WEARABLE DEVICE FOR PRECISION HEALTHCARE MONITORING SYSTEM

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ABSTRACT

Innovative technology approaches have been increasingly investigated for the last two decades aiming at human-being long-term monitoring. It's difficult to check parameters like Blood pressure, heart beat, temperature, Oxygen level, etc., in day-to-day life whenever needed. To make easy we are going to design and construct an IOT based patient health monitoring system using Arduino and generic ESP8266. The main aim of this paper is to supervise the patients and the elderly people at their home itself. By doing this, unwanted visit to the hospital can be avoided. The system was developed to supervise the vital signs such as temperature, blood pressure, heart rate and fall detection.

I. INTRODUCTION

Remote healthcare has become a vital service with the growing rate of senior citizens. Health monitoring, rehabilitation, and assisted living for the elderly and medically challenged humans is an emerging challenge because they require seamless networking between people, medical instruments, and medical and social service providers. This motivates the need for affordable, low-power, reliable, and wearable devices that will improve the quality of life for many elderlies and physically challenged people. It will notify for the potential life-threatening events, also recognize the development of any disease. The hardware will be able to output the analogue values of sensed data which in turn will be synchronized with cloud server via middleware architecture. Wearable hardware will communicate with middleware architecture through wireless communication.

The necessary data processing on the cloud storage will identify the critical conditions as well as will create reports. It will show the continuous health status. In recent period, we observed a gradual rise in expectations of life in various part of the world, which leads to frequent increase in number of aged peoples. As per the report of United Nations the aged people will be about 2.0 billion (22% of the total world's population) by 2050. However, in a medical research survey found that it is 80% of the aged people elder than 65 and they suffering from at least one disease. Body sensors network provides a large convenience to detect the abnormality in patient's body and provide a proper treatment at time. This IoT system is a technique which encrypt the patient information and store at cloud database. Only authorized people have permit to access the cloud date with login passkey, using blynk IOT to see the vital signs value.

RELATED WORK

The development of the Internet of Things (IoT) has received much attention from both industry and academia. Sensors and devices connected to the IoT network can conveniently gather and collect information for further usage and analysis by IoT users. However, a large quantity of data produced by IoT devices contain sensitive

information, which leads to many challenging security issues in IoT systems. The most important one is how to efficiently and securely share IoT data with valid IoT users while forbidding others from obtaining the data. Our solution relies on a revocable attribute-based encryption (ABE) scheme to encrypt IoT data. The ABE technique makes fine- grained access control available on the encrypted IoT data, while the revocation technique makes invalid users unable to access future encrypted IoT data. [2] Pulse oximeter is a small, handy, pocket device which is simple and non-invasive method for examination of oxygen saturation (SpO2) in different parts ofthebody.1Pulse oximeter are one of the most commonly used tools in 5, critical care medicine especially important in ICU set up. SpO2 probe measures blood oxygen when placed onto a fingertip, or other peripheries like earlobe or foot tip and can be used to indicate whether a patient needs urgent medical care. [3]. Internet of Things (IoT) is flourishing and has penetrated deeply into people's daily life. With the seamless connection to the physical world, IoT provides tremendous opportunities to a wide range of applications. However, potential risks exist when the IoT system collects sensor data and uploads it to the Cloud. The leakage of private data can be severe with curious database administrator or malicious hackers who compromise the Cloud. In this work, we propose Kryptein, a compressive-sensing-based lightweight encryption scheme for Cloud-enabled IoT systems to secure the interaction between the IoT devices and the Cloud. [4]. This paper investigates the problem of joint multiuser admission control and beamforming optimization for multiple input single-output heterogeneous networks (HetNets). Considered is a HetNet where multiple newly deployed femtocell base stations have the coverage overlapped with that of an existing macrocell base-station. The design objective is to serve as many femto users (FUEs) as possible at their quality-of-service (QoS) requirements while maintaining the QoS requirements at the macro user. This paper then proposes three algorithmic schemes to perform multiuser admission control and beamforming optimization based on the levels of coordination between the MBS and FBSs. In Scheme I with full MBS-FBS coordination, a joint optimization framework is presented, and two solution approaches are proposed to determine the admission control and beamforming design for the FUEs in a centralized manner. In Scheme II with limited MBS-FBS coordination, a distributed algorithm that allows each FBS to unilaterally determine its admission control and beamforming strategy is proposed. [5]. Industrial Internet-of-Things (IoT), also known as Industry 4.0, is the integration of Internet of Things (IoT) technology into the industrial manufacturing system so that the connectivity, efficiency, and intelligence of factories and plants can be improved. From a cyber physical system (CPS) perspective, multiple systems are synthesized into IoT systems interactively to achieve the operator's design goals.In this paper, we leverage reinforcement learning techniques to automatically configure the control and networking systems under a dynamic industrial environment. We design three new policies based on the characteristics of industrial systems so that the reinforcement learning can converge rapidly.

PROPOSED SYSTEM

A. Block Diagram

The proposed system explains the IoT Based Patient Health Monitoring System using ESP8266 & Arduino. Our system can be uses sensors to measure and monitor numerous parameters such as temperature, heart rate, and blood oxygen level in hospitals and at home, the temperature sensor measures the temperature and heartbeat sensor is used to measure the heartbeat of the patient. SPO2 sensors are devices that detect the amount of oxygen in your blood and also oxygen saturation respectively. The results can be recorded using Arduino. The Arduino processes the code and displays it to LCD Display.

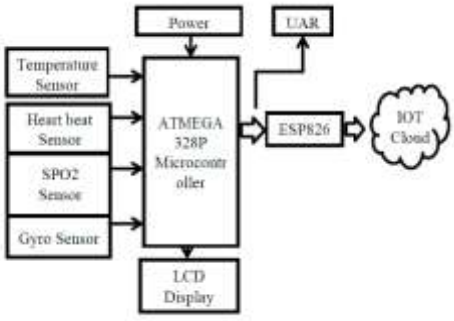


Figure 1. Block Diagram

B. Hardware Requirements

- Arduino ATMega 328P
- Node MCU ESP8266
- Temperature Sensor
- