VIVA-TECH IJRI
ANNUAL RESEARCH JOURNAL
VIVA-TECH INTERNATIONAL JOURNAL FOR RESEARCH AND INNOVATION
ANNUAL RESEARCH JOURNAL
ISSN(ONLINE): 2581-7280

MEDBORG: A Medical Service Robot

Tanvi Aswani[1], Aman Maurya[2], Dipkumar Gupta[3], Prof. Nutan Malekar[4]

[1]*Department of ELECTRONICS AND TELECOMMUNICATION, MUMBAI University, INDIA*

[2]*Department of ELECTRONICS AND TELECOMMUNICATION, MUMBAI University, INDIA*

[3]*Department of ELECTRONICS AND TELECOMMUNICATION, MUMBAI University, INDIA*

[4]*Department of ELECTRONICS AND TELECOMMUNICATION, MUMBAI University, INDIA*

Abstract : *Bacteria and viruses can survive for several days or longer on inanimate surfaces in hospitals. Disinfection, telemonitoring, and hygiene are three crucial components of any healthy indoor environment, & these characteristics become even more important in a pandemic. Because of the rise in contagious viruses & diseases, such robots are being developed to reduce contact & to assure cleaning, sterilisation, & support in hospitals. The robot involves using UVC light to disinfect surfaces & logistical duties, such as medicine administration &food delivery. Diseases spreads mostly through close & infected surfaces. To reduce human, contact on that time period the patient must interact with the doctor, the robot allows patients & doctors to have live video & audio conference conversations, while also allowing for distant monitoring. In today's overcrowded work environments, nurses endure substantial physical, mental, & emotional problems. But with the right help, this can change.*

Keywords - *Disposal, E-waste, hazardous, mining, ML Model*

I. INTRODUCTION

The COVID-19 pandemic has demonstrated that there is a lack of preparedness. Health- care facilities to scope with a pandemic. This has also highlighted the urgent necessity to build facilities capable of coping with infectious patients and to shift supply lines quickly enough to manufacture the prescription products (including medications) required to avoid infection and treatment for infected patients. At each visit hospitals or clinical centers, we try to leave everything, if possible. There is a danger of Hospital-acquired infections (HAIs) which are a leading cause of mortality and morbidity. A new coronavirus has caused an ongoing viral pneumonia outbreak over the world in recent months. High fever, cough, shortness of breath, and headache are among the symptoms of this disease, which is extremely infectious. More and more patients need to be isolated in independent rooms of the hospitals. How to transport meals and medicines to patients and reduce the infection for medical staff simultaneously is a hot issue. Using robots to bring medical supplies or meals to patients is a safe and practical way. As a result, the focus of this study is on how to guide the robot to its goal while also entering the door like a human. Human-robot skill transfer is one of the hottest subjects in human-assisted systems right now. The key challenge is to convey medical supplies securely under various exterior environmental conditions, particularly in the hospital room.

The use of robotics, automation applications, and artificial intelligence in public healthcare is growing daily. Robots assist doctors and medical employees in performing complex functions with precision and reducing medical staff workload, hence boosting the efficacy of healthcare services. To minimize COVID-19 from spreading, several work functions have been allocated to robots, such as cleaning and food processing jobs in contaminated areas. Service robots are mobile robots with a large payload capacity but limited degrees of freedom that are used in hospitals.

The Medborg Service and disinfectant robot can help to fight COVID-19 in many ways, particularly in the control of autonomous medic robots. This robot is deployed to deliver food and dispense medications to

individual patients. Health officials COVID-19 is a virus that has been spreading over the world among medical, nursing staff and patients by using intelligent robots.

