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Intelligent Mobile Patient Health Monitoring System

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Abstract - *Health care sensors are playing a vital role in hospitality. Patient monitoring system, a major improvement in hospitality because of its advanced technology. In the present busy days constant monitoring of the patient's body parameters such as temperature and heartbeat rate etc. becomes difficult. Hence to remove the burden of monitoring patient's health from doctor's head, we present the methodology for monitoring patients remotely using embedded technology which can provide medical feedback to the patients through mobile devices based on the installed sensors. The deployed embedded technology provides easy and continuous monitoring of patient and is available at a reasonable price.*

Key Words: *Mobiles, Health monitor, Intelligent systems*

1. INTRODUCTION

In today's busy life, mobile computing devices make information easily accessible for everyone from anywhere at any time. Advancement in the mobile devices could be beneficial for healthcare workers to provide accurate and reliable real time information. Continuous patient monitoring in terms of their body temperature and heartbeat rate is very important and becomes difficult.

The available technology which is routinely used for patient monitoring has different sections for collection, processing the data and due to which the information is not available in a real time. On the other hand, the sensors often connected with unwieldy wires and connected to the monitoring devices which provides discomfort to the patients due to their physical intervention.

The available devices which are currently used for continuous patient monitoring are quite heavy and expensive and are fixed in nature. Therefore, there is a need of a process which could be cost effective, flexible, easy to use and portable in nature.

The current project describes designing of simple, cost-effective system based on embedded technology for remotely monitoring of patients which would help for effective communication between doctor and patient and in turn doctor to take an appropriate action at proper time.

Few studies have been already reported in which advanced mobile technology has been used for different purposes. One such example includes use of solar energy for traction purpose in which solar energy gets converted into electrical energy by employing solar panel. Another example includes designing railway track gap detection autonomous vehicle using Microcontroller, IR obstacle Sensors assembly system, which detects the gap along its path. The central component of the whole system is a microcontroller.

1.1 Hardware used:

The sensors, hardware (**Figure 1**) and software (**Figure 2**) used in this project are summarised as follows.

- NODE MCU PROGRAMER 8266
- 16*2 LCD DISPLAY
- DS1820 (TEMPERATURE SENSOR)
- HEART BEAT SENSORS
- EEG SENSORS
- IC 7805 REGULATOR
- 12V ADAPTER
- CAPACITOR
- RECTIFER
- TRANSFORMER
- RESISTOR
- POWER SUPPLY 12V
- ARDUINO SOFTWARE

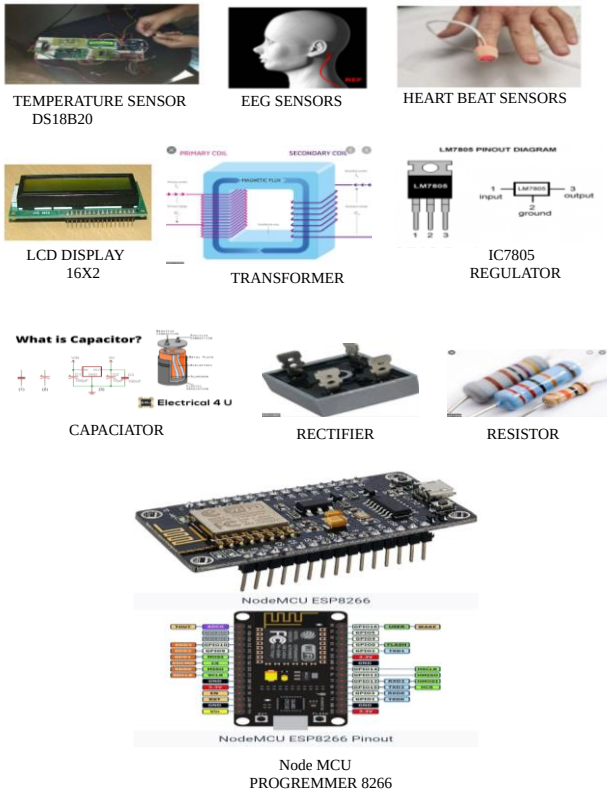


Figure 1. Sensors and hardware used in this study are summarized.

1.2 Software used:

Output will be display on mobile app using blynk app and we use ardunio uno software for run the program and get the readings.

Figure 2. Output displayed in mobile application apps.

2. WORKING PRINCIPLE

There are mainly two parts of the system one is transmitter and the other one is the receiver. In the transmitter, we have Heartbeat sensor, and the temperature sensor. All the sensors are connected to the patient. The microcontroller monitors the all the system in the transmitter if any abnormality in the patient condition then it sends the signal so that the receiver will capture the signal and will work according to that. Block diagram for patient monitoring system is given in **Figure 3** and final circuit diagram of intelligent mobile based patient monitoring is given in **Figure 4**.

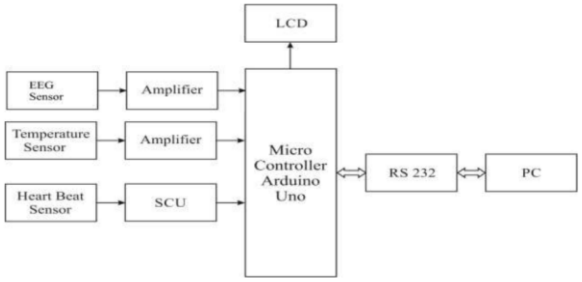


Figure 3. Block diagram for patient monitoring system.

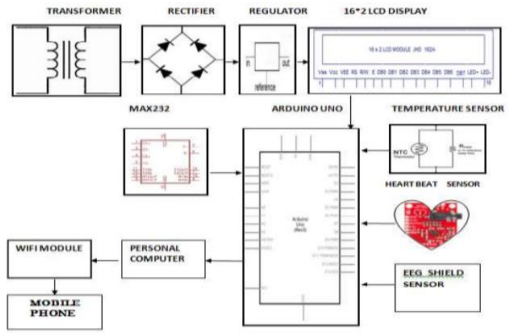


Figure 4. Final circuit diagram of intelligent mobile based patient monitoring.

3. RESULTS

Following Figure shows health parameters such as temperature, ECG heart beat and ECG measurement sensor.

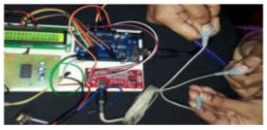
Temperature Sensor

Testing	Normal value	Observed value	Error rate
Person 1	24	28	+4
Person 2	24	30	+6

ECG heart beat sensor

Testing	Normal value	Observed value	Error rate
Person 1	74-78	72	-2
Person 2	74-78	84	+6

EEG measurement sensor



Testing	Normal value	Observed value	Status
Person 1	100-300	131	Active
Person 2	100-300	165	Active

4. APPLICATIONS

The designed patient monitoring system has following applications:

- It can be operated remotely by interfacing a GSM modem system.
- It can be used in ICU's, operation theatres, monitoring of oxygen levels etc.
- It can be also used in old age homes to monitor the various parameters of a sick person in old age homes.

5. FUTURE SCOPE

Multiple patient monitoring parameters such as parameters like blood pressure, body temperature, and heart rate can be included as controlling parameters in the future. This system also developed by using mobile app using Arduino software. Also this system continuously monitor patient's condition through mobile app.

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