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IOT BASED MEDICAL ASSISTANT ROBOT

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ABSTRACT -

This project proposes an IoT-based medical assistant robot to cater to the needs of the disabled and patients. The robot is designed to minimize person-to-person contact and ensure support in hospitals. The project provides a comprehensive analysis of the background and related works in the field to develop a more efficient device. The proposed method includes an algorithm, architecture, and controlling system that explains the automatic hand sanitizer and IoT-based physiological parameters observing system. This system monitors body temperature, pulse rate, and oxygen saturation levels, with a direct one-to-one server-based communication method and an end-user android app for maintenance. Overall, this project provides a detailed understanding of the design and implementation of an IoT-based medical assistant robot, which could potentially benefit healthcare facilities and their patients.

(Keyword : Medical assistant Robot, IoT, Pulse rate, Patient monitoring system, Automatic hand sanitizer, Oxygen level , Android App.)

I. INTRODUCTION -

The world has seen a significant increase in the use of technology to improve the quality of healthcare. One of the most promising technologies that have emerged in recent times is the Internet of Things (IOT). The IOT has made it possible to connect various devices and systems, enabling healthcare providers to monitor patients remotely and offer real-time medical assistance. In this regard, this project proposes the design and implementation of an IOT-based medical assistant robot that can aid and support to the disabled and patients in need. The robot aims to minimize person-to-person contact and support in hospitals, making it an essential tool, especially during pandemics such as the COVID-19. The proposed system includes an automatic hand sanitizer, an IOT-based physiological parameters observing system (body temperature, pulse rate, and oxygen saturation level), an IP camera for monitoring, and an end-user Android app. This project aims to contribute to the development of affordable and accessible medical technologies that can improve the quality of healthcare and reduce the burden on healthcare providers.

A. LITERATURE SURVEY -

According to this report [1] , the ratio of physicians to the population is less than one physician per one thousand people. This shortage of medical professionals makes it challenging to provide adequate medical care to everyone. During a crisis like the current covid-19 pandemic, the insufficiency of medical personnel becomes even more apparent .

In the past few years, several research studies have been carried out in the field of medical healthcare. We have reviewed various works on medical assistance.

The proposed paper focuses on the implementation of a conversational agent or "smart-bot" to provide material healthcare support. This will review the relevant literature in the field of conversational agents and their role in healthcare. Previous studies have shown that chat-bots are effective in providing support and information to patients with various healthcare needs. With the increasing demand for healthcare services and the shortage of healthcare professionals, the use of conversational agents can provide a viable solution for providing healthcare support to many individuals. [2]

The proposed research aims to investigate the factors that influence the use of advanced medical robots. In this we will review the relevant literature in the field of medical robotics . Previous studies have shown that perceived usefulness, ease of use, compatibility, and perceived risk are important factors in the acceptance and adoption of medical robots. By investigating these factors in the context of advanced medical robots, the proposed research can contribute to a better understanding of the barriers and facilitators to their use in healthcare.[3]

The proposed research aims to design and develop an intelligent autonomous elderly patient home monitoring system. In this we will review the relevant literature in the field of elderly patient home monitoring systems. Previous studies have shown that home monitoring systems that incorporate wearable sensors and smart home devices can improve the quality of care and health outcomes for older adults with cognitive impairment, chronic conditions, and disabilities. By designing an intelligent autonomous elderly patient home monitoring system, the proposed research can contribute to a better understanding of the potential benefits of such a system for older adults.[4]

The proposed research aims to design a low-cost pulse oximetry system based on the raspberry pi platform , previous studies have shown that low-cost pulse oximetry systems based on arduino and raspberry pi platforms can be accurate and have the potential to be used in remote patient monitoring and home-based monitoring applications. By designing a low-cost pulse oximetry system based on the raspberry pi platform, the proposed research can contribute to the development of affordable and accessible medical technologies.[5]

The proposed project focuses on the implementation of an iot-based real-time signal acquisition system over the cloud using the thingspeak platform for multi-zonal temperature and humidity measurement. Previous studies have shown that iot-based systems are efficient in collecting, storing, and analyzing data in real-time, making them suitable for a range of applications.[6]

II. METHEDOLOGY -

A. SYSTEM OVERVIEW -

The two parameters are stated as follows:

(i) Mobility and motion

(ii) Physiological parameters monitoring,

The complete system includes the following components : IP digital camera, sensors, microcontroller (nodemcu), automated sanitizer unit, motor driver and motors. A block diagram of the proposed system is presented in fig 1.

