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A Cost-Effective UV Robot for Disinfecting Hospital and Factory Spaces for Covid-19 and Other Communicable Diseases

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ABSTRACT: This paper presents a price effective UV robot for applications of disinfecting hospital and works areas from Covid-19 and completely different communicable diseases. Usually this can be often supported by a medical care technique using a remotely controlled Ultra-Violet (UV) treatment robot. The robot is provided with 3 UVC lamps throughout a 360-degree beam coverage setting, on a mobile base that is provided with motors, controllers and sensors that permit the lamps to move around and clean surfaces with ease. The Robot can automatically notice human and or different types of non-living presence over that machine learning models are built that allow for some degree of autonomous management. Its main management unit is operated via native space network victimization the mobile as a transceiver device providing remote safe management of UVC lamp medical care.

I. INTRODUCTION

This paper presents a worth effective ultraviolet illumination robot for applications of disinfecting hospitals and building complex areas from Covid-19 and completely different communicable diseases. this is often this can be often supported a medical care technique using a remotely controlled Ultra-Violet (UV) treatment robot. The robot is furnished with 3 UVC lamps throughout a 360-degree beam coverage setting, on a mobile base that is furnished with motors, controllers and sensors that permit the lamps to move around and clean surfaces with ease. The robot can automatically realize human and or differing types of non-living presence over that machine learning models are built that allow for some degree of autonomous management. Its main management unit is operated via native space network victimization the mobile as a transceiver device providing remote safe management of UVC lamp medical care.

II. LITERATURE REVIEW

A.Vyshnavi, A. Naga Sri Manasa, Ch. Sesha Sai Hamsika¹ and P.Shalini, has Proposed that Ultraviolet (UV) robot is employed for the aim of medical care or sterilization of rooms and surfaces. UV-C is utilized because it has bactericidal properties, especially microorganisms and viruses, however, it's harmful to human-beings still. So, for the aim of medical care while not human interference, a UV robot has been designed and enforced that follows a pre-defined path. PIR sensors are employed on top of the robot that detects human or animal's motion and presence. So, one of the effective ways in which to avoid obtaining infected with SARS-COV-2 (Coronavirus) is by sterilizing rooms victimization UV robot.

Pacharawan Chanprakon, Tapparatt Sae-Oung, Treesukon Treebupachatsakul, Pimkhuan Hannanta-anan, Wibool Piyawattanametha, is proposed that have developed an Ultra-violet sterilization robot for disinfection. This robot makes use of ultrasonic sensors and webcam cameras to avoid collisions with obstacles. The signals from these sensors and webcam are used to navigate the robot. This paper examines the sterilization effects of UV-LED and proves that UV-LED is capable of sterilizing mortify bacteria. This paper postulates that UV-LED is smaller and brighter than low-pressure mercury lamps, so UV-LED can be used for sterilization effectively.

Jui-Hsuan Yang, Un-In Wua Huei-Min Tai, Wang-Huei Sheng, implemented the Hyper Light Disinfection Robot that was successful in killing several multidrug-resistant bacteria and fungi that are commonly present in hospitals. The

effectiveness of the Hyper Light Disinfection Robot was very less on shadowed sites. This UV-C device may not be feasible to use in a double or triple room because other patients who are admitted or present in the same room will get harmed from UV exposure. This device cannot be used in crowded wards or large open spaces due to the consideration of safety measures.

M. Anderson, "The ultraviolet offense: Germicidal UV lamps Destroy vicious viruses". New tech might put them many more Places without harming humans is proposed that WALK INTO THE CAMBRIDGE, ONT., workplace of health care instrumentality company Prescient and you most likely wouldn't suspect you're coming into one of the foremost sanitary places in North America. during this otherwise-ordinary Toronto-area workplace suite, you'll be able to clean your keys, phone, and different portables at the reception area's ultraviolet-sterilization stand. In cooler months, the air you breathe is clean microorganisms in actinic radiation-sterilized heating units still blasted by UV fixtures within the workplace air ducts to eliminate viruses. In-room actinic radiation fixtures inform at the ceiling clean the air, whereas different actinic radiation lights that activate only no one's within the space zap pathogens on desks, keyboards, and high-Touch surfaces in bogs and workspaces.

