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IOT Virtual Doctor Robot

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Abstract: ***Doctors are usually needed to work at every hospital and emergency center every now and then. But it is not feasible for every doctor to be available at every place at desired time. The problem with video calling is that video calls need to be done from a PC or laptop on a desk. This limits the doctor's capacity to view patient or around operation theatre at will or even move through hospital rooms as needed. To help solve this issue we here develop a virtual doctor robot that allows a doctor to virtually move around at a remote location at will and even talk to people at remote location as desired. This robot provides a whole lot of advantages for doctors: Doctors' ability to be at anyplace anytime, Doctors can move around in operation theatres, Doctors can move around the patient with ease, Doctors can see medical reports remotely via video calls, Doctors can move around in other rooms at will. The system makes use of a robotic vehicle with 4-wheel drive for easy navigation. The robot also includes a controller box for circuitry and a mounting to hold a mobile phone or tablet. The mobile or tablet is used to hold live video calls. The doctor can use an IOT based panel to control the robot. The control commands sent online are received by the robot controller. The robot controller operates over Wi-Fi internet. The received commands are received in real time and the robot motors are operated to achieve the desired movement commands.***

Keywords: Robotic vehicle, Easy navigation, controller box, IOT based panel, robotic motors.

I. INTRODUCTION

There is a growing trend in the medical field to minimize the need for hospitalization, moving several health care procedures from hospitals (hospital centric) to patient's homes (home-centric). This strategy has been raised mainly due to its possibility for improving patient's wellness and treatment effectiveness. It can also reduce the costs of the public health system worldwide and its efficiency, which in the last decade has been challenged by the population aging and the rise of chronic diseases.

For this purpose, Internet of Things (IoT) provides the scalability which supports continuous and reliable health monitoring on a global scale. This paradigm is increasingly becoming a vital technology in healthcare. Furthermore, the recent progress in low-power consumption, miniaturization,

and biosensors has revolutionized the process of monitoring and diagnosing health conditions.

For patients' de-hospitalization the platform proposed initially were designed, by including wearable and unobtrusive sensors. The software is developed and the components are guided by the Reference Architecture for IoT-based Healthcare Applications for a real intensive care unit (ICU) and the interoperability with existing multiparametric monitors.

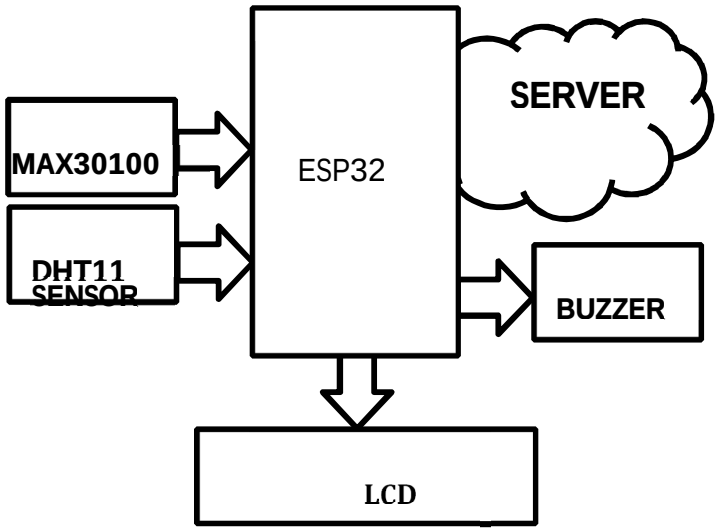

Fig1: Virtual Doctor Modelling

A. Theoritical Modelling

The major component of the Robot is Arduino UNO controller which runs on battery power supply, that as to be charged, whenever it gets discharge.The robot having four wheels is controlled using commands by which it can move around the patients, robot is controlled by doctor by monitoring on the screen using Mobile or tab by making video call. It consists of SPO2 (heartbeat & Oxygen) sensor ad temperature sensor when touched the values are sensed ad displayed on LCD. The four wheels are controlled using motors which are connected to the controller via L239D module.

B. Hardware Components

1) Arduino Uno

Fig2: Arduino Uno

The Arduino UNO R3 is the perfect board to get familiar with electronics and coding. This versatile microcontroller is equipped with the well-known ATmega328P and the ATMega 16U2 Processor.

2) 16X2 LCD display

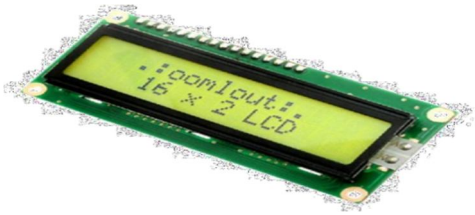

Fig3: 16X2 LCD display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. a 16x2 lcd display is very basic module and is very commonly used in various devices and circuits.