II. PROBLEM STATEMENT :-

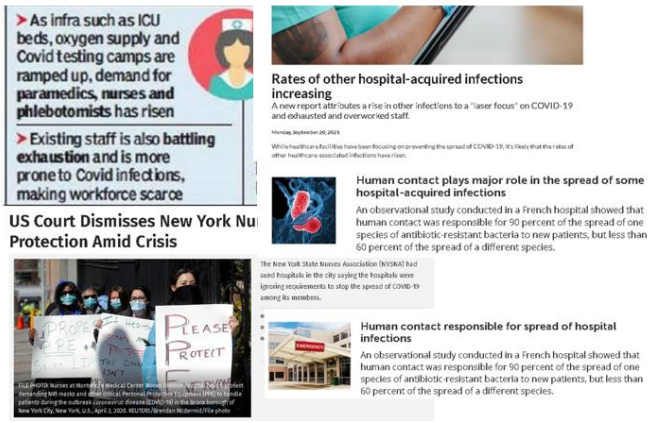

Fig.1 : News Article

How might we design a System that helps the nurses & other Health Care Workers to deal with the vulnerable Outbreak on a Global Scale.

III. FLOWCHART

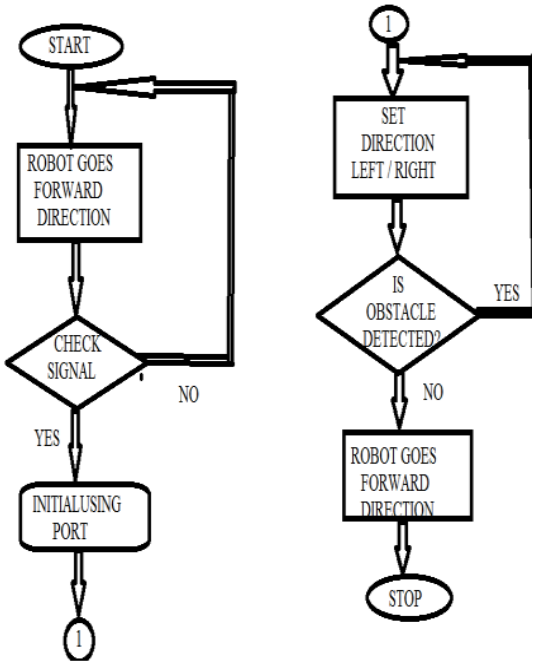

Fig. 2 : Flow Chart of Medborg

- The robot uses a servo mounted IR Sensor to detect objects in front of and on either side of the car and an L293D DC motor driver shield to drive four geared motors, one on each wheel.
- The robot is made using ultrasonic sensor and it is controlled by ATmega8-DIL28 microcontroller.
- IR are fixed in front portion of the robot vehicle.
- The sensor is sensing the obstacle and deviate its path to choose an obstacle free path in real time situation on the hospital lobby.
- The sensor will give data to the controller, which will be compared to the controller to determine the robot Wheel's movement.

- The IR Sensor will be used to sense the robot wheel movement and direction, and a wheel encoder will be used to control it.
- This robot can recognise obstacles and avoid colliding with them.
- And ensure the delivery and services to the patients.

IV. METHODOLOGY

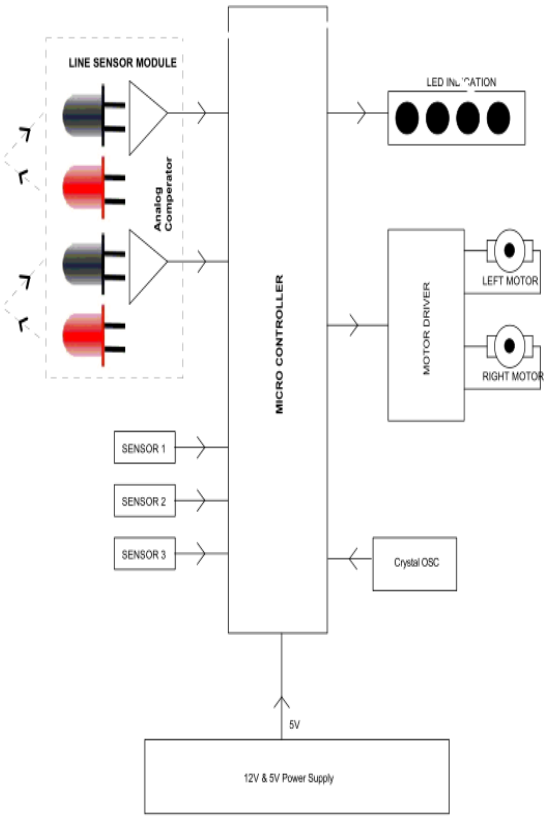

Fig.3 : Connection diagram of Medborg.

