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Vaidya Yantra (IoT Based Teledoctor)

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Abstract— *Specialists are normally expected to work at each medical clinic and crisis focus every so often. Be that as it may, it isn't attainable for each specialist to be accessible at each spot at wanted time. To assist with settling this issue we here faster a Virtual Doctor Robot that permits a specialist to essentially move around any clinic room and converse with patient. Our thinking focuses on the capabilities of a convenient virtual expert robot, a user-friendly automated healthcare device that leverages the network of things and highlights the intelligent customer interface for therapeutic purposes (IoT). In critical cases, a specialist will be contacted online via video call and depending on the patient's condition, the specialist can contact to book an ambulance (depending on conditions). In non-emergency situations, the setting will dispense more medication based on health issues. Therefore, experts believe that this strategy can be applied in places where there is no immediate access to health services. Adopting this strategy in these regions not only contributes to health emergencies, epidemics and pandemics like COVID-19, but also increases survival rates. Our whole system is controlled and monitored by microcontrollers and also by Internet of Things.*

Key words: *IoT, Virtual Doctor Robot, Microcontroller, COVID-19.*

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I. INTRODUCTION

Hospitals and emergency rooms are constantly in need of doctors, but finding them isn't always simple. However, doctors cannot always be present where they are needed. The drawback of video calling is that it requires using a PC or laptop at a desk to make a connection. This limits the doctors' ability to travel about the operating rooms or the hospital when they need to see patients or to view them. To help with this, we have developed a IoT based teledoctor robot that enables a doctor to virtually move around and even converse with patients remotely (PRN). This robot provides a wide range of options for clinicians, such as: the availability of doctors at any time and everywhere. In addition to being able to easily move around the patient, doctors can read medical reports remotely through video chats and are free to wander around other rooms as they like. For simple maneuvering, the system uses a robotic vehicle with four-wheel drive. A mounting for a phone or tablet and a controller box for circuits are features of the robot. that allow for the holding of live video calls.

Specialist are normally expected to work at each medical clinic and crisis focus once in a while. However, it isn't attainable for each specialist to be accessible at each spot at wanted time. The issue with video calling is that video calls ought to be done from a PC or PC on a workspace. This restricts the specialist's ability to see patient or around activity theatre voluntarily or even travel through emergency clinic rooms depending on the situation. The main objective of the project is to provide a wide range of options for clinicians, such as the availability of doctors at any time and everywhere Virtually and to provide medical opportunities for the Villagers and residents of rural areas who do not have the luxury of receiving medical care from a doctor who practices in a major city.

II. METHODOLOGY

The system makes use of a robotic vehicle with 4-weels basically like a rover. The robot also includes a controller box for circuitry and a mounting to hold a mobile phone or tablet. The mobile or a tablet can be placed in the mounting. The Proposed system consists of NodeMCU that acts as the brain of the entire system and sends or receives command in real time. The system consists of the Motor Driver which is used to control the speed and power supply for the DC motors used in the system. The Motor Driver is interfaced with the NodeMCU. The doctor can use an IOT based panel to control the robot. The control commands that are sent online are received by the robot controller and the robot controller operates over the Wi-Fi internet. The received commands are received in real time and the robot motors are operated to achieve the desired movement commands. The root can be included with other functions including battery status alert to remind of battery charging on time.

