International Journal for Modern Trends in Science and Technology, 9(05): 462-467, 2023

ISSN: 2455-3778 online
DOI: https://doi.org/10.46501/IJMTST0905078
Available online at: http://www.ijmtst.com/vol9issue05.html

Sanitization and Food serving Robot for Quarintine Patients using IOT

Dr. A. Hazarathaiah | Sk.Masthan Basha | T. Sudheer | P. Muni Raja | P. Tharun Kumar | V. Bhargav

Department of ECE, Narayana Engineering College, Gudur, AP, India

To Cite this Article
Dr. A. Hazarathaiah, Sk.Masthan Basha, T. Sudheer, P. Muni Raja, P. Tharun Kumar and V. Bhargav. Sanitization and Food serving Robot for Quarintine Patients using IOT. International Journal for Modern Trends in Science and Technology 2023, 9(05), pp. 462-467. https://doi.org/10.46501/IJMTST0905078

Article Info
Received: 16 April 2023; Accepted: 10 May 2023; Published: 18 May 2023.

ABSTRACT

This project describes the evolving role of robotics in healthcare and allied areas with special concerns relating to the management and control of the spread of the novel coronavirus disease 2019 (COVID-19). The prime utilization of such robots is to minimize person-to-person contact and to ensure cleaning, sterilization and support in hospitals and similar facilities such as quarantine. This will result in minimizing the life threat to medical staffs and doctors taking an active role in the management of theCOVID-19 pandemic. The intention of the present research is to highlight the importance of medical robotics in general and then to connect its utilization with the perspective of COVID-19 management so that the hospital management can direct themselves to maximize the use of medical robots for various medical procedures. This is despite the popularity of telemedicine, which is also effective in similar situations. In this project we can serve food for the quarantine patients and also sanitize the room to prevent spread of the virus from one to another. This robot is controlled by using Bluetooth.

KEYWORDS: Robotics, Food Serving

1.INTRODUCTION

In the midst of this global pandemic, robots are intervening where humans should not, and robots are being used for tasks such as disinfecting hospitals and delivering food and medicine, which is very convenient and convenient[1]. Health care workers, researchers and governments are fighting daily to control the spread of the virus that has infected more than 22,053,135 people and killed more than 777,489 people worldwide [Last updated: August 8, 2020] Monday 18 , 07:11 GMT]. Robots are also deployed to administer treatments and support quarantined patients.

The World Health Organization recommends physical distancing for people around the world to prevent community transmission of Covid-19[1]. Disinfection has become a very important aspect in these times of pandemic and plays a very important role in preventing exposure to this deadly virus, thus helping to eradicate this global epidemic. One of the high-risk areas for exposure to this deadly virus is the areas where people flock. Treatment: hospitals and wards. Disinfection in these areas is definitely difficult and requires very high control. But despite all these advanced measures, there are always risks. The goal of this project is to minimize human interactions as much as possible and automate tasks such as disinfection with the help of robots.

In this case, the use of robots can reduce human exposure to pathogens[2]. This issue becomes more

important with the intensification of the epidemic. This project uses Autodesk Fusion 360 software to design and develop a disinfectant robot. Integrated development of Arduino and HC-05 Bluetooth module used for control and programming. The design of the bot has a smiley feature that helps spread positivity in times like this.They improve the reach of these areas and their accuracy. IoT utilizes existing and emerging technology for sensing, networking, and robotics

2. LITERATURE SURVEY

A few research papers related to medical robots have been reviewed and the following references show influence on the design of the smart medical assistant robot. Marcin Zukowski et-AL[1] have developed a humanoid medical assistant and companion robot dedicated to children hospitals. They have focused on the robot being able to express emotions and communicate with the children by recognizing their faces and using pictures and text on the chest display to tell stories and present educational videos.The 'Bobot' autonomously
navigates through hospital rooms and performs simple medical tests like measuring patient's body temperature or heart rate andsends live video feed to the doctors and nurses. The robot is run using ODROID XU and XU4 with Ubuntu 14.04 operating system and has a dedicated Raspberry Pi 2 computer to animate the robot's eyes. Marcin Zukowski ET-AL[2] presented the implementation of patients' temperature measurement system for the medical robotic assistant. They have experimented with MLX90614 infrared thermometer and FLIR Lepton thermal camera and found outthat the MLX90614 infrared thermometer cannot be used as the only input source of the system and to get more accurate results, robot would need to come as close as less than 0.3 metres to a patient's face. To overcome this they created a hybrid system having infrared thermometer along with thermal camera to provide ambient temperature and approximate skin temperature that can be used to detect presence of humans in front of the robot. The paper by HimadriNath Saha et.al, propose a IoT Based alarm system for Garbage Monitoring and Clearance. This system has a level sensor to monitor the garbage level in the bin and when the level is reached, it alerts the municipality officials. An android app is developed for connectivity. The Microcontroller is ArduinoUno and the system takes energy from a solar panel. This deice Has RGB Lights to indicate the exact level of the garbage. The scope of the present study is to design a smart medical assistant robot by exploring various contact less sensor technologies. The robot should be compact for efficient handling and incorporate a quick learning real time environment recognition technology for its locomotion in a crowded hospital.

