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I-Health Monitoring System

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Abstract: Internet of things is the most popular term coined in recent years. IOT is becoming tremendously important for traffic monitoring, smart homes, smart parking management and other industrial applications. With the continuous development of the IOT, more and more “things” will be able to accessible over large scale on Internet network. In this project, We have proposed an intelligent patients monitoring system to monitor the Pulse rate and body temperature using a wearable system it is designed and implemented in this paper. The Pulse rate and body temperature receives from wearable system and stores the data to a database and after a time period this method can determine the Pulse rate and temperature of the monitoring body. In case of emergency if the patient's health condition is not stable (critical), the system automatically sends a push notification to doctors and nurses via Web services.

This would help the doctor to monitor his patient continuously from anywhere as well as helps the patient's relatives to view his (patient) health condition remotely (with limited access).

Keywords: Internet of Things (IOT), Pulse Sensor, Temperature Sensor, cloud computing, Node MCU, ESP8266.

I. INTRODUCTION

Our current generation electronics technology is becoming the most demanded aspects of daily life, and the medical field is not exception for this, so the need for well-equipped hospitals and diagnostic canter is increasing day by day as the people are becoming more conscious and curious about their health abnormalities. The stress on the mind is too much demanding the need for the fully equipped diagnostic centres. Today's hospitals are huge and with large areas in a building. They may occupy no. of floors in one building. Different wards are situated at different places such as men's wards, women's wards, maternity wards, general wards, special rooms, and more importantly ICU's, doctors need to keep monitoring all the patient's. This is not feasible for the doctors to go to each ward and monitor each patient frequently say after each half an hour. Keeping all this aspects in mind we designed well equipped wearable patient monitoring system. Where with the help of tools and sensor this wearable kit will monitors patient health parameters time to time and in case of any abnormalities or critic situation it sends alarm push notification related to pulse rate and body temperature to doctors and patient relatives via web services over internet network.

II. PROBLEM STATEMENT AND OBJECTIVE

- A. i-Health Monitoring System is the most demanding field in the medical area. This project is beneficial for all class members in our family. This project really proves helpful when family members need to go out for some emergency work.
- B. Also in National Defence sector where soldier fitness is considered to be the health of our Nation. This technology can be used and on daily basis soldier health can be monitored.
- C. Disabled patient can use this technology as who find it really difficult to go to doctors on daily basis or for those patients who need continuous monitoring from doctor.
- D. Hospital visits for normal routine checkups can be minimized.
- E. Patient health parameter data is stored over the cloud. Such that it will be more beneficial than maintaining the records on printed papers. So keeping and maintaining the digital records which are kept in a particular computer or laptop or memory device like pen-drive because there are chances that this device can get corrupt and data might be lost. Where as in case of IOT, the cloud storage is more reliable and does have minimal chances of data losses.

III. PROPOSED WORK

Our objective is to acquire the health parameters and module them into a wearable tool such that it extend as portable health tool for older people (who live alone) as well as monitoring health in Defence Services and people having Cardiac diseases. With rise in IOT, the technology is accelerating in far superior dimension. In order to maintaining the pace with the new technologies, this project will make sure progress in this sector.

Figure below shows the system overview how the proposed prototype device work. For determining the systems perfectness data is being collected from different persons. First the sensor which connected with ESP8266 equipped with Node MCU is placed to the monitoring body. The sensor started to collect the data and is sends the data to a web server using ESP8266 WiFi module. After that it determined Pulse rate and Temperature of monitoring body. The pulse rate and temperature of the monitoring body is shown on the webpage and it may send the data to the physician.

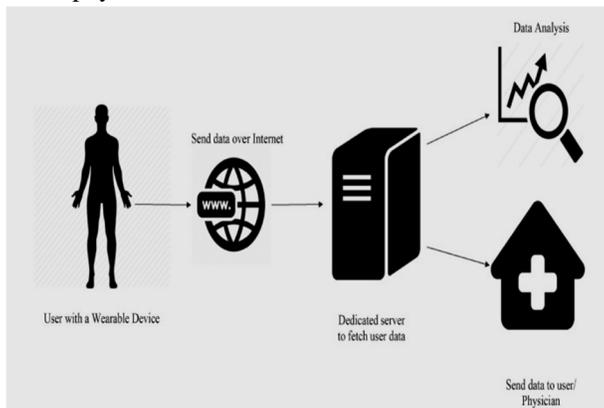


Figure 1 – Architecture of the proposed prototype

IV. TECHNOLOGY USED

- 1) *Internet of Things (IoT)*: IOT is an ecosystem of connected physical objects that are accessible via internet. The term ‘thing’ in IoT could be a person with a heart monitor or an automobile with built-in-sensors. The technologies which are available in our surrounding, it helps them to interact with internal states or the external environment, for exchanging data over cloud platform, which in turn affects the decisions taken.



