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IoT based Patient Health Care Monitoring System

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Abstract:
The Internet of Things (IoT) is a wide technology which is used nowadays to interconnect all the devices. IoT creates a platform where embedded devices are connected to the internet. IoT founded clever health intensive care preparation theatre's an energetic role in the manhood. Due to advancement in communication and information technology, the Internet of Things (IoT) is used in many actual applications. Several wearable strategies are used to monitor the health condition and convey the data to the receiver which are in cloud. Hence, it is adapted for long distance patient monitoring continually. It will bring a positive transformation to the rural area patients in the field of smart health management. In this paper an android application is developed to incessantly monitor the patient's health. The respiration sensor, pulse rate sensor, temperature sensor, ECG and EMG are used to display the patients' health condition.

***Keywords*:** Internet of Things, Health monitoring, Wearable devices, Sensors.

1. Introduction

The Internet of Things (IoT) is a system of solid totaling devices, powered and alphanumeric machines. It is provided that with exclusive identifiers and it has the skill to allocation the data done a grid without needful any interaction. Many patients lose their lives due to unawareness of the recent technologies in the medical field. In recent days, due to the growth in the field of medicine the doctor need not monitor his patient by making them to stay nearby. In case of emergency, if the patient is not treated on correct time it will lead to serious complications. The doctor needs an immediate status of the patient to start his treatment. If the conditions become serious the specialist is warned, so that he can pleasure the patient in correct time. The system provides the health monitoring services to treat the patients in normal and critical situation [1]. The Internet of Things (IoT) is unique of the maximum hopeful knowledges for the upcoming generation. Healthcare and security will obtain excessive welfares with the evolution of this knowledge [5]**.** In this paper, a evaluation of systems grounded on IoT for healthcare and ambient helped living, defined as the Internet of Health Things (IoHT) is debated. Healthcare is an imperative IoT application, which can be categorized in three locations namely, 1. Acute overhaul (Hospital), 2. Elongated term care (Nursing home) and 3. Municipal based care(Homecare). This paper grants a projected which uses a Temperature sensor, ECG, EMG, Breathing sensor and Pulse rate sensor. Measuring the temperature, pulse rate are the important restriction for a patient, to be monitored so that the specialist can take instant actions deprived of any stay if he treasures any deviation in the patient's body. The data's which are collected from sensor is ported on to cloud which delivers scalability, federal user entree, obstinate data stowing. There is no organization preservation rate for heavyweight measurements of penetrating health data [2]. In the projected system, the protuberance from the malaise sensors and heartbeat sensors are involved to the patient's body that bargains the temperature and heartbeat of the patient and it is nursed to the PIC Controller.

This paper aims to observe the dynamic restrictions of the patient through non-invasive sensors using IoT to guide the health monitoring data to specialists and patients. It also participates mobile technologies to

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efficiently assemble and interconnect dynamic data since a patient's wearable biosensors although bearing in mind the mobile devices' partial competences and control drainage in adding to irregular network discontinuations thus dropping the suspension triggered throughout the handling of the patient [3]. A scheme which can be used for private health monitoring of patient grounded on his indications was established. IoT assists trendy forming an android application among the patients and doctors.

2. Patient Monitioning System Using Bluetooth Module

Health monitoring results in diagnosing the problem in the patients and observing the condition of the patient continuously so that mistaken judgment, missed treatment, disability to admission patients antiquity owing to data harm, missing primary shadow, etc can be avoided. The errors can also be minimized due to continuous observation and monitoring. The doctor collects the patient's data from the report sheet and writes it down in the paper worksheet. The proceedings are reproduced in the data entry sheets. The data is spread to the catalog attendant by the staff. There will be delay between the data collecting and availability to medical staff. [6] The initial requirement for a Internet-of-things (IoT) application involves a sanatorium backup area. Firstly, the procedure of modelling IoT systems through amusing films and use suitcases is studied. Later, the model emergency room systems uses are discussed. Then, use case models for a particular situation is created, if the patient hypothetically sorrow from a myocardial infarction. Finally, the oversimplification of the detailed case to a larger infirmary varied arrangement is done. Such an tactic can lead to amplified effectiveness, bigger security, and recovering pursuing of people, apparatus, and materials.

The communication between the patients and doctors are not in deep level. The patient must be monitored continuously to avoid serious health conditions. The presence of patients in the medical centre is impossible all the time. If any abnormality happens in their health, it will lead to critical problems. This leads to the proposed system which uses WIFI Module rather than Bluetooth, where the data's are in cloud and interconnected with the IoT.

Bluetooth Module

Bluetooth module is a Printed circuit board assembly (PCBA) which is a non segregated Bluetooth function. Bluetooth wireless communication module can be used in short period of time, which can be separated into the Bluetooth module and Bluetooth voice module.

Bluetooth module is a vital circuit chip, which desegregated bluetooth functions and which can be already used in wireless network conveyance. Generally, the Bluetooth module can be divided into data communication module, remote power module, etc. The modules prepared for the final stage of manufacturer products, which makes the next application easier by using chip.

Figure 1: Bluetooth module

Pulse Sensor

Heart beat sensor bounces digital production of heart beat, once a finger is usual on it. When the heart beat detector is waged, the LED light up and simultaneous through every one's heartbeat. It service on the concept of bright variation support by the lifeblood flow through thumb.

