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Health Monitor Using Edge and Android Application

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A B S T R A C T

It is always difficult to monitor the sick people who might need attentive care at all times which is an almost impossible task. This paper enunciates the development of model which constantly monitors health data of serious patient such as their heart rate, body temperature and saturation levels, which will help the caretakers to have all their patients' information in real time on their android or edge devices. The implementation of this approach was possible with Arduino MCU which will have the sensors like DS18B20 for body temperature and MAX30100 for heart rate and blood saturation integrated on it. This arrangement constantly sends the data to the server which in this is a cloud server. Hence the data can be seen on the android device in real time since updated from the cloud server.

Keywords: MCU, DS18B20, SPO2 Sensor, IoT Module

1. Introduction

In this difficult pandemic situation, a lot of sick people need sumptuous and adequate amount of care which must be done at proper intervals of time especially monitoring their body vitals. The caretakers who attend the patients will not be present there at all times and they need to check them only at some periodic time intervals which sometimes might cost their lives too. To overcome such casualties, a model has been developed which monitors the patient's body vitals like their blood oxygen levels, temperature and heart rate remotely. The model notifies the real time data to the care taker which will help them to attend them when required. Wellbeing is consistently a significant worry in each development of mankind and progressing as far as innovation.

Internet of Things (IoT) based wellbeing observing framework is the current answer for it. Distant Patient Checking plan enables perception of patients outside of standard clinical settings like at home, which grows admittance to human administrations workplaces at cut down costs. The main target of this idea is to plan and execute the savvy patient wellbeing global positioning framework which utilizes sensors to follow patient wellbeing and utilizations of web in terms of internet to illuminate their friends and family for occurrence of any issues. The target of creating observing frameworks is to lessen medical care costs by reducing doctor office visits frequently. Wide research is being done on the exploration of technologies in strengthening and building the health services effectively. Many IoT-based smart healthcare devices and systems are commercially available nowadays. These products are useful for the tasks such as monitoring patients, maintaining contacts with doctors, improving the performance of rehabilitation and so on. There are many systems related with health monitoring which is one way or the other beneficial to the users. Many devices are proposed in recent years with lots of features.

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2. Materials and Methods

In this paper, Remote Health Monitoring System is implemented using NodeMCU (ESP8266) with the following simple problem statement - To monitor body temperature, heart rate and oxygen level of patients in order to constantly keep track of the their health conditions remotely and have a check on them whenever required. In this model all the parameters are available on a single chip with the help of multiple sensors which can clearly observe the absence of multiple apparatus. Moreover the data can be collected and get updated in real time on the edge android device from our MCU via internet which is precise and real time too. Hence the chip is programmed to notify if there are any unusual changes in the patient's body vitals regularly and will be in the state to attend them immediately whenever critical need arrives.

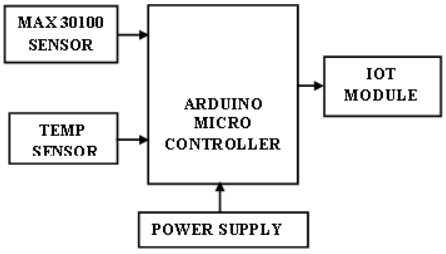

Fig. 1 –Block diagram of the system

DS18B20 Sensor is a one-wire programmable sensor for measuring person's body temperature for maxim integrated. It has a wide measuring range from -55ºC to 125ºC. The MAX30100 sensor senses the heart rate and also blood oxygen levels. These sensors fetch the values and push all the inputs to the cloud. The values are stored in the cloud for patient monitoring. There are three cases mild, above average and critical attention required. For mild there will be no attention required for that patient. The values above average will be notified for an attention but not that serious. If the values are above normal rate, immediate attention will be required for the patient and notified to the attender of that particular patient. Moreover the model includes a dedicated application service for the above mentioned process in order to have a complete analysis of patients critical body criteria in real time and reliable to the maximum extent.

3. Results and Discussions

An application is created for monitoring the basic values of the patients. The arrangement of sensors is meant to fetch the values of Blood oxygen level (SpO_2), heart beat rate and body temperature. The values fetched from the sensors are pushed to the cloud and saved for further needs if required. These values are stored also in the application. The application has three different cases - mild, average and critical. The mild case pops up when the patient's basic rate goes a little above the normal rate. The average case is shown once the patient's values goes above normal which when the patient needs some continues monitoring for maintaining the rate. The critical case will be notified once the values are no more normal and they need immediate attention from the doctors. These cases will be notified to the attender of the particular patients from the application created. This paper will create an easy monitoring of the patient using a simple application and sensors.

4. Conclusion

The proposed model creates an environment that will help monitor and manage the sick people who need critical care by providing a safe environment. Such people's body temperature, heart rate and blood oxygen levels are fetched and monitored continuously. An alert is sent whenever the fetched values are higher or lower than the required value and then taken care properly and adequately whenever required. This is achieved by using sensors and Node MCU with IoT Technology. This is a precise one for monitoring patient's body temperature, heart rate and oxygen levels remotely while also giving alerts constantly all in a single arrangement. The application of this model has a scope in all primary health care centres and also can be implemented in remote areas which may have more significance. This is cost efficient which has many applications over many places thus benefiting a lot of people.

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