IJARSCT

ISSN (Online) 2581-9429

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

IJARSCT
Impact Factor: 6.252

Volume 2, Issue 3, April 2022

IoT Social Distancing and Monitoring Robot for Queue

Onkar Kadam, Ashish Chauhan, Pooja Dubey, Prof. R. V. Bhaskarwar
Department of Electronics Engineering
Datta Meghe College of Engineering, Airoli, Navi Mumbai, Maharashtra, India

Abstract: *Social distancing is of key importance during the current pandemic. It helps limit the spread of covid by observing distance between disease spreading individuals. Now it is not possible to station a person 24×7 at each queue to monitor social distancing violations. Banks, Public Offices, Malls, Schools, Theatres etc. usually see long queues for hours every day. To ensure social distancing in queues we hereby design a social distancing monitoring robot. The robot consists of a 4-wheel design system used to drive the robotic vehicle. It makes use of a line following principle to constantly move along with the queue and monitor for social distancing violations. The robot uses IR sensing to travel along with the queue to and fro in order to detect violations. The robot is equipped with obstacle detecting ultrasonic sensor in order to detect obstacles in the vehicle path. The robotic vehicle uses another ultrasonic sensor for detecting distance between 2 individuals in a queue. If any 2 individuals are found having less than 6 feet distance between them, the robot instantly sounds a buzzer and alert to inform about the violation. Also, it sends alerts of these violations along with a camera picture using Wi-Fi over IoT to inform the higher authorities/head office to update them about violations with proof so instant disciplinary action can be taken. Thus, this project allows for automatic maintaining social distancing in queues to help prevent spread of the virus.*

Keywords: Social Distancing, Robot, IoT

I. Introduction

Since the end of 2019, the COVID19 pandemic has spread globally and have become a major health and safety issue for communities, health workers, and health systems around the world. During the pandemic, robots are used around the world to improve patient care and reduce the burden on the medical system. People may have to coexist with the virus for a long time. In fact, one of the most important effective measures to control the unfold of infectious diseases is to maintain social distancing. By minimizing close physical contact between people, we reduce the chance of contracting the virus and spreading it throughout the community. Observing the norms of social distancing between people has become an important measure to prevent the spread of COVID19. Our goal is to introduce a unique method for mechanically observing the people in a crowded environment that does not comply with social distancing restrictions. Relative to the distance of 3 ft between them. In order to test the social distance of the queue, we developed a robot with mandatory social distance. The robot consists of a four-wheel frame system used to drive the robotic vehicle. It uses the tail tracking principle to continuously queue and track behaviour that violate social distance. The infrared sensor moves the stern left and right to monitor violations. Currently, the robot is equipped with ultrasonic obstacle detection sensors to detect obstacles in the vehicle path. The robotic vehicle uses another ultrasonic sensor to determine the distance between two people. When the distance between people is less than 3 ft. then the robot immediately beeps and warns. In addition, it also sends these violation notices and camera images via Wi-Fi to the IoT and notify superior departments/key workplaces. If there are signs of violations, they will be subject to disciplinary action immediately.

II. Proposed Methodology

2.1 Block Diagram

The power supply is given to the rectifier initially followed by the voltage regulator afterwards it is given to the Raspberry pi. Camera module, ultrasonic, IR sensor are interfaced with the Raspberry pi. Motor driver is used to drive the DC motor connected to Raspberry pi. When the distance between the two people is less than 3-ft then the alert message is given through the speaker. The monitored data is sent through wi-fi to the IoT system.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, April 2022
Impact Factor: 6.252

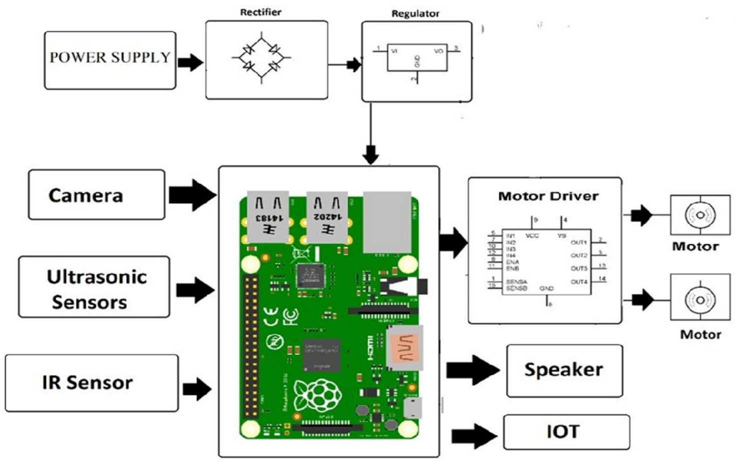

Figure 1: Block diagram

2.2 Circuit Diagram

These is a circuit diagram of our project.

