An IoT based Remote Intelligent Health Monitoring and Management System for Mankind During COVID-19 Situation

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***Abstract*— In this current covid-19 pandemic situation whole world is afraid about the future earth and recently covid-19 has come with the more powerful wave and again human life is facing a tough situation. Our society is spending life in between life and death. But in this current destroying situation we human being also have to survive through this condition and for this, each and every one has to maintain their lifestyle according to a proper schedule and also have to follow few rules to avoid the fatal attack of covid-19. And among these rules, there is a rule of social distancing where every human being has to maintain a distance of 6 feet. Now in this condition besides other needs, there is a necessity to go to doctors but due to social distancing there can be a risk to come to touch in each other but without touching patient doctors cannot properly diagnose patients and for this, we have proposed an idea of a device called DR. Robot which will help the doctors to diagnose patients properly without touching. This robot will help to measure body temperature, heart rate, blood pressure, weight and will display it based on which doctors can recommend prescription and medicine. Thus, this will help to prevent the spreading of diseases. Also this device can be carried easily to remote areas where doctors cannot reach easily and thus it can be used to treat patients when doctors are at the comfort of their own surroundings.**

Keywords—Covid-19, IoT, Robot, Social Distancing

I. INTRODUCTION

Our project titled dr. robot is an IoT device that will help to promote social distancing between doctors and patients in the future. As we know that the Covid 19 pandemic has already terrorized the world with its super destructive capabilities so people have become more conscious about their safety. Our project besides promoting social distancing also provides an interface for interaction between patients and doctors without any physical touch. This robot will measure a patient's body temperature, weight, blood pressure, heart rate with the help of modern technology and display it immediately for further examination. This robot will also have the feature to give prescriptions after it has been made by the doctor. The doctors, on the other hand, can examine the patient without actually touching them and thus it will prevent the spread of communicable diseases for both parties. Thus, it will provide a holistic solution to modern problems and thus it will be of great help to us human beings.

This model will be based on both software as well as hardware components. Different sensors will work simultaneously to analyze different body parameters and produce results. These results will be stored wirelessly in the cloud which can be accessed anytime and anywhere. The cloud will be secured so that no information will be leaked to the outside world. So, the patients can rest assured about their information to be secured. Also, this model can be easily transported to different places and it will be feasible and easy to use. Also, the cost will be such that it will be affordable and thus it can be used by many people. So, this model has a chance of doing well in the business world.

II. RESEARCH METHODOLOGY

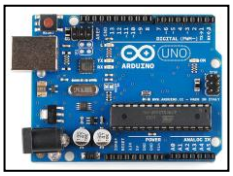
A. Hardware Requirements

- Micro controller (Fig1.) - The Arduino Uno is the main component of this module. Arduino microcontroller is commonly used in every IoT device. Coming to its low cost and efficiency, it is suitable for many components that have many parameters. Physically, Arduino is very stiff and its coding method is very easy if it's known how to be used. The capacitors on the board are arranged in such a way that is passed every data much fluently.

- BP Monitoring system (Fig.2) The BP monitoring system is a blood pressure measuring device which is sometimes known as a sphygmomanometer. This device is used to monitor anyone's blood pressure level correctly. It

is also called blood pressure checker or blood pressure gauge. In BP monitoring system contains a cuff that is wrapped around the arm and monitors the pressure of the cuff and thus it monitors systolic and diastolic pressure.

- Heart rate sensor (Fig.3). It measures pulse waves generated in the body which is the volume of blood passing through the blood vessel which is pumped by the heart. It uses the principle of optical sensors. It measures almost accurate results with little to no errors. It can be used personally by a person and it is easily affordable.
- Pulse Oximeter Heart Rate Sensor (Fig.4) MAX30100 is an integrated pulse oximeter which can sense heart-beat. It gets its readings from two LEDs which emit two wavelengths- a red and an infrared and then with the help of photodetector measures the pulsing blood absorbance. MAX30100 can be operated in range of 1.8 to 3.3 V.



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ig1. Micro controller

Fig2. BP Monitoring system

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Fig3. Heart rate sensor

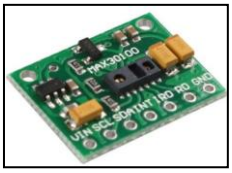

Fig4. Pulse Oximeter Heart Rate Sensor

- 4G GSM Module (Fig.5) GSM has mostly used in IoT based devices in order to use SIM facilities in any module. SIMM900A is the best at a low suitable cost and works almost fine. This module consists of two or more antennas according to our requirements. GMS module requires a little bit soldering but it is much rigid to be fit in an entire IoT circuit. Current days GSM devices support 4G speed services to be used.

- Node MCU (Fig.6) Node MCU is used for IoT implementation, the board just like Arduino which comes with a built-in ESP8266 Wi-Fi module already present in it. A NODE MCU is a Wi-Fi miniature module that also provides us to connect Wi-Fi connections within some limits of its place.

- Laser distance measure sensor (Fig.5) TF-LUNA Micro LiDAR Distance Sensor for IoT ITS is a laser distance monitoring system that has a 1cm distance resolution. It has an operating range of up to 8m. It consumes equal to or less than 0.35W. Its frame rate is 1-250Hz.

- Digital weight machine (Fig.6) This machine will help detect the exact human weight. It displays the weight in kilograms or pounds. This machine generally measures exact weight with little to no error. Its other name is digital weight machine.