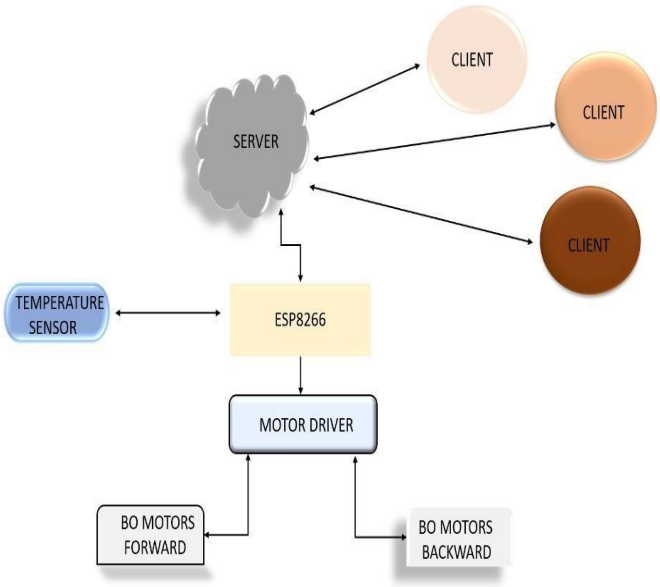

Fig 1: Block diagram of IoT Based Teledoctor

The proposed system makes use of a Node MCU as an important component. This wi-fi module is in turn connected to the power supply as well as the Motor Driver system. The Motor Driver system is controlled digitally. The Motor Driver system is in turn connected to the battery-operated lightweight DC motor with a capacity of 60-100 revolutions for a minute. The ESP8266 is connected to the server and the client can easily get an access in order to operate the Rover. The entire cloud makes use of a protocol called as Over-the-air (OTA). The various sensors like the temperature sensor, oxygen level sensor, blood pressure sensor etc. can be included in the proposed system. The readings or the data which is collected from the sensors can be sent to the doctor or the caretaker in real time. The present data and the past data is available in the server which can be used for the analysis patient health over time.

i) NodeMCU

The NodeMCU (Microcontroller unit) is an open-source software and hardware development environment built around an inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains the crucial elements of a computer: CPU, RAM, networking (WiFi), and even a modern operating system and SDK. That makes it an excellent choice for Internet of Things (IoT) projects of all kinds.

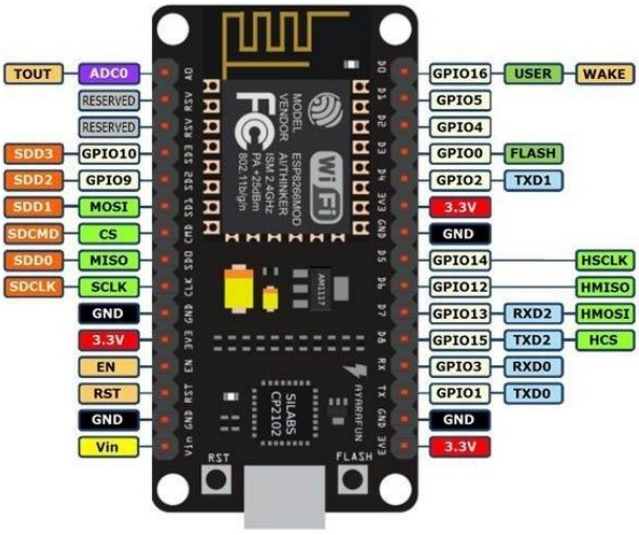

Fig 2: NodeMCU ESP8266 pins

ii) LM35Temperature Sensor

LM35 is an integrated analog temperature sensor whose electrical output is proportional to Degree Centigrade. LM35 Sensor does not require any external calibration or trimming to provide typical accuracies. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy.

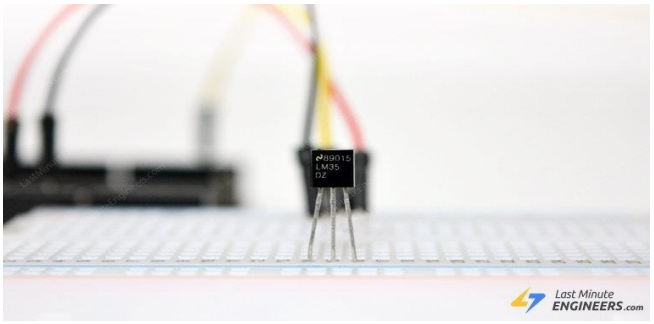

Fig 3: LM35 Temperature Sensor

iii) Battery Operated Motors

A DC motor with gear box attached to the shaft, which is mechanically commutated electric motor powered from direct current (DC). Generally used in DIY projects, Battery operated toys, Radio controlled vehicles, Robotic projects etc. Figure 4 shows the Battery-operated Motors.