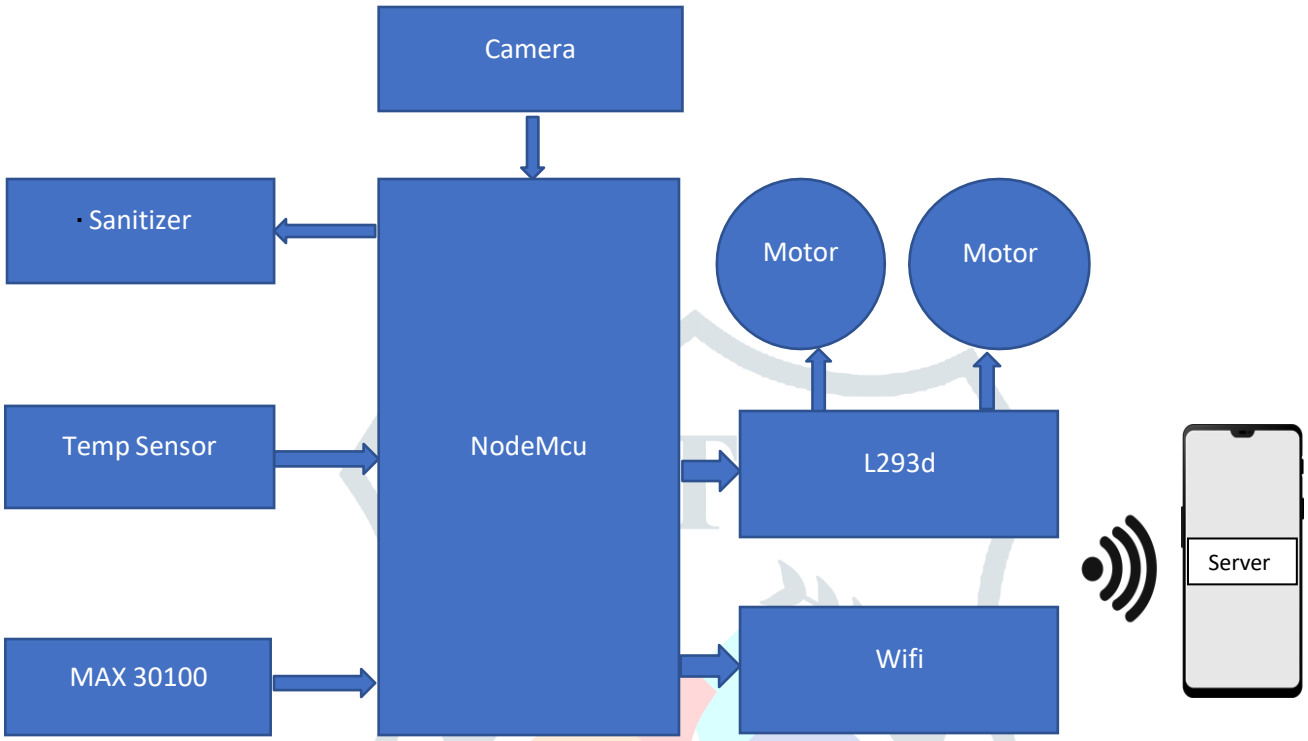

Fig 1 Block Diagram

B. SYSTEM ARCHITECTURE-

The flow chart explaining the function of the physiological parameters monitoring system in detail is illustrated in Fig. 2.

