



PROTOTYPE QUADRUPED ROBOT USING IOT TO DELIVER MEDICINES BY MULTI ROBOT COOPERATION AND Q-LEARNING APPROACH TO COVID-19 PATIENT

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ABSTRACT

Due to the breakout of a disease that has killed millions of people, the entire world is currently in a state of terror. A number of illnesses, including the plague, Ebola, Middle East respiratory syndrome (MERS), and severe acute respiratory syndrome (SARS), have caused fatalities in the past. A brand-new virus with a rapid rate of dissemination termed corona virus-2019 (COVID-19) is discovered in Wuhan, China, in December 2019.

An official institution, ITI of Odisha, has already begun the mission of providing services utilising robots to tackle COVID-19. They are now tasked with supplying the patient with food, medication, and drink as part of their care. The cooperation of the working robots is neglected, nevertheless. To avoid direct touch with the suspected patient, robots are tasked with performing surgery. This document omits other tasks and assignments.

Keywords: Robotics, IOT, Q-Learning.

1. INTRODUCTION

The whole world is in panic due to the outbreak of a disease that resulted millions of deaths. In December 2019, a new virus named as corona virus-2019 (COVID-19) is identified in Wuhan, China with high spreading rate. These viruses are a group of viruses that causes respiratory problem in human body. COVID-19 belongs to beta family of corona viruses. They are now assigned with the task of taking care of the patient by providing them food, medicine and water. The robots use a variant of reinforcement learning approach to achieve their deterministic moves in controlled environment called as Q-learning. The robots work as Patient carrier to the target bed moves the patient from the ambulance arrival to the empty bed, Medicines and diet provider Provide medicine and diet to the patient on time, On-call service provider provide services like water distribution to patient who requests, Emergency controller that calls the doctor on emergency condition of the patient.

The fundamental aim of this project is to explain an innovative, flexible and realistic model of a robot for delivering medicines to covid patients.

The robot should be operating Prototype for Quadruped Robot using IoT to Deliver Medicines and Essentials to Covid-19 Patient using Q-Learning from the remote location with the help of android application and the sensor is used for avoid the obstacle. In sight of the well-being and treatment of patients and the delivery of medicines according to the schedule, delivery in various wards of hospitals using robotic methodology is analyzed in this task with the instruction of sensors. It will CNN network must simultaneously calculate each proposed region, therefore a high also help people to not come in contact with other people. With the help of this method, we would ensure that the disease will not spread while the medicine delivery.

2. LITERATURE SURVEY

2.1 Alsamhi, S.H., Brian, L., Qiao, Y.: Technology used for multi-robot collaboration to combat COVID-19 and future pandemics. IEEE Access 99, 1–1 (2020)

This conceptual paper overviews how technology is involving the operation of multi-robot collaboration for combating COVID-19 and future pandemics. Robots are a promising technology for providing many tasks such as spraying, disinfection, cleaning, treating, detecting high body temperature/mask absence, e. On an average, one infected person can spread the infection among 3–10 individuals. However, the medic people are on high risk as they have frequent interaction with the patient. To avoid the rate of infection among the health worker, many organizations are using robot as attendant. In the year 2015 during the Ebola outbreak (Ashour 2020), robots were used for the said purpose. In this choose we developed a robot for delivering goods and medical supplies experiencing an epidemic COVID-19. Raspberry Pi was used to control the sensors, motor driver, LCD display and an external camera, while external wifi module was used to create a Wi-Fi network.

2.2 Ashour, H.M., et al.: Insights into the recent 2019 novel coronavirus (SARS-CoV-2) in light of past human coronavirus outbreaks. Pathogens 9(3), 186 (2020)

Coronaviruses(CoVs) are RNA viruses that have become a major public health concern since the Severe Acute Respiratory Syndrome-CoV (SARS-CoV) outbreak in 2002. . In December 2019, a new virus named as corona virus-2019 (COVID-19) is identified in Wuhan, China with high spreading rate. Currently, In the whole world there are many hospital staff were infected while providing the service to the covid patient. To avoid these problem we introduce a robot to provide service to the patient.