Fig 4: BO Motors

iv) Motor Driver

A Motor driver IC is an integrated circuit chip that controls motors in an Autonomous Robots and Embedded circuits. Figure 5 shows the Motor Driver.

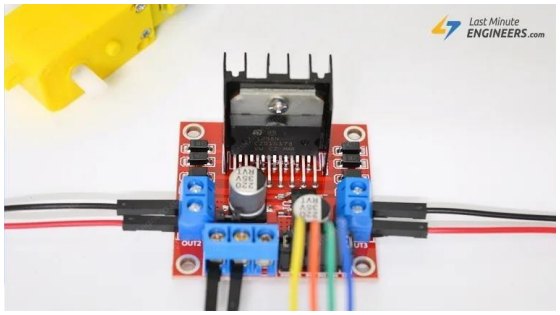

Fig 5: Motor Driver

v) Blynk Application

Blynk is a new platform that allows you to quickly build interfaces for controlling and monitoring your hardware projects from your iOS and Android device. After downloading the Blynk app, you can create a project dashboard and arrange buttons, sliders, graphs, and other widgets onto the screen. The focus of the Blynk platform is to make it super-easy to develop the mobile phone application. As you will see in this course, developing a mobile app that can talk to your Arduino is as easy as dragging a widget and configuring a pin. With Blynk, it can control an LED or a motor from mobile phone with literally zero programming. Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things the blynk application is shown in Figure 6

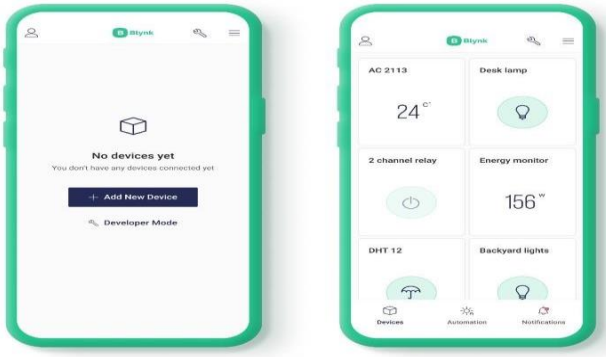

Fig 6: Blynk Application

vi) AnyDesk Application

Any Desk is a comprehensive tool that lets you control your desktop computer from the screen of your mobile device.

III. RESULT & CONCLUSION

A. Result:

The Medical services to poor in mobile areas in the state was offered in an effective manner as the patients were able to interact with the medical expert. The Robot was used in the critical COVID-19 wards and the patients interacted with the medical experts virtually which was an advantage and a safety measure for medical expert The proposed system was used domestically in home for personal assistance. The sensors interfaced to the system was used to check the various health parameters like the body temperature, oxygen level, blood pressure etc. and the data sensed by the sensor

Fig 7: Proposed Model

was sent to the doctor in real time and was also stored in the server. The present and the past data from the sensor that was stored in the server was helpful for the doctors or caretakers to analyze the trends of patient's health and provided a clear picture about the health status Villagers and residents of rural areas got luxury of receiving medical care from a doctor who practices in a major city. Physical demands on human labor were decreased and the amount for labor needed to care for patients was reduced. The system provided a wide range of options for clinicians, such as the availability of doctors at any time and everywhere Virtually.

IV. Conclusion:

In conclusion, an IoT-based virtual doctor is a promising technology that has the potential to revolutionize the healthcare industry. It utilizes various IoT devices such as wearables, sensors, and other medical devices to monitor patients remotely and provide real-time medical assistance. This technology can improve the quality of care, reduce healthcare costs, and increase accessibility to medical services, especially for people living in remote areas.

However, there are also some challenges that need to be addressed, such as data privacy and security concerns, regulatory compliance, and the need for reliable network connectivity. Moreover, an IoT-based virtual doctor cannot replace a human doctor entirely and should only be used as a complementary tool to assist healthcare professionals.

Overall, the IoT-based virtual doctor is a promising technology that can improve healthcare services and patient outcomes. With continued research and development, it has the potential to transform the healthcare industry and make healthcare services more accessible, efficient, and effective.

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