- In this project Arduino will be the main controller for our Robot. For path control we are going to use Indoor Navigation in which firstly we have to control manually and after that all the signal which we have given to controller during manual control, the same signal will be stored in EEPROM of Arduino and after that once the robot set to auto mode it will follow the path or route what we have stored in the memory for self-path detection and control.
- Based on this research's we are also implementing UVC Disinfection with combination of PIR. PIR we are going to use for Sensing the presence of human beings in the Specific range and based on the signal received from PIR Arduino will make UVC disinfection ON/OFF accordingly.
- As per WHO advice regarding exposure of UVC for long time on Human beings, keeping that in mind we have also implemented as Mist Maker in the Project which work as disinfectant sprayer and disinfection of surfaces is performed through that and mist can be keep on continuously. The sprayer delivers small disinfectant droplets having an average size of 40-80 m that are aggressively drawn to surfaces in order to improve surface covering completeness. The device is intended to be

used with a variety of different disinfectants and sanitizers. For the current study, the disinfectant used was Spore Defense Cleaner Disinfectant (Clorox) which contains 0.25% sodium hypochlorite.

V. BENEFITS OF MEDBORG

- High-Quality Patient Care
- Operational Efficiencies
- Increase social awareness
- Good governance
- Builds Sustainable environment
- Safety and security of citizens
- Health
- Safe Work Environment

VI. EXPECTED RESULT

The robot is divided in three different section of functions:

1. **Disinfection:** -

Fig.6 : Disinfection Robot

Manual wiping, chemical spraying, and ultraviolet irradiation were all used in traditional hospital environmental cleaning and disinfection; however, the quality of manual wiping is difficult to verify. Aldehyde is a kind of aldehyde. disinfectants, disinfectants comprising chlorine, peroxyacetic acid, and other Disinfectants can irritate the skin and cause occupational injuries. The robot uses Ultraviolet lamp and Mist Disinfectant According to environmental cleanliness requirements the robot has two modes with the help of Manual and automatic cleaning robot accurately disinfects targets the operation path is followed, and accurate obstacle avoidance is achieved. According to environmental cleanliness requirements the robot the robot performs cleaning operation.

2. **Telemonitoring: -**

Fig.7 : Telemonitoring Robot

During the pandemic situation its difficult for the doctors and frontline healthcare workers can't keep check on the patients time to time because they will have the danger of getting in contact with the virus so to reduce and avoid the contact so they can focus on more important and crucial tasks. The robot can navigate to the patients' beds and the robot has a camera and an screen attached on robot through which the doctors and healthcare workers can telemonitor the patients' health.

3. Delivery and collection: -

Fig.7 : Collection and delivery service robot

The robot has two controlling modes automatic and manual with the help of automatic control the robot can move through spaces can deliver the patients medicines, essentials & can collect reports

VII. CONCLUSION

The most widely applied technology focusses on surface disinfection by applying ultraviolet (UV)-C radiation. Due to rise in Contagious virus and diseases there is a leading cause of infection, hence such robots are in hospitals and other similar facilities, such as quarantine, to reduce person-to-person contact and to ensure cleaning, sanitation, and support. SARS-CoV-2 spreads mostly through close human contact and contaminated surfaces, hence preserving social distance has become a necessary precaution. This necessitates treating patients with as little doctor-patient interaction as possible. To decrease the amount of time the patient has to interact with the doctor, the robot uses voice recognition to speak with the patient. Healthcare personnel can watch patients via two-way audio-visual communication using telepresence systems that feature VoIP (voice over Internet protocol) technologies. which can perform live video and audio conference calls between patients and doctors. This helps to eliminate the need for frequent interaction and aids with remote monitoring. It is equipped with an interactive display screen and speakers. The leading causes of infection in these areas include aspects as prolonged periods of exposure The use of these robots for logistic tasks, such as medication and food delivery. Burnout in the healthcare industry feels inevitable. Currently, in increasingly overcrowded work situations, nurses endure considerable physical, mental, and emotional problems. With the ongoing complexities of patients combined with the demanding back-end tasks expected in healthcare shift work, there's less and less time for meaningful face to face contact with patients