2.3 Mr.V.Arun., Mr. S.V.S. Prasad., G. Sridhar Reddy., L.Ruthwik Reddy.: Arduino based Quadruped Robot. 4Volume 12, Issue 5, May 2021, pp. 147-155, (2016)

Basically they have made use wheeled robot which is only remote control. robotics has been evolved so far rapidly in many fields. There are vast applications of robots in industrial and military work hence reducing manpower with the help of IOT and AI. In recent years robotics is also applied in security purpose or as surveillance robot in industries and military applications. Raspberry Pi was used to control the sensors, motor driver, LCD display and an

external camera, while external wifi module was used to create a Wi-Fi network. In this report we introduce an made use of wheels integrated representation and structure for a robot that helps it to grasp and pass over previously unseen, uneven surrounding that involves vast, crooked obstacles.

2.4 Srikanth Kavirayani., Divya Sree Uddandapu., Aravind Papisani.: Robot for Delivery of Medicines to Patients Using AI in Health Care. 4Volume 12, Issue 5, May 2021, pp. 147-155 ,(2020)

They build a robot to deliver the medicines in hospital ward and patients. The robot cannot avoid all kind obstacle including human beings, to do that we used artificial intelligence. Arduino UNO was the controller used to control Wi-Fi module, sensors, camera and dc motor. External power supply was generated of 12 volts by connecting two 6-volt batteries. The evolution of the project was observed from microcontrollers to Arduino IDE and from Bluetooth module to ZigBee module further extending to Wi-Fi module. We found that the Wi-Fi module would provide added security and added range of distance To deliver the medicines the intelligence algorithm and sensors are used. With the help of this system, it can be very beneficial for the hospital staff as it can save a lot of time.

3. METHODOLOGY

In our research we are proposing robot, to carer current needs of covid-19 situation. We had proposed solution with minimum cost by considering few sensors and Arduino board. To control robot, android application is developed, through that application we will trace robot and deliver medicine to patient in hospital. We are also maintaining about. Which medicine is delivered to which patient and what time? So doctor will also monitor doses of patients about medicine.

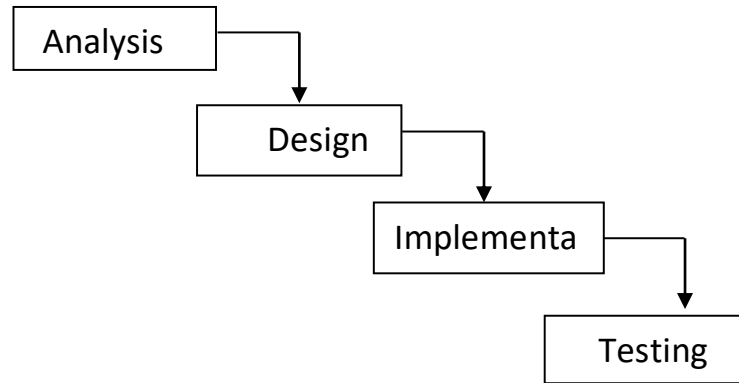
Example: Waterfall process model, Spiral model and Evolutionary model. The “Waterfall” process model has been followed for the development of this project. This model is the one of the best process models. There are several variations of this model.

This process is best only when all the requirements are known in advance. This process is easy to understand by system developers as well as users. And this process model is more visible, as it produces deliverables at the end of end phase.

Visibility is one of the process characteristics that are looked for by project managers while selecting a process model for any project.

Advantages:

- 1) The development process is more visible, i.e. deliverables are produced after each phase. This will help to know the status of the project at any time.
- 2) This is best suitable for projects in which all the requirements are known in advance and projects changes are not required.



3.1 Figure Waterfall process model

The waterfall process model has five phases. They are as given below.

1) Analysis

The system's services, constraints and goals are established by consultation with system users.