Fig5. 4G GSM Module

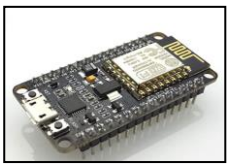

Fig6. Node MCU

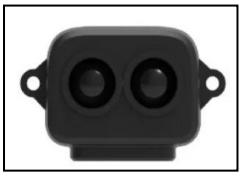

Fig7. Laser distance sensor

Fig8. Digital weight measure machine

III. WORKFLOW DIAGRAM

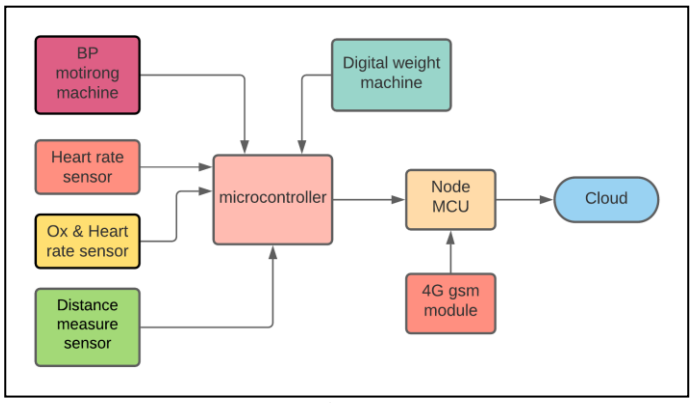

Fig9. Work flow diagram

IV. CIRCUIT DIAGRAM

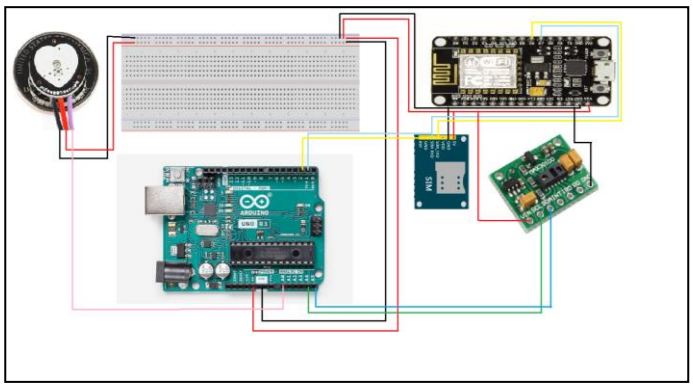

Fig10. Circuit Diagram

V. WORKING PRINCIPLE

This system will be equipped with a video calling facility which will be software-based and it will be an interface of communication between patients and doctors. Further the microcontroller embedded in this system will be connected with multiple sensors which will be used to examine a patient's body. The sensors which will be included are blood pressure monitoring machines, heart rate sensor, oxygen level sensor, height measuring sensor, and also a digital weight measuring machine. These sensors will be connected to the cloud via node MCU and GSM modules. Thus, it will facilitate instant transfer of data between patients and doctors provided an internet connection is present.

VI. RESULT AND DISCUSSION

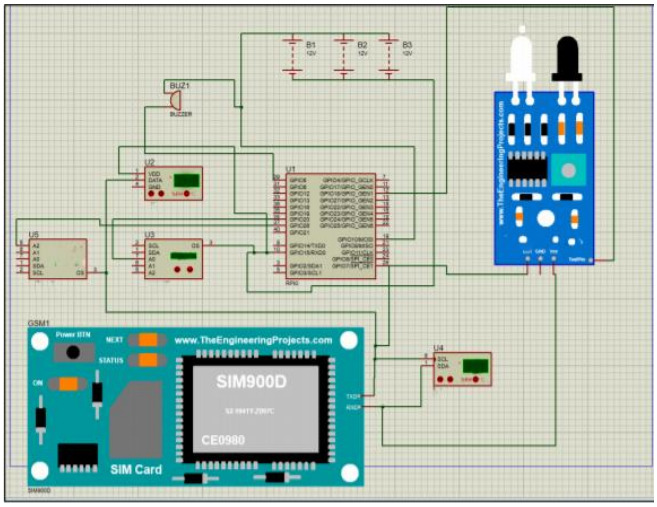

Fig11. Simulation process of the device

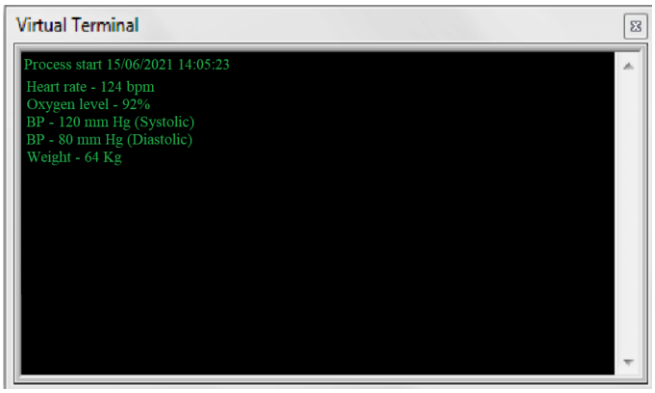

Fig 12. Output of the simulation

VII. FUTURE SCOPE

a) Prescriptions given by the doctors will be printed with the logo and handed to the patient immediately after checkup.

b) More accurate sensors will be used in the future for more accurate results.

c) Improved security for data stored in cloud.

d) More sensors will be incorporated to increase the efficiency of the model's data annalyzation.

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