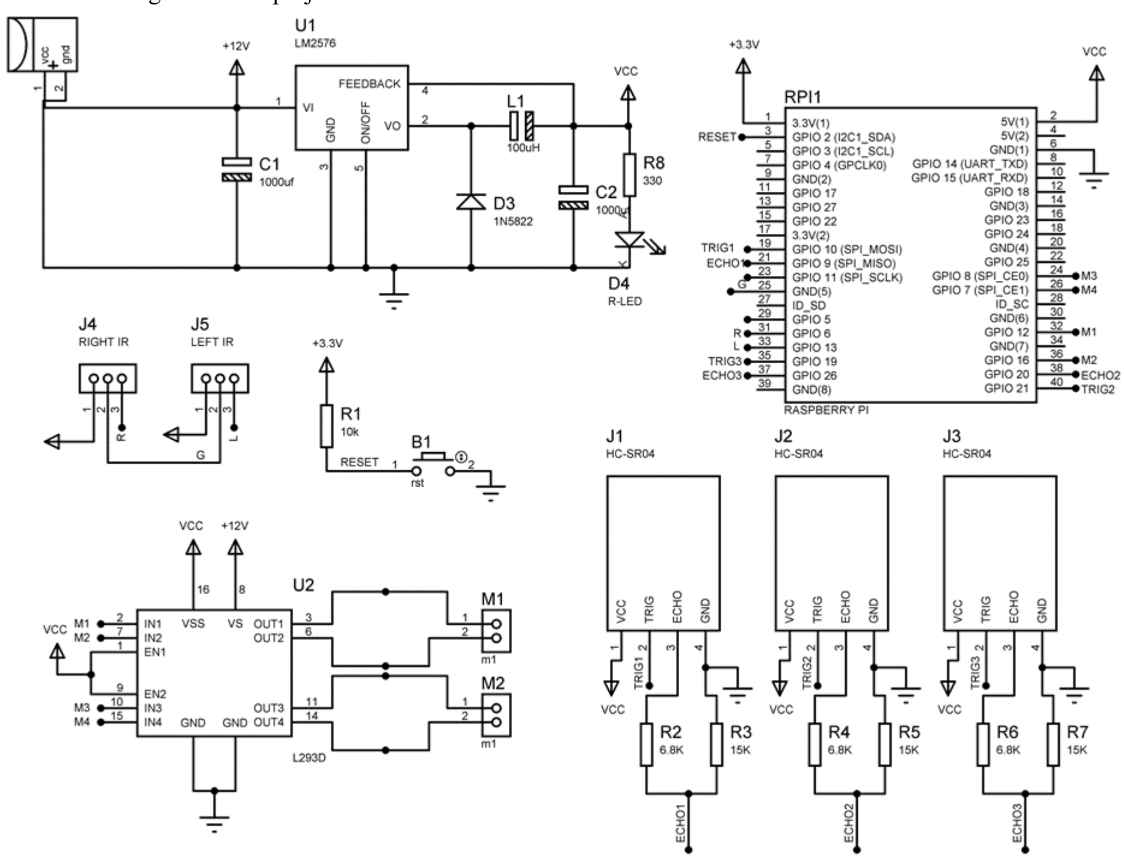

Figure 2: Circuit diagram

III. Result

3.1 Output

Following is the output of our project. The robot moves to and fro on the determined path and the ultrasonic sensor detects the objects in front it. As soon as the robot detects the standing less than 3 ft distance the robot beeps and alert message is sent to the system connected with IoT.

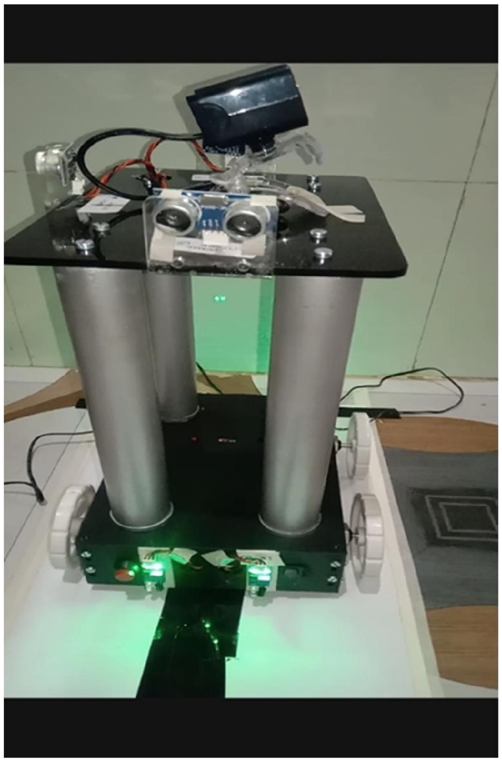

Fig.3. (a)