2) Design

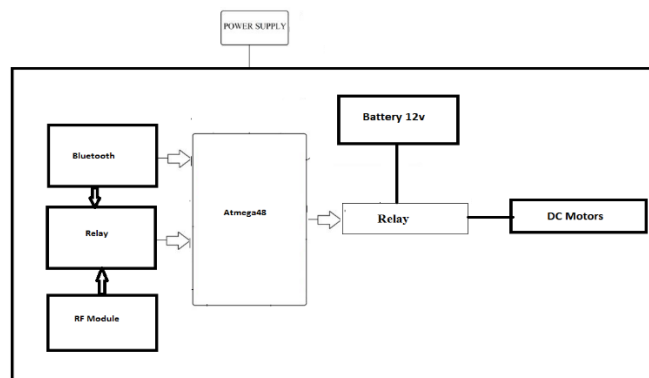
The systems design process partitions the requirements to either hardware or software systems. It establishes an overall system architecture. Software design involves representing the software system functions in a form that may be transformed into one or more executable programs.

3) Implementation

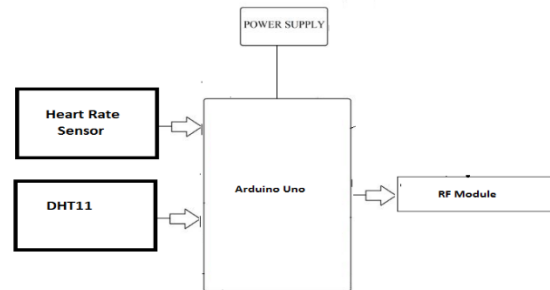
During this stage, the software design is realized as a set of programs or program units.

4) Testing

The individual program units or programs are tested. Then they are integrated and tested as a complete system to ensure that the software requirements have been met. After testing, the software system is delivered to the customer.



Block Diagram of Robot



Block Diagram of Patient module

Once they observed the arrival of a patient, they will go execute the hold, put, move and return function to reach to the target with the help of doctor. The patient more than that then they will face issues on transferring the patient from one position to another position. We had proposed solution with minimum cost by considering few sensors and Arduino board. To control robot, android application is developed, through that application we will trace robot and deliver medicine to patient in hospital.

DHT11 measures Patient temperature. Heart rate sensor, It will sense the Heart pulse rate of the patient and sends the information through RF module using Arduino. We connecting 4 Relays to the 4 motors For moving different directions of the robot. RF module is used to receive the information about patient to the receiver. We will control the robot with the help of Android App. Through this Robot we will provide the essential needs to the covid-19 Patient.

ATmega48 microcontroller The microcontroller is at the core of every embedded module. Hence, great care must be exercised in choosing the right microcontroller without compromising on functionality. Keeping in view many factors that governed the correct implementation of our project the ATmega48 microcontroller from Atmel Corporation's AVR microcontroller family was chosen. Few crucial reasons may be cited so as to justify our choice of this microcontroller. The first being, that all AVR microcontrollers are designed to deliver more performance at lesser power consumption. It is compatible with popular protocols like I2C and SPI. It also has advanced features like an on chip analog to digital converter, six pulse width modulation channels, and data retention is supported up to a hundred years at 25° C. Also compilers for the ATmega48 are available free of cost from the manufacturer. An added advantage is that the AVR series can be programmed using the AVRGCC (GNU C compiler), thus making it an undisputed choice for even GNU/Linux based programmers. The ATmega48 microcontroller has execution speeds of up to one MIPS per MHz of clock frequency.

Pulse Sensor is a low cost, very small size a plug-and-play heart rate sensor for Arduino and Arduino compatible boards. It can be used by students, artists, athletes, makers, and game & mobile developers who want to easily incorporate live heart-rate data into their projects.