3. EXISTING SYSTEM

In this COVID situation, each health care worker is not assigned to one patient, but are constantly moving from one patient to another. Availability of the health care workers is also constantly changing. In this system,there may be a chance of spreading corona virus from patient to the health worker.To prevent this we are proposing a robot as medical assistant.

The Disadvantage in existing system in this all the methods are direct contact with the patient they was cause the Risk of life.

1. In the existing model, there is no robotic arm for collecting and delivering medicine or food items.
2. There is no automatic UV disinfection system.
3. There is no self-sanitizing option in the existing system. The robot needs an external sanitizing device to disinfect it.
4. Human body temperature cannot be measured by using the existing technology.

4. PROPOSED SYSTEM

In our proposed setup, a robot is proposed which is controlled through a web page and a camera is installed on Robot.In our proposed system, the robot serves the patient needs and medicine and is controlled from remote location.Health worker can check the patient condition through camera from remote location.The robot is used to carry food and medicines
without creating direct contact between humans and thereby maintaining social distancing. In this system ,the robot will serve food and medicine to the covid patient and also check the temperature of the patient.The robot is controlled by using Bluetooth through an android app(readily available).After robot entered the food and medicine box will open by the robot controller through app.And also robot will sanitize the room by spraying sanitizer allover the floor.

5. PROPOSED METHOD BLOCK DIAGRAM

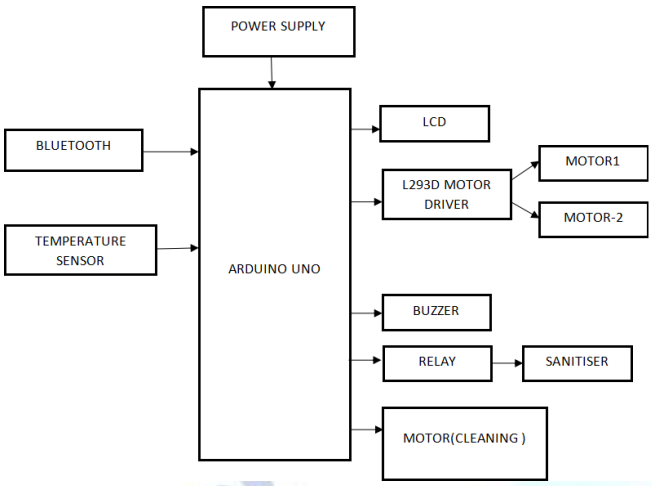

Fig. 1. Block Diagram

The Arduino hardware consists of a microcontroller (usually an Atmel AVR or ARM processor) along with input/output pins that can be used to connect sensors, motors, LEDs, and other electronic components. The software component includes a development environment that allows users to write and upload code to the Arduino board, as well as a standard library of pre-written code that can be used to simplify common tasks.

Power supply:Arduino boards typically require a DC power supply with a voltage range of 5-12 volts and a current output of at least 500mA (milliamperes). The most common power supply used for Arduino boards is a USB cable connected to a computer or a USB power adapter, which can provide 5 volts and up to 2.5 amps of current.

However, for applications where a USB power source is not available, other types of power supplies can be used. For example, a wall adapter with a DC output of 9 volts and a current output of 1 amp can be used for Arduino boards that require a higher voltage input. It's important to make sure that the power supply used with an Arduino board provides a stable and consistent voltage and current output to avoid damaging the board or causing erratic behavior.

When selecting a power supply for an Arduino board, it's important to consider the voltage and current requirements of the specific board and any connected devices, as well as any additional power consumption caused by sensors or other peripherals. It's also important to ensure that the power supply is compatible with the input voltage and connector type of the Arduino board being used.

Bluetooth: There are many Bluetooth modules that can be used with Arduino boards to enable wireless communication with other devices. Some popular Bluetooth modules that are compatible with Arduino include:

1. HC-05 and HC-06: These are low-cost Bluetooth modules that use the Bluetooth 2.0 standard and can be used to create wireless serial connections between an Arduino board and another Bluetooth-enabled device.

2. HM-10 and HM-11: These are Bluetooth Low Energy (BLE) modules that can be used for low-power wireless communication between an Arduino board and a smartphone or other BLE-enabled device.

3. RN-42: This is a Bluetooth 2.1 + EDR (Enhanced Data Rate) module that provides a simple way to add Bluetooth wireless capability to an Arduino project.

4. Bluefruit LE SPI Friend: This is a Bluetooth Low Energy (BLE) module that connects to an Arduino board via SPI interface and provides wireless communication with other BLE-enabled devices.

When selecting a Bluetooth module for use with an Arduino board, it's important to consider factors such as range, data rate, power consumption, and cost, as well as the specific requirements of the project or application. It's also important to ensure that the Bluetooth module is compatible with the Arduino board being used and that any necessary software libraries or drivers are available.