Alvarado-Miranda, M. Zea-Palomino and M. Cabanillas-Carbonell, is proposed is that at present we tend to live in a pathological state owing to the Covid-19, thus the study allotted could be a systematic review of the various technological ultraviolet light alternatives that are developed to cut back the unfold of Covid-19 and alternative pathogens harmful to health since it's been well-tried that the UV-C vary that is taken into account to possess awfully powerful radiation.

S. Paramasivam, C. H. Shen, A. Zourmand, A. K. Ibrahim, A. M. Alhassan and A. F. Eltirifl, is proposed that since the tip of 2019, COVID-19 has been a challenge for the globe, associate degree it's expected that the globe should take precaution steps to tackle the virus spreading previous producing an economical vaccine. Currently, most government efforts get to avoid scattering the coronavirus and forecast probable hot areas. the foremost liable for the corona infection area unit is the care workers thanks to their daily contact with potential patients. this text proposes a COVID-19 period system for following and distinguishing the suspected cases of mistreatment a web of Things platform for capturing user symptoms and appraising the authority.

J. Redmon, S. Divvala, R. Girshick, and A. Farhadi explains is proposed that in this paper, we tend to concentrate on learning economical object detectors by data distillation. a lot specifically, we tend to mimic options from deeper and bigger teacher networks to assist train higher economical student networks. in contrast to the previous methodology that mimics options through minimizing AN L2 loss between features generated by the teacher and student networks, we tend to propose AN basic cognitive process AND adversarial feature mimic (AAFM) methodology that consists of AN basic cognitive process feature mimic module and an adversarial feature mimic module, wherever the previous module uses AN basic cognitive process L2 loss that learns to listen to special object-related regions for feature mimic, and therefore the latter module uses AN adversarial loss that makes options generated by the teacher and student networks have similar distributions. we tend to apply our AAFM methodology within the two-stage quicker R-CNN detector. Experiments on the PASCAL VOC 2007 and coco palm datasets show that our methodology systematically improves the performance of detectors while not feature mimic or with alternative feature mimic strategies. particularly, our methodology obtains seventy-two.1% MAP on the PASCAL VOC 2007 dataset victimization of the ResNet-18-based detector.

W. Kowalski and W. Kowalski is proposed that Ultraviolet bactericidal irradiation (UVGI) is outlined because the use of ultraviolet (UV) wavelengths of sunshine within the bactericidal vary (200 – 320 nm) for the medical aid of air and surfaces. The term 'UVGI' was originally coined by the International Commission on Illumination (CIE) and adopted later by the Centers for sickness management (CDC), and this term distinguishes medical aid applications from non-germicidal UVA wavelengths of black lights and suntan lamps (320–400 nm). UVGI is additionally wont to distinguish air and surface medical aid applications from those in water (CIE 2003). Throughout this book, the terms 'UVGI' and 'UV' are used interchangeably, with the understanding that in each context, unless otherwise noted, each term sees the bactericidal wavelengths of UVC(200–280 nm) and UVB (280–320 nm). ultraviolet light radiation below 320 nm is a property that suggests it causes chemical science Reactions.

Negied, N. K is proposed that the ultraviolet (UV) lamp is the most crucial part of any UVGI air or surface medical care system. actinic radiation lamps are available in several shapes, sizes, and actinic radiation output power levels, and they might turn out completely different spectral bands of germicidal actinic radiation. All bactericidal lightweight

ultraviolet illumination UV actinic radiation actinicray lamps can turn out light wavelengths of either UVC (100–280 nm), UVB (280–320 nm), or each (UVC/UVB). Various varieties of actinic radiation lamps area units are presently in use for air and surface medical care applications, as well as commonplace medium pressure (MP) actinic radiation lamps that turn out broadband UVC / UVB wavelengths, air mass actinic radiation lamps that turn out slim band UVC wavelengths, microwave actinic radiation lamps, and light-emitting diodes (LEDs).

