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Medicine Delivering and Patient Parameter Monitoring Robot (Medrobo)

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ABSTRACT

In this project, we propose a robot named Mebrobo with some functionality of providing medicine as well as to measure the vital parameters (Heart rate, Temperature) of the patient. During the current scenario, reducing the human-to-human contact in hospitals is required. In a bid to prevent doctors and medical staff from getting affected by Coronavirus, the role of medicine delivering robots is evolving. We can attain the locomotion procedure of the robot using the principle of Radiofrequency identification (RFID) that automatically identifies and tracks tags attached to the objects. The movement and finding the path to patient location is done through IR Sensors. All the measured parameters will be stored to the cloud using Internet of Thinking (IoT).

Keywords—*Temperature Sensor,Pulse Oximeter,NodeMCU*

Introduction

Population in our country is increasing rapidly, with the increase in the number of people comes the proper management of service. A place like hospital needs 24 by 7surveillance. Inadequate staff members, negligence of nurses can cause big risk to patients life. This is the era of technology and automation. If automation is brought to healthcare center then it will be far effective. Automation can be introduced in hospitals by the application of line following robot.

A line following robot can act as temporary nurse which can assist hospital staff in case of any emergency. Also this kind of robot will work as a delivery robot in operation room where doctors will need any extra accessories at any emergency instance. This kind of robot has advantages such as fast service, available 24x7, more reliable, more efficient.

To make software to work with embedded systems we need to bring software and hardware together ,for this purpose we need to burn our source code into microprocessor or microcontroller which is a hardware component and which takes care of all operations to be done by embedded system according to our code. The process of converting the source code representation of your embedded software into an executable binary image involves **three distinct steps**:

1. Each of the source files must be compiled or assembled into an object file.
2. All of the object files that result from the first step must be linked together to produce a single object file, called the re-locatable program.
3. Physical memory addresses must be assigned to the relative offsets within the re-locatable program in a process called relocation.
   The result of the final step is a file containing an executable binary image that is ready to run on the embedded system.

Existing Methods And Its Drawbacks

Poor quality health care not only increases the mortality rate but also leads to unnecessary suffering and persistent symptoms. Efforts have been made to enhance these conditions with the use of computerization and robots to replace nurses yet they are to reach out the masses and most of them are not efficient enough to provide effective care to patients.

Drawbacks:

- Improper monitoring of patient's health parameters

- Unavailability of timely medical attention during emergencies
- Negligence or possible human error by care taking authorities
- Loneliness of patients
- Lack of quality data analysis from past records of patient health
- Improper and time-consuming maintenance of paper records.

III..PROPOSED SYSTEM

Our project MedRobo is an alternate solution to the difficulties faced by the hospital staff in treating the coronavirus positive patients, who raised this problem. It checks the important parameters of the patient such as temperature, heart rate without the involvement of humans or by avoiding the direct contact of hospital staff with the patients. By using the reference parameters which are given to the system, will compare with the measured parameters. Then the recorded parameters data will be sent to the doctors through the IOT platform when RFID Reader reads the tag which stores the patient details. The movement and finding the path to patient location is done through a IR Sensors. Also can reevaluate and view the data's of individual patients after a particular interval of time to make sure that all those patients suffering from coronavirus are feeling better and are in good condition.

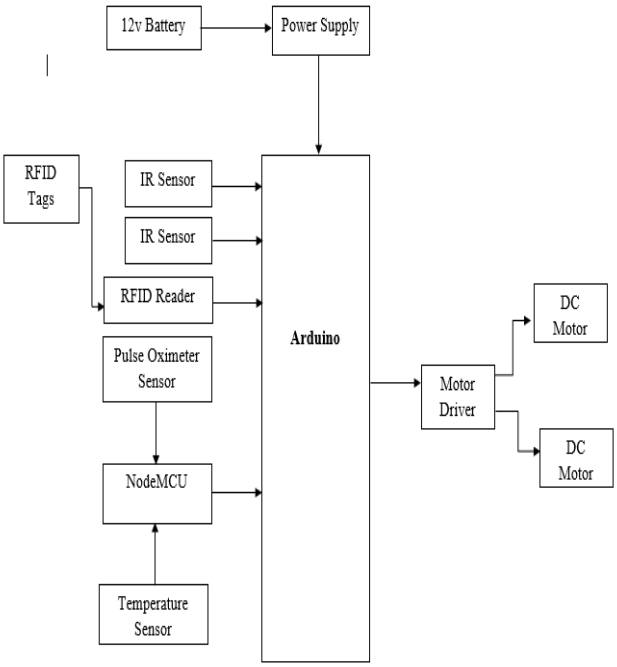
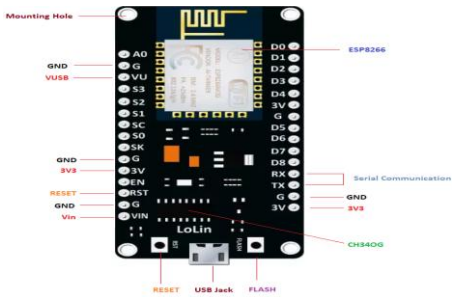
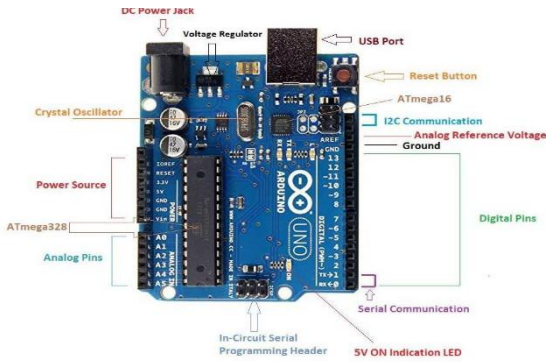


Fig (1) :Block diagram for proposed system

NodeMCU is an open-source firmware and development kit that plays a vital role in designing your own IoT product using a few Lua script lines.Multiple GPIO pins on the board allow you to connect the board with other peripherals and are capable of generating PWM, I2C, SPI, and UART serial communications.

