

Virtual Doctor Robot

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ABSTRACT

We all know that during pandemic like corona or generally in hospitals, the front-line workers such as doctors, nurses, compounder in hospitals are nearest to the patients. They all need to look after the patients without caring about themselves and hence doctors, nurses, workers have a high chance of getting contacted to the disease. And few of the medical personnel fearing for the disease and their health, they are not ready to work in the hospital. Hence to tackle this problem we have come up with a solution i.e., Virtual doctor robot- The artificial nurse. The result of this project is a robot that is designed to act as a medical assistant robot which can be controlled by nurses or doctors from a distance using their smart phone or it can just use autonomous navigation to reach the patients and give them required medicines, monitor patients health and stream all the patient information wirelessly through the internet to your palm(mobile). Which sterilizes the hospital wherever it travels. Not only it can carry lightweight packages and sterilize the hospital, It can be used as a telecommunication robot ad establish communication between doctor and patient.

Keywords— Epoxy Resin, Banana fibre, thermo gravimetric analysis, fly ash, mechanical testing, universal testing machine.

INTRODUCTION

Inspiration for Virtual Doctor Robot project is that during pandemic like corona or generally in hospitals, the front-line workers such as doctors, nurses, compounder in hospitals are nearest to the patients. A telepresence robot was made to establish communication between doctor and patient. Since all these robots work in hospitals, thought of combining all these features with some extra features and making a robot. Hence the idea to build virtual doctor robot was born. And, by taking the current scenario into consideration, I thought of building robots which will both help to disinfect the place and act as a medical assistant to the doctors. Once the idea came to my mind; it was

decided to make a detailed study on this i.e., how patients are monitored and to become familiar with the environment in which the robot was supposed to work in the future. Such robots can carry medical equipment between hospital rooms and help in picking medical tools on demand. We can categorize medical robots into two main categories. The first category consists of robots helping in medical producers fully autonomously, semi-autonomously, or being teleported by medical personnel. The second is, making social robots that will not have direct physical contact with patients or partake of medical interventions but are focused on helping people and supporting them mentally.

METHODOLOGY

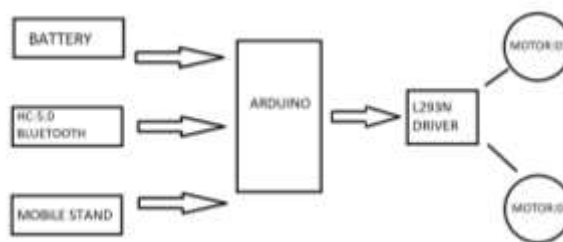


Fig no. 01, Figure.1 represents a basic working block diagram of the robot. The whole methodology can be divided into parts.

OBJECTIVES

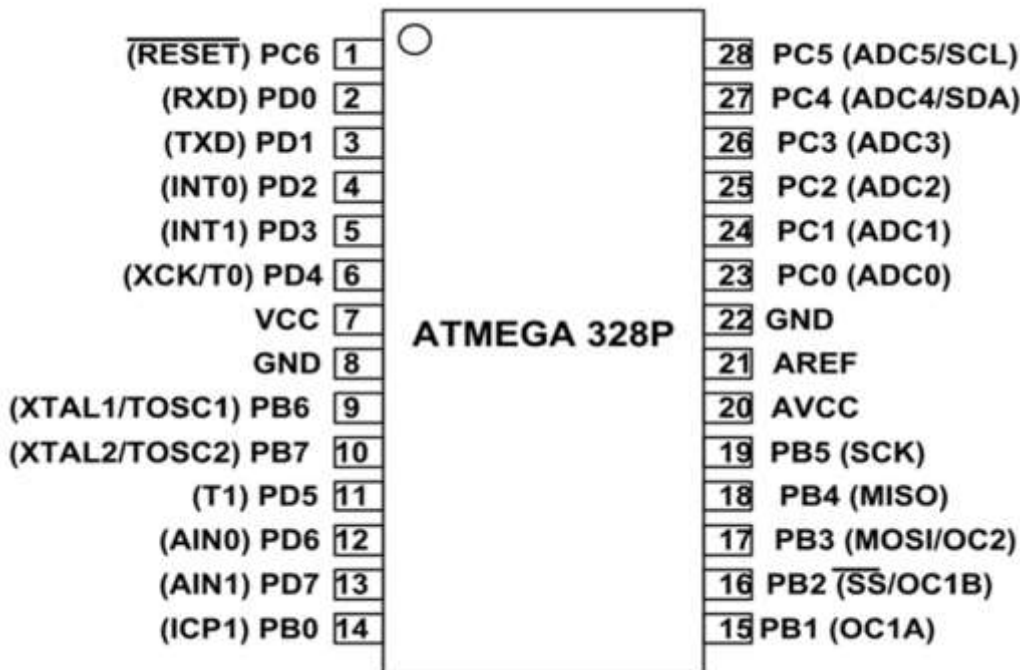
- 1) Medical Transportation: Giving medicines and meals to patients and staff by adding a tray and a robotic ARM to our Virtual doctor robot, thereby optimizing communication between doctors, hospital staff members, and patients.
- 2) Establishing communication between doctor and patient.
- 3) Establishing serial communication between Arduino UNO and Node MCU.
- 4) Making the artificial nurse robot which can use line following mode - The robot transverse the path according to black or white line following algorithm using a 5-channel digital line following sensor. Wireless remote control - The robot movement is