3) Gear Motor

Fig4: Gear Motor

A geared DC Motor has a gear assembly attached to the motor. The speed of motor is counted in terms of rotations of the shaft per minute and is termed as RPM. The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gear motor, its speed can be reduced to any desirable figure.

4) PCB

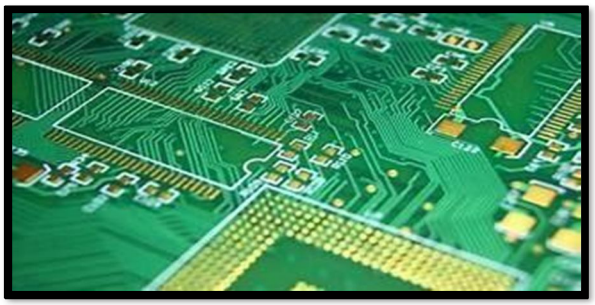

Fig 5 PCB BOARD

A printed circuit board (PCB), also called printed wiring board (PWB), is a medium used to connect or "wire" components to one another in a circuit. It takes the form of a laminated sandwich structure of conductive and insulating layers: each of the conductive layers is designed with an artwork pattern of traces, planes and other features etched from one or more sheet layers of copper laminated onto and/or between sheet layers of a non-conductive substrate.

5) ESP8266

Fig6: ESP8266

NodeMCU is an open-source Lua based firmware and development board specially targeted for IoT based Applications. It includes firmware that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.

6) Motor Driver

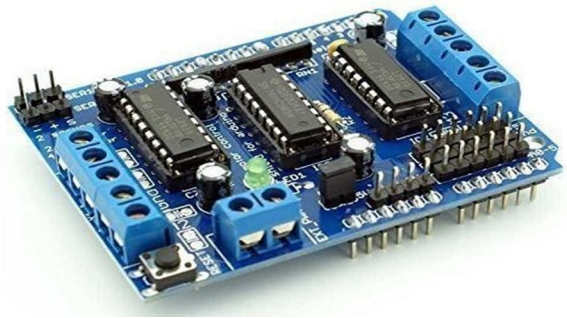

Fig7: Motor Driver

Generally, L293D motor driver can control two motor at one time or called is a dual H-Bridge motor driver. By using this IC, it can interface DC motor which can be controlled in both clockwise and counter clockwise direction.

7) Temperature Sensor

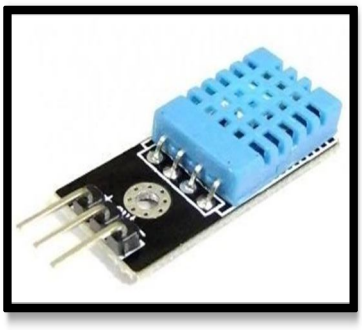

Fig8: DHT11 Temperature Sensor

The percentage of water present in the air is termed as humidity Water as gaseous state called vapor. As the temperature of the air increases more water vapor can be generate. DHT11 is a low-cost digital sensor for sensing temperature and humidity.

8) Regulator

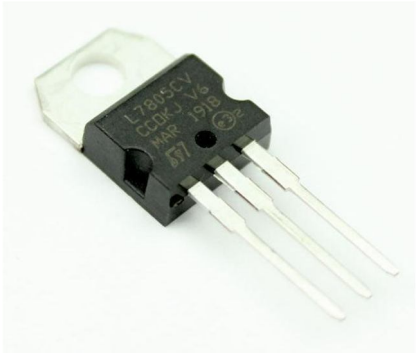

Fig9:Regulator

The AC power supply from mains first gets converted into and unregulated DC and then into a constant regulated DC with the help of this circuit.

9) MAX30100

Fig10: MAX30100

The MAX30100 is an integratedpulseoximetryandheartrate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analogsignal processing to detect pulse oximetry and heart-rate signals.

10) Electro-Mechanical Buzzer

Fig11:Electo-mechanical Buzzer

A buzzer is in the mechanical form of a small rectangular or cylindrical housing, with electrical connection for direct mounting on rigid printed circuit.

11) Lithium-ion Battery

Fig12: Lithium-ion Battery

A lithium-ion battery is a type of rechargeable battery that makes use of charged particles of lithium to convert chemical energy into electrical energy.