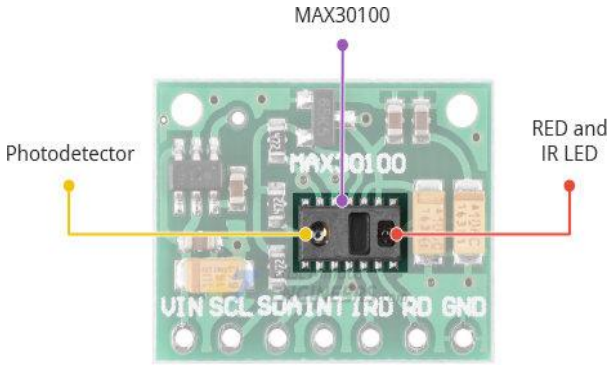


Arduino Uno is a microcontroller board developed by Arduino.cc which is an open-source electronics platform mainly based on AVR microcontroller Atmega328.

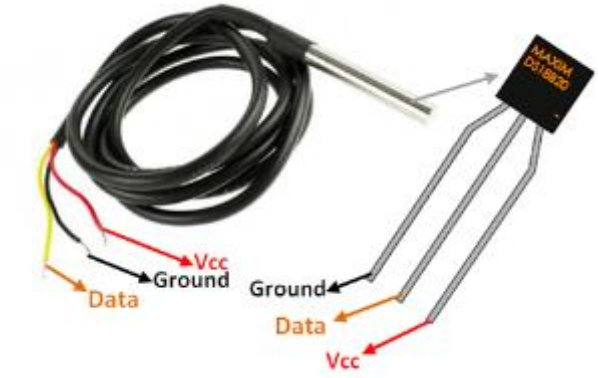


Arduino UNO

The MAX30100 **pulse oximeter** and heart rate sensor is an I2C-based low-power plug-and-play biometric sensor. It can be used by students, hobbyists, engineers, manufacturers, and game & mobile developers who want to incorporate live heart-rate data into their projects.



The digital **temperature sensor** like DS18B20 follows single wire protocol and it can be used to measure temperature in the range of -67oF to +257oF or -55oC to +125oC with +-5% accuracy. The DS18B20 is one type of temperature sensor and it supplies 9-bit to 12-bit readings of temperature. These values show the temperature of a particular device



IV. RESULTS AND DISCUSSIONS

Considering the problems of existing methods and giving solution to that problem by considering the basic requirements for our proposed system

We need to select the below components:

1. Microcontroller
2. Inputs for the proposed system (ex: sensors, drivers etc.)
3. Outputs (ex: relays, loads)

After considering hardware requirements, now we need to check out the software requirements. Based on the microcontroller we select there exists different software for coding, compiling, debugging. we need to write source code for that proposed system based on our requirements and compile, debug the code in that software .

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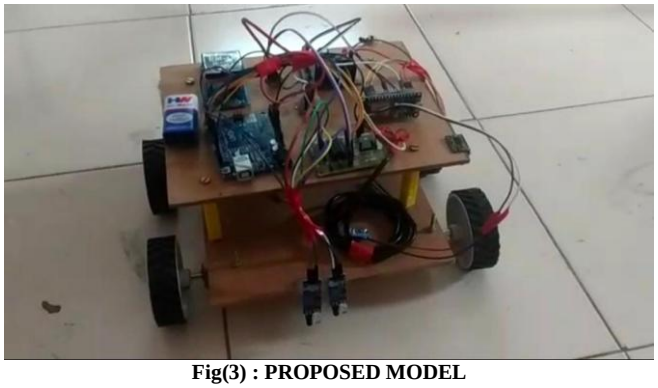
After completing all the requirements of software and hardware we need to bring both together to work our system. For this we need to burn our source code into microcontroller, after burning our source code to microcontroller then connect all input and output modules as per our requirement.

Fig(2):MEDROBO OPERATED



Fig(3) : PROPOSED MODEL

ADVANTAGES

- IOT Monitoring proves really helpful when we need to monitor & record and keep track of changes in the health parameters of the patient over a period of time. So with the IOT health monitoring, we can have the database of these changes in the health parameters. Doctors can take the reference of these changes or the history of the patient while suggesting the treatment or the medicines to the patient.
- Hospital stays are minimized due to Remote Patient Monitoring.
- Hospital visits for normal routine checkups are Minimized.

V. CONCLUSION

The system we have designed and fabricated is a prototype and there is still scope for adding more features and making it industry ready. We have used the Node MCU microcontroller for both its low cost and its simplicity. Along with the temperature sensor and heartbeat sensors, SpO2 sensors and other features can be added to make the doctors diagnosis procedure more efficient.

We conclude this paper as it provides a detailed insight on a medical assistant robot which when implemented in hospitals will enhance the existing quality of health care and will help doctors to a great extent. The target of this robotic solution is to provide comfort and best of facilities to patients without human intervention.

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