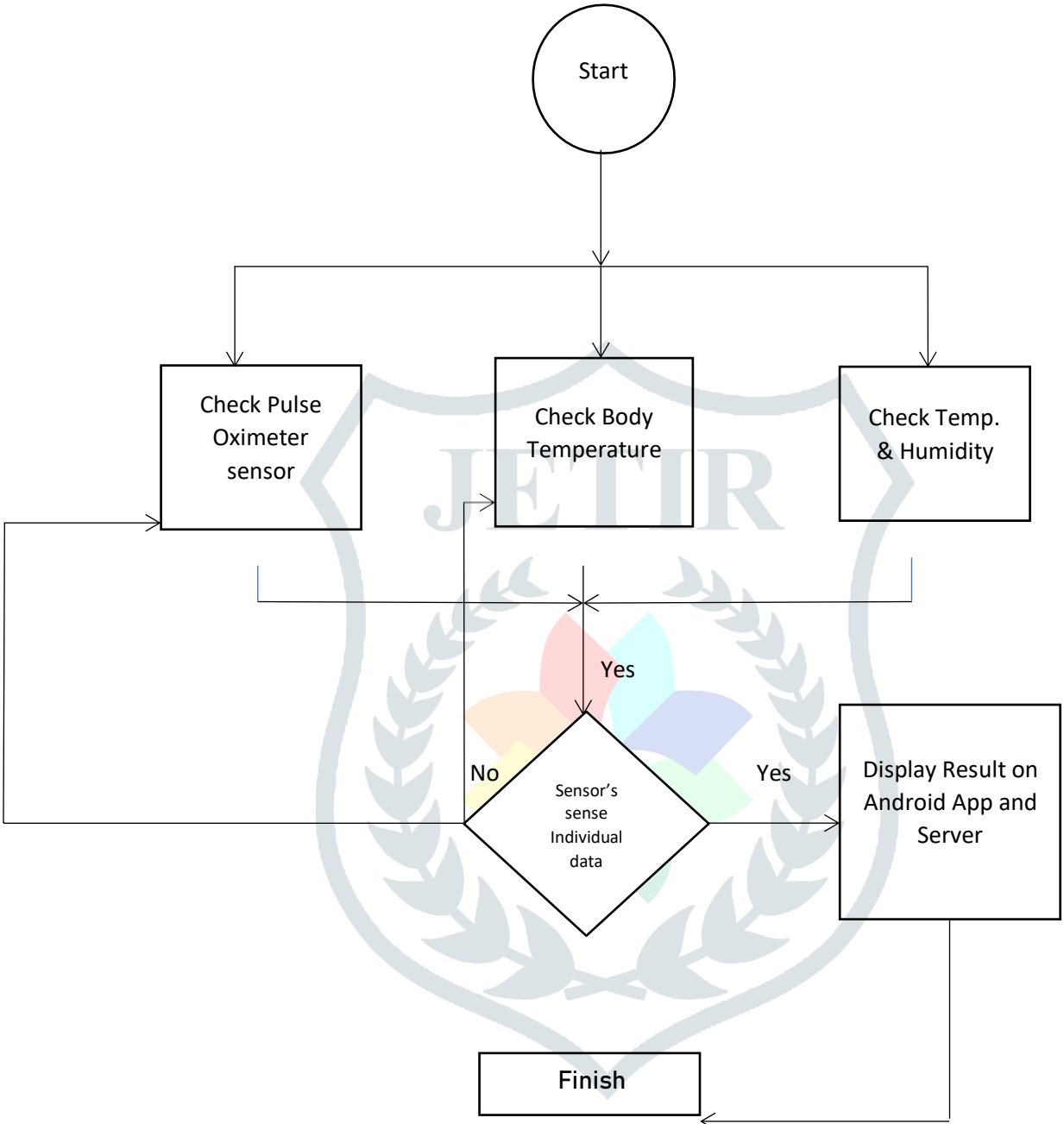

Fig. 2: Flow chart of the physiological parameters monitoring system.

III. IMPLEMENTATION –

In the physiological observing system, we have incorporated different types of sensors. We have used the (LM-35) sensor to measure body temperature. This sensor senses the affected person's body temperature and shifts the information to the nodemcu. After that, the nodemcu processes all this information and indicates it on the android app step by step. This process is presented in Fig. 2. . The suspect can take a look at his/her pulse rate through the robot as well. When the suspect's pulse is active, the BPM value will appear on the display and also on the android application.. Next, suspects can test the oxygen saturation level via this robot. If blood flow is present, the spo2value will appear as shown in Fig. 2 and android application . At the same time. The microcontroller will also transfer the data to the server through a Wi-Fi module. For communication among the suspect & authorized people through video conference, we implanted/placed an IP camera on the robot . The IP camera will display all the information at the local ip.