Acknowledgements

Presentation, Inspiration and motivation have always played a vital role in any field's growth. It gives me immense pleasure to express my gratitude to my guide Prof. Nutan Malekar , Extc Department, Viva Institute of Technology, Virar, for her valuable guidance, encouragement and help for completing this work.
I would like to express my sincere thanks to you mam, for giving us this opportunity to undertake this paper presentation. I would also like to thank our principal Dr. Arun Kumar to show us a support. I would show my gratitude to Asst. Prof. Archana Ingle HOD (Extc Engineering) for her support. I am also grateful to all my teachers for their constant support and right guidance.
I am immensely obliged to my team members for their elevating inspiration, encouraging guidance, support and valuable efforts in the completion of the paper.

REFERENCES

[1] K. Kogure, N. Hagita, Y. Sumi, N. Kuwahara, H. Ishiguro, “Toward ubiquitous intelligent robotics IROS 2003 Proceedings, "Intelligent Robots and Systems," 2003. International Conference on, IEEE/RSJ, 2003, vol.

[2] T. Hasegawa, K. Murakami, R. Kurazume, Y. Senta, Y. Kimuro, T. Ienaga, Proceedings of the International Conference on Ubiquitous Robots and Ambient Intelligence, Pohang, Korea, 2007, pp.

[3] S. Nishio, N. Hagita, T. Miyashita, T. Kanda, N. Mitsunaga, M. Shiomi, T. Yamazaki, “Sensor network for structuring people and environmental information, Cutting Edge Robot, (2010) 367–378.

[4] H. "Automatic," by T. Noguchi, T. Mori, and T. Sato. programme component generation and connection based on rdf sensor description in Intelligent Robots and Systems, 2006 IEEE/RSJ International Conference on On the subject of the conference,2006, pp. 2008–2014.

[5] "Rsi-cloud for integrating robot services with internet services," IECON 2011-37th Annual Conference on IEEE Industrial Electronics Society, IEEE, 2011, pp. 2158–2163. Y. Kato, T. Izui, Y. Tsuchiya, M. Narita, M. Ueki, Y. Murakawa, K. Okabayashi, "Rsi-cloud for integrating robot services with internet services," IEEE, 2011, pp. 2158–216.

[6] H. Gross, C. Schröter, S. Mueller, M. Volkhardt, E. Einhorn, A. Bley, T. Langner, C.Martin, M. Merten, I'll be on the lookout for you: Home robot companion for older individuals with cognitive impairment, in: SMC, 2011 IEEE International Conference on Systems, Man, and Cybernetics.

[7] C.D. Nugent, D.D. "Editorial home automation as a way of independent living," IEEE Trans. Autom. Sci. Eng. 5 (1) (2008) 1–9. Finlay, P. Fiorini, Y. Tsumaki, and E. Prassler, "Editorial home automation as a means of independent living," IEEE Trans. Autom. Sci. Eng. 5 (1) (2008) 1–9.

[8] Object persistence in 3D for home robots, by P. Alimi, D. Meger, and J.J. Little, in Semantic Perception, Mapping, and Exploration 7.

[9] Choreonoid: S. Nakaoka, IEEE/SICE International Symposium on System Integration, xtensible virtual robot environment based on an integrated gui framework.

[10] AAAI Spring Symposium: Multidisciplinary Collaboration for Socially Assistive Robotics, exploratory examination of a robot approaching a person in the context of handing up an object Robotics, 2007, pp. 18–24. K.L. Koay, E.A. Sisbot, D.S. Syrdal, M.L. Walters, K. Dautenhahn, R. Alami, Exploratory study of a robot.

[11] Smart UVC Disinfection Robot: The Public Health Guardian. 2020. Available online: https://www.geekplus.com/ product-2/smart-uvc-disinfection-robot (accessed on 15 January 2021).

[12] International Federation of Robotics. Definition of Service Robots. 2014. Available online: http://www.ifr.org/service-robots/(accessed on 21 October 2020).