

A REVIEW PAPER BASED ON THE STUDY OF CORONA WARRIORS SMART ROBOT USING IOT

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Abstract: The outbreak of coronavirus disease (COVID-19) has created a global health crisis and has had a very deep impact on our everyday lives. As the number of cases of corona patients are increasing it has become vital to come up with a solution by which the doctors and other corona warriors can treat the corona patients without getting infected with COVID-19 in the process. Robots are very helpful and can solve many of these problems.

This paper attempts to provide an overview of different robots used in healthcare along with their features and different facilities provided by them. The different systems elaborated in this paper give the insights of the features that a corona warrior robot should have.

Index terms

NodeMCU, BLYNK, RTSP, Proximity sensor, Arduino Uno R3 Based Robot Control Board, COVID-19, UoA Robotics Software.

I. INTRODUCTION

The Covid 19 Corona Virus is caused by major respiratory symptoms which is considered as a global Pandemic. The total Covid 19 positive cases are 1,48,480,035 and over 3,133,637 people have lost their lives due to Corona Virus. The Corona Virus has very badly affected the economy of each country and also disturbed the normal life of people. While thinking from the technical background it is very necessary to start innovating various solutions for this Covid 19. A solution for this is to design and develop a robot for safety purpose. So for this Many of the developers have started developing the robots so as to deal with on going pandemic. Deploying robots will help to stop the spread of the coronavirus, it will also take care of patient. The Main Challenge for Covid 19 is its High Contagion, also its higher rate of infection which is spreading to its worse along with the higher death rate day by day. To avoid or reduce person to person contact Robots can be used as the virus will not grow inside the robot. This will save the time and reduce direct contact from the patients. Developing and creating a Healthcare Robot with variety of automation in it along with the ability to detect few things will help to decrease the time and also help to lower the continuous spread of the virus. It will also coordinate and improve the management decisions at public places. The Robots will improve the efficiency at crowded places and try to help to

reduce personal contact and thus infection through it.

Covid 19 has a worst impact on the worldwide population which is very negative sign leading towards the economy of the world. Patients who are having the past medical history with Comorbidity including Blood Pressure, Heart related diseases, Cancer, Diabetes and some respiratory infections are most affected during the treatment of Corona virus. As these patients already deal with those complications, it is more risky to save their lives due to that, so they have to be careful and take proper care of themselves as it can be fatal for them. The Covid 19 can be symptomatic or asymptomatic as it is contagious disease. Therefore, its very crucial to use Sanitizers time to time, wash our hands frequently, Use the Masks properly to cover our mouth and maintain social distancing as it will avoid and reduce the viral infection which easily spreads through sneezing, touching the surface or person. Healthcare workers and frontline workers have to compulsorily use the PPE kits, N95 Masks, Face shields, Gloves for their personal safety. These people have to be more safe as they are treating the Covid Positive Patients and are continuously working in that environment.

As studying the current situation, from the Technical aspect Robots can be used to take proper care of covid positive patients. Also robots can reduce the work load of Doctors, Nurses and other frontline workers which will save their time and help to reduce the contact with covid positive patient so as they won't be affected due to the corona virus. Robots will improve the medical assistant in the hospitals. The main aim of this study is to get explored to various new strategies which will lead to healthcare automation and innovation with the help of robotics from the aspect of Covid 19.

II. LITERATURE SURVEY

A). In the paper – Healthcare Robot System for Hospital Environment, the authors Sir Ho Seok Ahn, Min He Lee and Bruce have proposed a Healthcare Robot which includes a Carebot and Receptionbot. This Robot enhances the healthcare workflow. The proposed system of this paper includes of 3 subunits –

1. A Reception bot, 2. A Nurse Assistant Robot and 3. A Medical Server. From the technical point of view robots have made a huge automation in our living environment and is trying to reduce the manpower, human efforts and

save the time. The Robot proposed in this paper works within the subunits.

- I. Reception Bot - The Reception Bot has its main work at the Reception centre at the hospital.

It works to facilitate the healthcare workflow. It also interacts with the patients or the person who is seeking for the help at Reception. It detects human faces and interact with them. Basically this robot will help out at the reception of hospital as it will maintain flow and order of work at hospital. This robot is semi autonomous so it can't be matched with the person who works at the reception. Physical tasks, Complex Work can't be done by this robot. It is used to help the person and reduce their efforts.

- II. Care Bot - The Care bot's main work is to note the personal information, health data or past medical history of the patient. The collected information is helpful for the Admission of the patients or where the patients data is required to the doctor. So it will be easy as the data is already collected by the Care Bot. As nurse helps the patients, the same way care bot helps the patients but just cannot do the physical tasks.

The Conclusion from this paper is that the Carebot and Reception bot are used for healthcare workflow. The methods used in this paper are discussed in Methodologies below.