controlled by Wi-Fi or internet from anywhere using mobile.

FEATURE

- 1) Our virtual doctor robot consists of a base consisting of 4 wheels run by 12v 1000rpm Dc Motors.
- 2) The motors are controlled by the motor driver.
- 3) The line sensor input is processed by Arduino board and sends signals to motors via motor driver.
- 4) The virtual doctor robot consists of a plate or a holder to keep tablets, medicines, etc
- 5) It has a temperature of the sensor module, which can be used to detect the temp of the patient.
- 6) Checking on the patients instead of employing humans.
- 7) It as human colloid detection and obstacle the sensor which helps it to stop hitting humans or objects accidentally.

COMPONENTS



VCC is a digital voltage supply.

AVCC is a supply voltage pin for analog to digital converter.

GND denotes Ground and it has a 0V.

Port A consists of the pins from PA0 to PA7. These pins serve as analog input to analog to digital converters. If analog to digital converter is not used, port A acts as an eight (8) bit bidirectional input/output port.

Port B consists of the pins from PB0 to PB7. This port is an 8 bit bidirectional port having an internal pull-up resistor.

Port C consists of the pins from PC0 to PC7. The output buffers of port C has symmetrical drive characteristics with source capability as well high sink.

Port D consists of the pins from PD0 to PD7. It is also an 8 bit input/output port having an internal pull-up resistor.

AREF is an analog reference pin for analog to digital converter.



Arduino Uno is a microcontroller board based on the ATmega328P ([datasheet](#)). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller, simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

“**Uno**” means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform. (IDE = integrated development environment)

Bluetooth Module (HC-05): HC-05 module is an easy-to-use Bluetooth SPP (Serial Port Protocol)

module, designed for transparent wireless serial connection setup.

Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm. Hope it will simplify your overall design/development cycle. Bluetooth is a type of wireless communication used to transmit voice and data at high speeds using radio waves. It's widely used in mobile phones for making calls, headset and share data. This type of communication is a cheap and easy way to control something remotely using arduino. For communication with arduino using Bluetooth a Bluetooth module need to be connected with arduino. Several model of Bluetooth module are available. I am using here HC-05 a very common and cheap one. HC-05 module has 6 pins.

CONCLUSION

Current Works are focused on providing autonomous navigation of the robot in an unknown, dynamic environment with moving objects. Making robots perform basic medical tasks is in development. We keep constantly working on improving human-robot interaction. The robot in its initial form, would play significant roles and would assist medical staff in some of their everyday chores. The future work is to make the robot more interaction friendly to patients and have more accurate and efficient autonomous capabilities. In future this project can stand as a great field for conducting different science research, and testing engineering solutions. Humanoid robotic medical assistants and human assistants will be simultaneously working in one hospital.

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