II. RESULTS AND DISCUSSION

Connect the power supply to the Arduino to start the robot

Fig13: Virtual doctor robot Model

Fig14: LCD display

III. CONCLUSION

Using IoT based virtual doctor robot, the burden of a doctor can be reduced during the busy schedule. The waiting time of the patients can be reduced. Primary patient monitoring and patient caring assistance with daily activities is achieved. For user friendly, we designed "Doctor robot" with manual and autonomous control system. Doctors from anywhere in the world will be able to show the all-patient data without touching the patient through the IOT system and make communicate video calls with the patient. We believe this robot will go a long way in alleviating the lack of adequate doctors in medical services around the world.

Clinical robots help with a medical procedure, smooth out emergency clinic coordinated factors, and empower suppliers to concentrate on patients. Robots in the clinical field are changing the way that medical procedures are performed, smoothing out supply conveyance and sanitization, and saving time for suppliers to draw in with patients. Clinical robot market is relied upon to acquire market development in the figure time of 2022 to 2028.

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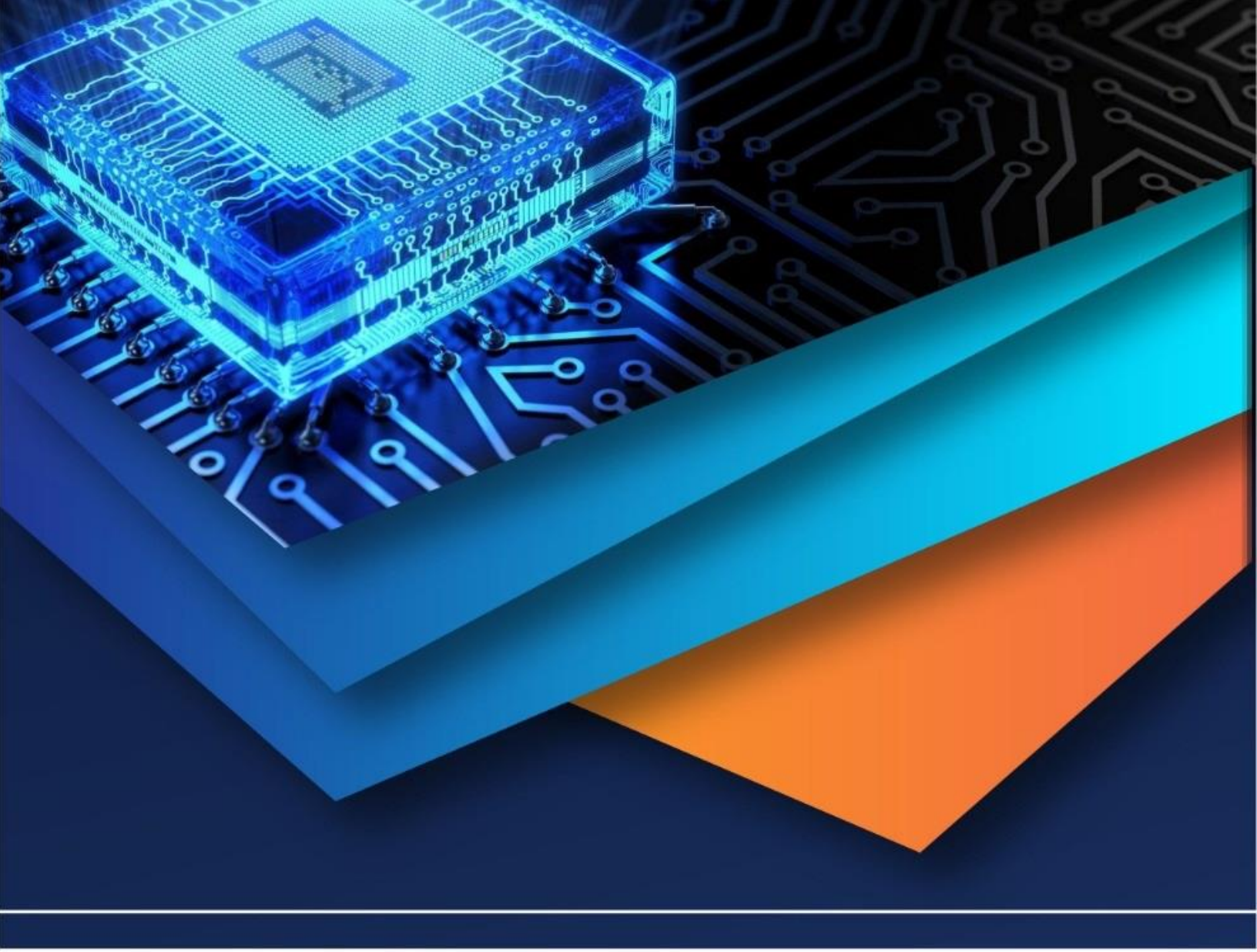

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