B). D. Kalaiarasi¹, Pavithra², Pratheeba³, Priyaadharshini have proposed IOT based compact robot having Arduino NodeMCU, its central functional unit. The main features of the robot are wireless control, achieved by using Wifi module, also we can activate and deactivate the obstacle detection and GPS system is also incorporated so that the user can know the current position of the robot. Here cloud services store commands and data and deliver them to device. In this way the memory load of the system is also reduced. The system has IR obstacle sensors to avoid any obstacles in the path of robot.

Two modes are designed here. First one is by using wireless control and the second one is obstacle detection. When the robotic car is operated in first mode, there is only one method to control the car which is by using a smartphone via Wifi. The basic functions of the robotic car are move forward, move reverse, move left and move right. It also executes actions like stop, pick and drop based on the instructions given to it through user interface. In second mode, the car moves in forward direction until any obstacle appears within its predefined threshold distance. After Encountering the barrier, the robotic car will stop and wait for the next command from user. However, there is no object detection method and wireless range is too small.

- C). Tanveer Ahsan, Maliha Rahman Mishi, Rabeya Bibi

have proposed a multiple motion controlling mechanism of a robotic car by using Raspberry Pi. Here Raspberry Pi works as a master and Arduino UNO works as a slave. The clients have an advantage to manage the activities of the robot from faraway places with internet by using voice commands and Universal Windows Application. Users can get the feedback and data. It can also receive direct commands simultaneously from many sources, making the system even more efficient. There is no need for the device and client to be online at the same time. Cloud services store commands and data and deliver them to device. A GPS system is incorporated, Therefore, the users can get the current position of the robotic car. The system has ultrasonic sensors to avoid any obstacles coming in the path. Here it is ensured by the multiple control system that a collection of independent computers must appear as a single controlling system to all the users. Also multiple control systems cause convenience in handling a system. However, the system does not have video surveillance and also the wireless range is very small.

D). In the paper Fire detection through robot, its mentioned that a robot based on IOT is capable to detect the fire and fight or resolve the fire at many places like houses, offices, public places, etc where there is no access of humans when the fire is on. The robot in this paper is used to fight against the fire and resolve it. Along with this it also fights with the harmful gases with the help of infrared sensors and gas sensors. As soon as the robot will detect the fire it will send the message to the user with the help of SMS services or GPRS packs. This robot is semi-autonomous as it is programmed for some specific actions. The Microcontroller used in this robot is ATMEGA 328 which is incorporated in Arduino UNO board. This concludes that this robot is a semi-autonomous which is based on IOT used as firefighter and can replace traditional firefighter.

E). Diksha Singh, Pooja Zaware, Dr. Anil Nandgaonkar have proposed a surveillance robot with ability of Live audio stemming and video transmission. As compared to other surveillance system based on Bluetooth technology, Wifi surveillance robot is more efficient. The main objective is to provide low cost and more efficient surveillance system. The surveillance Robot is used for live audio and video stemming. Blynk software is used for audio stemming and RTSP camera used for video transmission. The robot can move left, right, front back in all directions and stemming of video is good quality. The wifi control robot is much protected from attackers. The Wifi module Operates on globally on large distance.

III. METHODOLOGIES

A. Node MCU

The Node MCU is open source and low cost hardware and software development environment. It is built around ESP8266 which is an inexpensive System-on-a-Chip. The ESP8266 module is a low cost WiFi chip having

full TCP/IP capability, and also this little board has a MCU that makes it possible to control I/O digital pins with simple programming language.

B. Proximity Sensors

A proximity sensor can detect any object which is near it, that is within its specified range without any physical contact with the object. It emits a beam of electromagnetic radiation or an electromagnetic field and keeps looking for changes in field or else returns the signal. The object which is being sensed is known as the target of the proximity sensor. It has a long functional life and high reliability as there are no mechanical parts and also there is lack of physical contact between the sensor and the object. A proximity sensor which has a very short range is used as touch switch.

C. RTSP

RTSP is Real Time Streaming Protocol. It is used to record video or serving live video to the clients. We use RTSP for transmitting the video instead of Traditional Camera.

D. BLYNK

BLYNK is an application which is used for Controlling NodeMCU model and robot's movements remotely. To control through blynk app, android phone has to enter password for securely accessing the account.

E. UoA Robotics Software

There are some component based software frameworks like ROS, OPEN-RTM, OPROS, etc but these software weren't enough to integrate the components from multiple software. Hence, Sir Ho Seok Ahn, Min He Lee and Bruce chose the UoA Robotic Software Framework to integrate all the components of their study. UoA Software Framework consists of 3 layers - applications, robot manager and components. A pre defined API, combination of web socket connection and JSON messages are used to interact with robot manager. To solve the complex cases it uses the sensor manager.

IV. CONCLUSIONS

The aim of this paper is to provide a compact text that facilitates a global view of robots that are used in healthcare. Main features in these robots are wireless control using Wifi module, obstacle detection which is used to detect any obstacle in the path of the robot and a GPS system is also incorporated so that the users can get the current position of the robot. Also they have video and audio transmission. Users can control the movements of the robot with the help of mobile application. These have been useful in reducing the workload in the hospitals.

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