Temperature sensor: Arduino Temperature Sensor.
To use a temperature sensor with Arduino, you will need to connect the sensor to the Arduino board and write a program to read the sensor data. Here are the steps to get started:

Choose a temperature sensor: There are various types of temperature sensors available, including thermistors, thermocouples, and digital sensors like the DHT11 or DHT22. Select the one that suits your needs.

Connect the temperature sensor to the Arduino: The connections will depend on the type of temperature sensor you are using. For example, if you are using a thermistor, you can connect one end to the analog input pin of the Arduino and the other end to ground. If you are using a digital sensor like the DHT11, you will need to connect it to a digital pin.

Initialize the sensor and the pin it is connected to
Read the temperature data from the sensor
Convert the sensor data to temperature (if necessary)
Print the temperature data to the serial monitor or display it on an LCD screen

6. RESULTS

Fig.1.1 sanitization robot

A sanitization robot IoT (Internet of Things) system designed to automate the process of cleaning and disinfecting a space.

Fig.1.2 forward

To make a motor move forward using an Arduino, need to apply a voltage to the motor in one direction. It can achieve this by using an H-bridge motor driver, which allows to control the direction and speed of the motor.

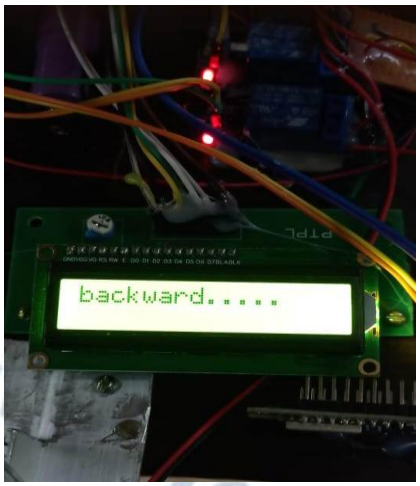

Fig.1.3 backward

To make a motor move backward using an Arduino, need to change the direction of the current flowing through the motor. achieve this by using an H-bridge motor driver, which allows to control the direction and speed of the motor.

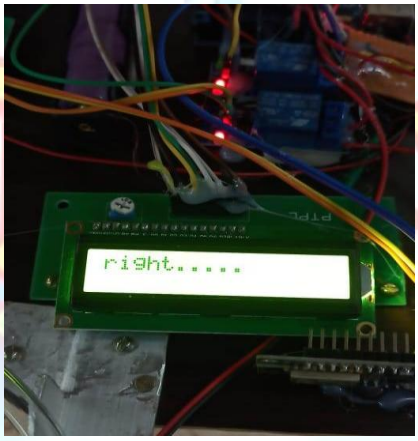

Fig.1.4 Right ward

Right command would typically refer to a command that causes the motor to turn or rotate in a rightward direction. H-bridge motor driver circuit to control its direction.

Fig.1.5 Left ward

Left command would typically refer to a command that causes the motor to turn or rotate in a leftward direction. H-bridge motor driver circuit to control its direction.

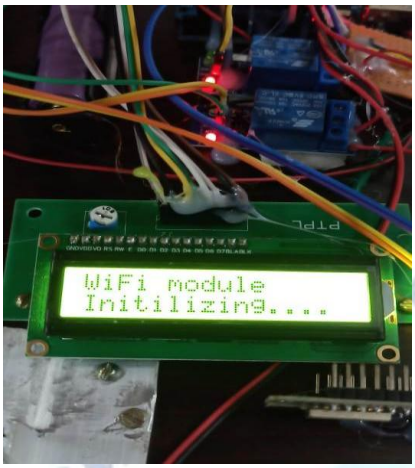

Fig.1.6 Wifi module

Initializing a Wi-Fi module typically involves setting up the module with the necessary parameters, such as the Wi-Fi network credentials (SSID and password), security settings, and IP configuration.

Fig.1.7 Stop

Stop command on an LCD screen is to use a push button or switch connected to an Arduino(microcontroller). The Arduino (microcontroller) programmed to detect when the button is pressed and then execute the appropriate stop command to halt the process being displayed on the LCD screen.

7. CONCLUSION

In conclusion, the development of a sanitization and food serving robot using IoT technology for quarantine patients is a promising solution to ensure the safety of healthcare workers and patients. The robot can efficiently sanitize the environment and serve food without the need for human contact, minimizing the risk of infection transmission. The use of IoT technology allows for remote monitoring and control, ensuring that the robot operates efficiently and effectively. However, further research and development are needed to improve the robot's capabilities and address any potential safety concerns. With continuous innovation and improvement, this technology has the potential to revolutionize the healthcare industry and improve the quality of life for quarantine patients.

8. FUTURE SCOPE

Future versions of these robots could be designed to sanitize not just surfaces but also the air using UV-C light technology or other advanced sanitization techniques. They could also be equipped with sensors that detect the presence of germs and automatically disinfect the area.The robots could be enhanced with artificial intelligence and machine learning algorithms that enable them to learn from their environment and adapt to new situations. This would make them more efficient at their tasks and enable them to perform more complex tasks.

The robots could be programmed to provide personalized nutrition and meal plans based on a patient's dietary requirements and preferences. This would ensure that patients receive the right nutrients at the right time to aid in their recovery

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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