Figure 2 – Internet of Things

- 2) *Cloud computing*: Cloud Computing and Internet of Things are tightly linked. The growth of IoT and the rapid development of associated technologies create a widespread over connectivity of “things.” This lead to the large amounts of data, which needs to be stored, processed and accessed. It supports exclusive way for big data storage and analytics. Although, IoT is accelerating on its own, the real innovation will come from interacting with cloud computing. The combo of cloud computing and IoT will enable new monitoring services and powerful processing of sensory data streams over network.

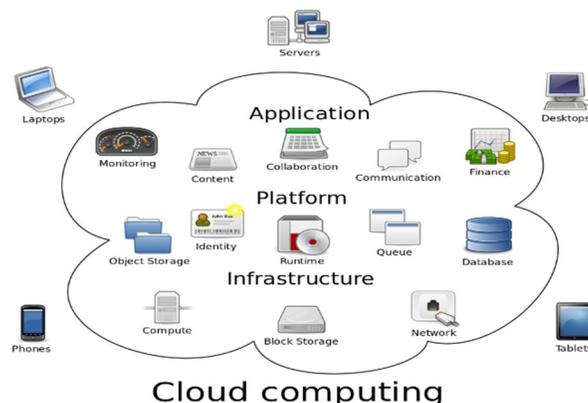


Figure 3 – Cloud Computing

V. HARDWARE TOOLS

- A. The NodeMCU is an open source Internet of Things platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC and hardware which is based on the ESP-12 module.
- B. The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer, Espressif Systems.
- C. The Pulse Sensor is a plug-and-play heart-rate sensor for Arduino. It can be used by students, artists, athletes, makers, and game & mobile developers who want to easily incorporate live heart-rate data into their projects. It essentially combines a simple optical heart rate sensor with amplification and noise cancellation circuitry making it fast and easy to get reliable pulse readings. Also, it sips power with just 4mA current draw at 5V so it's great for mobile applications.
- D. The Temperature Sensor is used for sensing body temperature which gives 1 degree temperature on every 10mV change at its output pin.

VI. SOFTWARE TOOLS

- A. Arduino IDE (Intregrated devlopment environment) is a cross platform application written in the Open Source language.
- B. The Proteus Design Suite(Electronics Delopment platform) is an proprietary software tool suite used primarily for electronic design automation and synthesis. The software is used mainly by electronic design engineers and technicians to create schematics and electronic prints for manufacturing printed circuit boards.
- C. XAMPP stands for Cross-Platform (X), Apache (A), MySQL (M), PHP (P) and Perl (P). It is a simple, lightweight Apache distribution that makes it extremely easy for developers to create a local web server for testing purposes.

VII. CONCLUSION

The proposed system provides a better solution over traditional Health System. Our main objective is to acquire the health parameters and module them into a wearable tool such that it extends as portable health tool for older people (who live alone) as well as monitoring health in Defence Services and people having Cardiac diseases. With rise in IOT, the technology is accelerating in far superior dimension. In order to maintaining the pace with the new technologies, this project will make sure progress in this sector.

A. Future Scope

- 1) Integrating more sensors for more specific data acquisition and analysis.
- 2) Will be applicable in army services in active situation.
- 3) Will be used to provide health service to rural areas in affordable price.
- 4) Huge database will be built for doctors to diagnose people from different areas and cultures.
- 5) This project will be coined in Android platform soon such that project will be more UI interactive.

Our project can be considered as platform to develop in the field of IoT on the health sector. In developing countries like ours, this kind of innovative and cost effective project can improve the future of technology. So, we are looking forward to implement the project in order to make an Accelerating technological impact in new era.



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