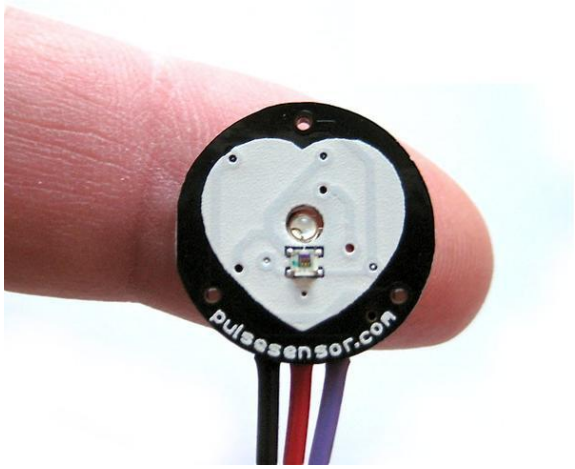

Figure 2: Pulse Sensor

3. Patient Monitoring System Using Wifi Module

The proposed system measures the additional parameters like ECG, Temperature, and pulse of the patients using the ECG sensor, temperature sensor, and pulse oximeter sensor. [4] The future system is founded on helpfulness calculating and wireless sensor networks. The data becomes accessible in the "cloud" from where it can be handled by skilled systems and dispersed to therapeutic staff. An Android App is developed for the patients to view their health condition along with a doctor. In the patient's app, the patient can communicate with the doctor through the doctor's app. The Fig1 shows the lump picture of patient 24-hour care system using WiFi Module.

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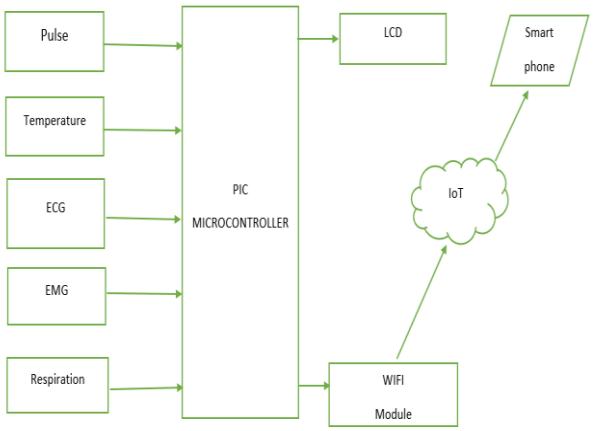

Figure 3: Patient Monitoring System Using Wifi Module

The doctor's application can be established which is used to direct the proposals for improved health care and also for the online prescription of the patient. If there is any abnormality in the patient it can be indicated with the help of alarm by setting a threshold value by alerting the doctor through the app. The place of the patient will be made more modern to the doctor concurrently in critical health conditions. In such case, direct deed will be taken near the patient for appropriate behavior at the accurate period. [7] The nature of healthcare presents a quantity of tasks to systems originators and decision. In spite of tasks, there is a momentous marketplace for systems and crops to sustenance caregivers in their responsibilities as the number of people needs are increasing day by day.

Wifi Module

A self-contained ESP8266 WiFi Module is a combined TCP/IP protocol that can spring any microcontroller admission to your WiFi network. It is accomplished of also presenting the application or offloading all Wi-Fi network. It is talented of similarly hosting the application or unburdening all the Wi-Fi network functions from extra submission processor. Each ESP8266 module comes below pre-programmed AT command set firmware that can basically grab this up to your Arduino device and get details of WiFi-ability. This is extremely an cost effective board, and ever growing community.

Figure 4: Wi-Fi Module

ECG Sensor:

ECG is a technique of gathering electrical signals produced by the heart. This permits us to recognize the level of functional stimulation that somebody is suffering, but it can also be used to recovering appreciate someone's spiritual state.

An ECG is a non-invasive, effortless exam with swift outcomes. Throughout an ECG, sensors that can sense the electrical action of your heart are devoted to your upper body and occasionally your branches. These sensors are frequently left on for just a rare time.

ECG histories the electrical movement engendered by heart power depolarizations, which broadcast in exciting electrical waves towards the skin. ECG electrodes are naturally wet sensors, needful of a conductive gel to increase conductivity among skin and electrodes.

4. Conclusion

In this paper, the functional limitations such as body temperature, heart pulse, and ECG signals are taken and monitored continuously on the mobile phone. Specialist and patients can portion their material over mobile application and the patient gets proposals or treatment data through the application. Each time the parameters such as body temperature or heart rate go under or upstairs from the usual series then an watchful message is sent to the surgeon. The system will be a life-saving method which is useful for patients who are in rural areas.

Figure 5: ECG Sensor

5. Results and Discussions

The below Fig 2 shows the hardware of the patient monitoring system using IoT

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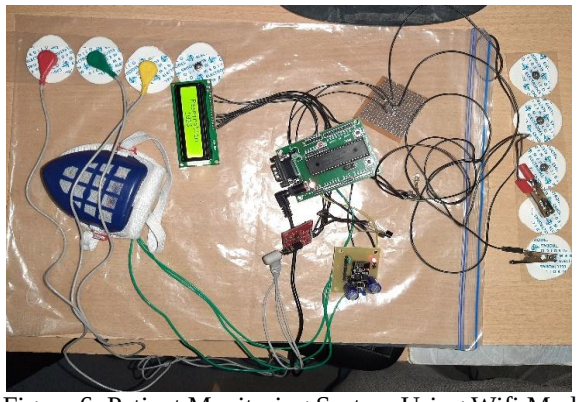

Figure 6: Patient Monitoring System Using Wifi Module

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