamepad as well as uses that to operate a real engine that possesses a minimum power factor.

Pi camera

The Camera Unit can record high-definition videos along with taking still photos. It has video modes of 1080p30, 720p60, and VGA90, as well as always capturing. It connects to the Raspberry Pi's CSI port via a 15cm ribbon wire.

The camera is made up of a compact circuit board (25mm by 20mm by 9mm) that uses an adaptable ribbon connection to interface to the Raspberry Pi's Camera Serial Interface (CSI) bus socket. The camera's image detector is a fixed focus aperture with a native sensitivity of five megapixels. The camera's software allows still photographs up to 2592x1944 pixels and video resolutions of 1080p30, 720p60, and 640x480p60/90 pixels.

Desired specifications of the project

- The tank capacity of the Sanitizer that can be loaded is 150ml.
- The tube length of UV light designed is about 25cm.
- The Sanitizer Density is measured to be 0.90g/mL.
- The Speed obtained is 5meter/ Sec.

The brightness and time of the UV light is expressed as follows,

Brightness = Luminosity / (4Π * Distance^2)

Time = UV dose / Brightness

UV dose - $\mu Ws / cm^2$

Brightness – W / cm^2

Brightness = 15 * 4W / (4Π * 25^2) = 6W / 7853.98 cm^2

= 76.3 $\mu W / cm^2$

Thus the brightness produced by the desired project is also obtained.

Viscosity affecting the flow rate

The viscosity of a substance can alter due to a variety of circumstances, including temperature, humidity, and conditioning. A substance that performs properly in the lab could have a completely different viscosity when it exits an extreme temperature manufacturing process. If Carbopol is replaced with a green environmentally substitute, a Carbopol-based product that thins when it comes into touch with salt on the skin may lose this property.

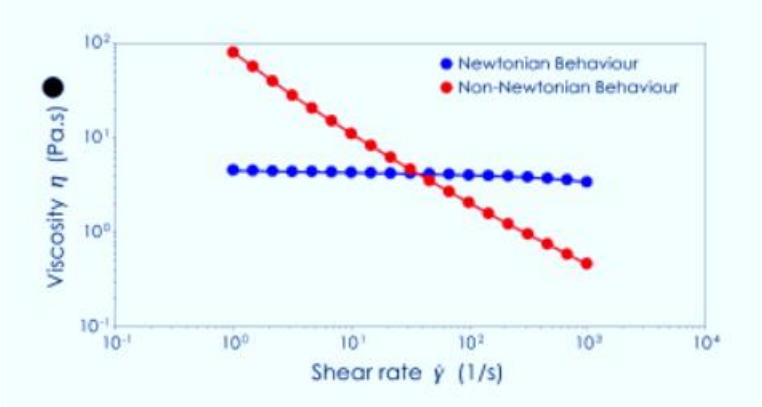

Fig.1.Viscosity of the sanitizer

The sanitizer exhibits a non - newtonian behavior, when the viscosity increases the shear rate decreases. When the viscosity increases the flow rate decreases. Thus the pressure or the force applied has to compensate to proceed with the appropriate flow rate.

IV. RESULT

This robotic can prevent injury as well as navigate about the environment unique combination of either a webcams video as well as lidar. This Ultraviolet robot has airspeed of 5 metres per second and therefore can run for 30-45 minutes on a charge without connected to with a plug socket. Hand wash Machine's Light source disinfected the majority of bacteria inside the environment, if not all. In the specified region, while there were some innocuous, quasi bacteria.

V. CONCLUSION

The above research provides a detailed assessment of robots' possibilities in biology as well as related fields, with either a focus on COVID-19 catastrophe containment. As seen in the epidemic, competent COVID-19 care can drastically limit the amount of people with the disease and casualties. Because it has now become a worldwide problem, technology driven governments may help others by giving weapon systems including automated infrastructures to ensure a successful management of the illness. Cost of health care digitalization, this analysis justifies that the adoption of medical robots had considerably improved both health of the patient’s security solutions due to manual methods. Surgical drones typically solely classified employing implementation subcategories to accommodate everything part of inpatient services, including load balanced supervision but also stable infrastructures for consistent as well as took place in order inside medical institutions.

VI. FUTURE WORK

To create the robotic smart sufficiently to prevent collisions and some other costly healthcare apparatus while efficiently disinfecting everything and every part of something like the facilities, remote sensing techniques were added to that same robotic as well as excellent charting was used with the assistance of Learning Algorithms. This will also assist in instantaneous going to charge and destination via a Photovoltaic Solar Car Charger. A autumn

technology, comprised of a camcorder and a 3D Digitizer, is included in the creature's primary functionality to recognise people who already have fallen asleep. The robot can alert health workers in the case of a serious situation involving a client recognised by the wearable sensors as well as continuous examined closely modules.

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