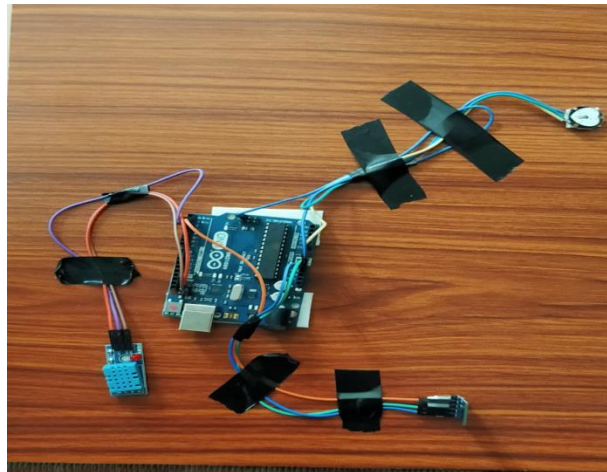
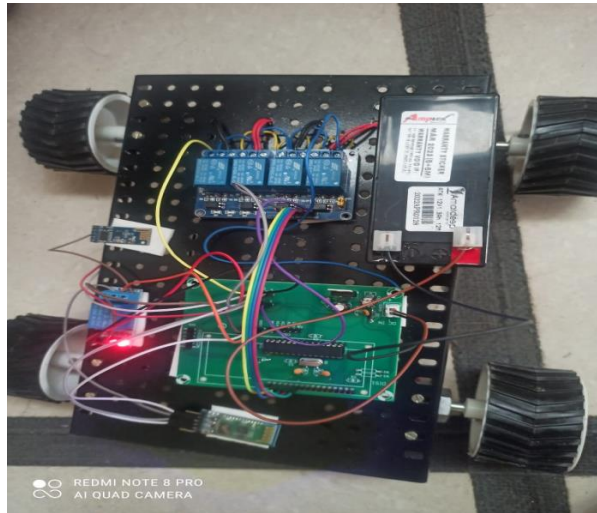
Heart Rate Sensor: Pulse Sensor Amped upgrades the hardware by including circuits for amplification and noise reduction. Obtaining accurate pulse readings is substantially quicker and simpler. Either a 3V or 5V Arduino will work with the pulse sensor.

a cable that is color-coded and has male header connections. Connect it directly to a Breadboard or an Arduino. Soldering is not necessary.

An ear clip that fits the sensor exactly. To read from an ear lobe, it can be epoxy or hot-glued to the back of the sensor.

4. RESULT

The robot will essentially transport the medications to the specific patients, and an android application will be used to regulate its movement. This device can assist COPD sufferers in receiving their medications in a secure manner. As a result, the user won't have to interact with sick people and won't risk contracting the disease from doing so, while the patient will also be able to receive their medication on schedule. Additionally, the patient's temperature and heart rate are continuously monitored. Only medical personnel, including doctors and nurses, who will have the authority to give infected patients medicine, will be granted access to the application.



```
12:51:07.317 Connecting to HC-05 ...
12:51:10.581 Connected
12:51:26.596 F
12:51:26.819 moving Front
12:51:26.873 12:51:28.626 B
12:51:28.783 moving Back
12:51:28.783 12:51:30.014 L
12:51:30.147 moving Left
12:51:30.198 12:51:31.697 R
12:51:31.857 moving Right
12:51:31.857 12:51:33.064 M
12:51:35.344
12:51:35.344 temperature = 28.50C
12:51:35.344 Heart rate= 29
12:51:35.523 S
```

front Back Left Right paramet... Stop M7

▼



5. CONCLUSION

We are concluding our project, Android based and Bluetooth controlled Quadruped is a robot which can manure on 4 wheeled consisting of for motors on leg and can move in all four directions. This Quadruped robot was tested successfully that can move in all directions. We develop a software program to control the movement of the robot and to detect the emergency condition of the patient and also monitoring the maintaining record in database about. which medicine is delivered to which patient and what time with the help of the software program. In future scope we will deliver the essentials and medicines based on the images of condition of patients or the patient speech input. We will also incorporate communication facility between robot and the patient and also between robot and the doctor.

The scope for future work has to be presented in following modifications can be made to present circuit , which lead to still smarter project. The module can be equipped with a faster and more capable microcontroller to integrate control of many more devices at the same time. Another further intended development is to introduce time controlled devices for use in commercial spaces. This, for example could be the control of a large display in a showroom between two different intervals of time, without the intervention of any user or technician. Voice alerts can be used to indicate the various controlling of devices their status of operation.

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