Fig.3. (b)

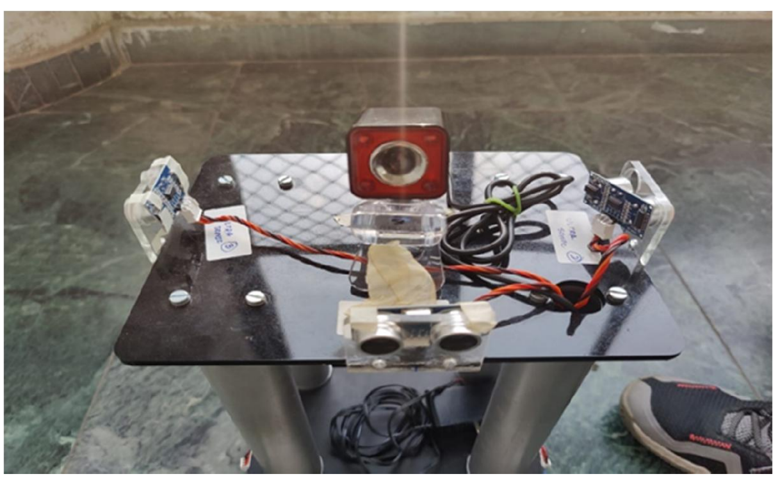

Fig.3. (c)

Fig.3. (a) Image of robot working
Fig.3. (b) Image of the robot side view
Fig.3. (c) Image of robot top view

IV. Conclusion

We present a method to detect breaches in social distancing norms in indoor scenes using sensors (ultrasonic and IR sensor). If we use a robot to attend to the individuals who are non-compliant with the social distancing norm and to encourage them to move apart by a message through a speaker mounted on the robot. we demonstrate this method will effective in localizing pedestrians, detecting breaches, and pursuing walking pedestrians. We conclude that the hybrid configuration outperforms configurations in which only one of the two components is used for tracking and pursuing non-compliant pedestrians. Therefore, all individuals in an indoor environment are encouraged to maintain a 3-ft distance from each other. The current approach for issuing a warning to violating pedestrians using a monitor has limitations, and we need to develop better human-robot approaches. As more such monitoring robots are used to check for social distances or collecting related data, this could also affect the behavior of pedestrians in different settings. we need to perform more studies on the social impact of such robots. Due to COVID restrictions, have only been able to evaluate the performance of COVID-robot in low to medium density laboratory settings. Eventually, we want to evaluate the robot's performance in crowded public settings and outdoor scenarios. we will also need to design better techniques to improve the enforcement of social distancing by using better human-robot interaction methods.

References.

[1]. Wang, Xi Vincent, and Lihui Wang. "A literature survey of the robotic technologies during the COVID-19 pandemic." Journal of Manufacturing Systems 60 (2021): 823-836.

[2]. Somaldo, P., Ferdiansyah, F. A., Jati, G., & Jatmiko, W. (2020, December). Developing smart COVID-19 social distancing surveillance drone using YOLO implemented in robot operating system simulation environment. In 2020 IEEE 8th R10 Humanitarian Technology Conference (R10-HTC) (pp. 1-6). IEEE.

[3]. Kulkarni, Mayuri Diwakar, Khalid Alfatmi, and Nikhil Sunil Deshmukh. "Social distancing using IoT approach." Journal of Electrical Systems and Information Technology 8.1 (2021): 1-13.

[4]. Sathyamoorthy, A. J., Patel, U., Paul, M., Savle, Y., & Manocha, D. (2021). COVID surveillance robot: Monitoring social distancing constraints in indoor scenarios. Plos one, 16(12), e0259713.

[5]. Chen, Z., Fan, T., Zhao, X., Liang, J., Shen, C., Chen, H., & Zhang, W. (2021). Autonomous social distancing in urban environments using a quadruped robot. IEEE Access, 9, 8392-8403.