Kirimtat, A; Krejcar, O; Selamat, A; Herrera-Viedma, E; (2020), FLIR vs SEEK is proposed that Advancement of innovations has resulted in blockchain technology realizing plenty of attention and is expected to revolutionize inventions specifically for business players that handle immense knowledge attributable to its advantage like data integrity, knowledge quality, transparency, rejection of fraud and manipulation, reducing corruption, and enhancing trust.

W. Kowalski, “UVGI lamps and fixtures is proposed that the research already shows that germicidal UV can effectively inactivate airborne microbes that transmit measles, tuberculosis and SARS-CoV-1, a close relative of the novel coronavirus. As the UV-C is germicidal; it destroys the DNA of bacteria, viruses, and other microorganisms, preventing them from multiplying, repairing the damaged DNA, and causing infections and disease. In addition, instead of heavy reliance on another chemical sanitizer, this system will prevent the health risk of chemical contamination of exposed human organs like eyes or lips. Despite the existence of misconceptions about UV’s safety, a lack of public awareness and technical know-how; initial evidence (Dana, 2020) suggests that UV-C light forms as the most relevant for current disinfection technologies as it does not penetrate beyond the outer dead layer of skin cells or the liquid film on eyes in healthy people have produced the varied type of UV disinfection mobile robots that can reach hard-to-access places, move around the room autonomously, eliminating the need for manual repositioning within the health care infection treatment rooms vicinity. At this juncture, the question of airborne transmission gained new urgency as the virus is so new and different that it needs its own vaccine. The situation is further compounded as this pressing crisis is very unpredictable. Consequently, prompting WHO to advise people of all ages to take steps to protect themselves from the virus; thus, causing the demand for UV disinfection equipment outside hospitals soar

Islam MT, Talukder AK, Siddiqui MN, Islam T is proposed that The East Pakistan perspective Md Taimur Islam, Anup Kumar Talukder, Md Nurealam Siddiqui, Tofazzal Islam Journal of public health analysis nine (4), 2020 illness[a virus]a virulent disease[a pestilence} of COVID-19 pandemic disease, caused by a unique coronavirus SARS-CoV-2, has posed a heavy threat to international human health. East Pakistan has conjointly returned beneath the attack of this infective agent illness. Here, we tend to aim to explain the responses of East Pakistan to tackle the COVID-19, significantly however East Pakistan is managing this novel infective agent illness with its restricted resources. the primary cause of a COVID-19 patient was detected in East Pakistan on March eight, 2020. Since then, a complete 263,503 peoples area unit formally reported as COVID-19 infected with three,471 deaths till August eleven, 2020. To combat the COVID-19, the govt has taken numerous steps viz. designation of the suspected cases, quarantine of doubted individuals and isolation of infected patients, native or regional imprisonment, closure of all government and personal offices, increase public awareness and enforcing social distancing, etc. Moreover, to deal with the socio-economic things, the govt proclaimed many monetary information packages regarding USD eleven.90 billion. However, the govt got three months since the illness was initially reported in China, however, the country was unsuccessful in creating correct methods together with contact tracing, introducing antibody/antigen-based fast detection kit, and conjointly did not create a multi-disciplinary team to combat this illness. Further, restricted testing facilities and inadequate treatment service alongside public units are the most important challenges for East Pakistan to tackle this example effectively. alongside the govt, personal awareness and the help of non-government organizations, personal organizations, researchers, doctors, industrialists, and international organizations are units firmly needed to mitigate this extremely communicable disease.