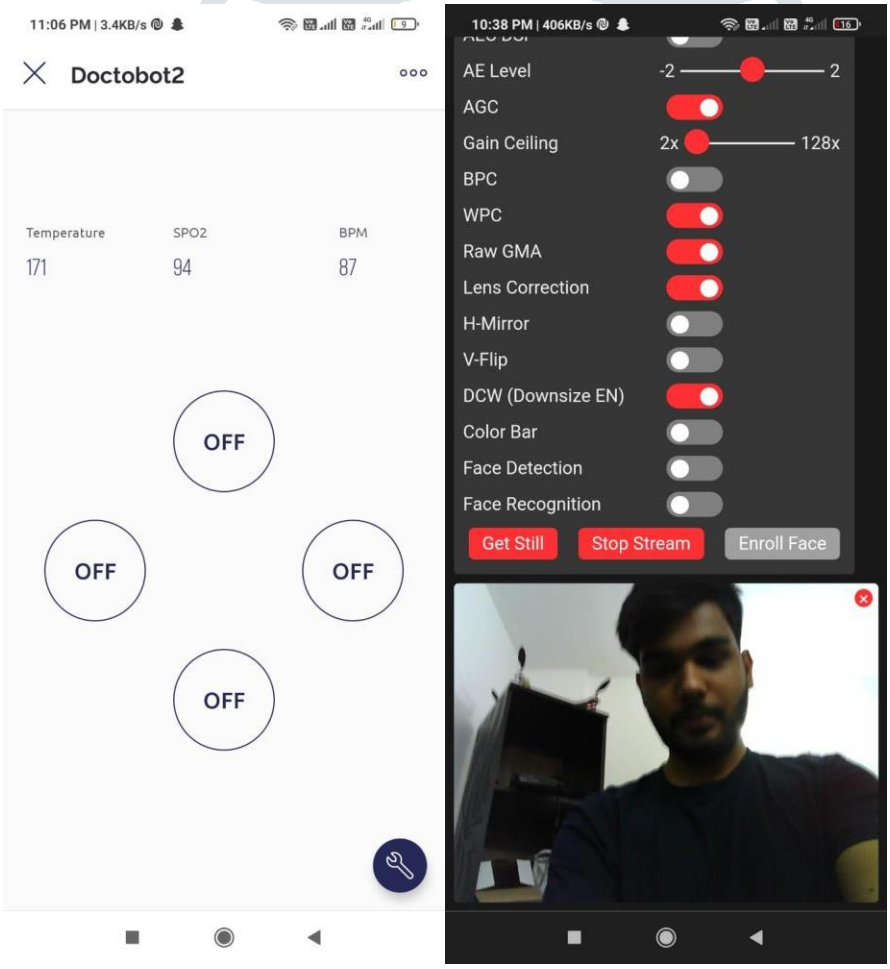

Fig 3 .Displaying data of the physiological monitoring system in the android app.and stream on local ip.

A. CONTROL SYSTEM-

The robot has self-sufficient control systems. To control the robot in self-sufficient mode an android app and a Wi-Fi module are used. The android app works as a transmitter and the microcontroller & Wi-Fi module works as a receiver. By using of the serial communication technique, we manipulated robot from left, right, ahead, opposite positions and stop by usage of the android app.

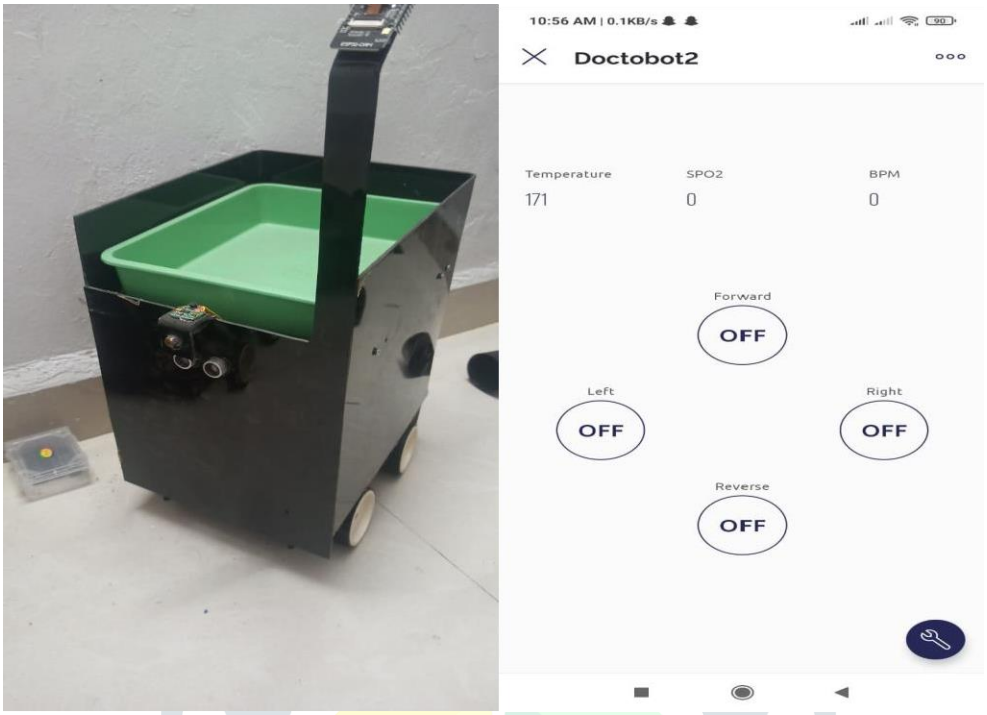

Fig 4 .Front view of robot including a physiological monitoring system, automatic sanitizer, room temperature and humidity monitoring, IP camera .and android application user interface.

IV. CONCLUSION –

In this paper we have worked on design and implementation of an iot-based medical assistant robot is a significant breakthrough in the healthcare industry. The project aimed to provide real-time medical assistance and support to the disabled and patients in need, while minimizing person-to-person contact and ensuring proper cleaning and support in hospitals. The proposed system includes an automatic hand sanitizer, an iot-based physiological parameters observing system, an IP camera for monitoring, and an end-user Android app. Results showed that the system could monitor and record vital signs accurately, and the robot could offer assistance and support to patients effectively. Overall, this project has demonstrated the potential of iot in the healthcare industry, and it is expected to contribute significantly to the development of affordable and accessible medical technologies that can improve the quality of healthcare and reduce the burden on healthcare provider.

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