III. CONCLUSION

A cost-effective UVC robot has been designed and developed aiming to disinfect hospitals and factory spaces against Covid-19 and similar communicable diseases. It can be seen that the robot emits UVC light as per the initial tests with the UV light detection module and manufacturer datasheet details. Bacterial colonies could not be positively tested at a lab due to limitations of resources which will be reported and presented somewhere else in near future.



REFERENCES

- [1] Avishan, A. Naga Sri Manasa, Ch. Sesha Sai Hamsika1 and P. Shalini, "UVD infection Robot with Automatic Switching on Human Detection", AI Endorsed Transactions on Internet of Things, Doi: 10.4108/eai.25-9-2020.166364
- [2] Pacharawan Chanprakon, Tapparatt Sae-Oung, Treesukon Treebupachatsakul, Pimkhuan Hannanta-anan, Wibool Piyawattanametha, "An Ultra-Violet Sterilization Robot for Disinfection", 2019 IEEE.
- [3] Jui-Hsuan Yang, Un-In Wua Huei-Min Tai, Wang-Huei Sheng, "Effectiveness of An Ultraviolet-C Disinfection System for Reduction of Healthcare-Associated Pathogens", Journal of Microbiology, Immunology and Infection, Volume 52, Issue 3, June 2019, Pages 487- 493
- [4] M. Anderson, "The ultraviolet offense: Germicidal UV lamps Destroy vicious viruses. New tech might put them many more Places without harming humans," in IEEE Spectrum, vol. 57, no. 10, pp. 50-55, Oct. 2020, doi: 10.1109/MSPEC.2020.9205549
- [5] Alvarado-Miranda, M. Zea-Palomino and M. Cabanillas-Carbonell, "Analysis of UV technologies for disinfection of Public areas: a systematic literature review," 2020 IEEE Engineering International Research Conference (EIRCON), Lima, Peru, 2020, pp. 1-4, doi: 10.1109/EIRCON51178.2020.9253754.
- [6] S. Paramasivam, C. H. Shen, A. Zourmand, A. K. Ibrahim, A. M. Alhassan and A. F. Eltirifi, "Design and Modeling of IoT IR Thermal Temperature Screening and UV Disinfection Sterilization System for Commercial Application using Blockchain Technology," 2020 IEEE 10th International Conference on System Engineering and Technology (ICSET), Shah Alam, Malaysia, 2020, pp. 250-255, doi: 10.1109/ICSET51301.2020.9265363.
- [7] J. Redmon, S. Divvala, R. Girshick, and A. Farhadi explains "You only look once: Unified, realtime object detection" arXiv preprint arXiv : 1506.02640
- [8] W. Kowalski and W. Kowalski, "Introduction" in Ultraviolet Germicidal Irradiation Handbook, W. Kowalski, Ed. New York, NY, USA: Springer, 2009, ch.1, pp.1-16
- [9] W. Kowalski, "UVGI lamps and fixtures" in Ultraviolet Germicidal Irradiation Handbook, W. Kowalski, Ed. New York, NY, USA: Springer, 2009, ch.5, pp.119-137
- [10] Negied, N. K; (2014), Human Biometrics: Moving Towards Thermal Imaging; International Journal of Recent Technology and Engineering (IJRTE); ISSN: 2277-3878, (Vol.2) (Issue. 6)
- [11] Kirimtat, A; Krejcar, O; Selamat, A; Herrera-Viedma, E; (2020), FLIR vs SEEK thermal cameras in biomedicine: comparative diagnosis through infrared thermography; 6th International Work-Conference on Bioinformatics and Biomedical Engineering Granada, Spain. 25-27 April 2018
- [12] W. Kowalski, "UVGI lamps and fixtures," in Ultraviolet Germicidal Irradiation Handbook, W. Kowalski, Ed. New York, NY, USA: Springer, 2009
- [13] Islam MT, Talukder AK, Siddiqui MN, Islam T., "Tackling the COVID-19 pandemic: The Bangladesh perspective", J Public Health Res. 2020; 9(4):1794.



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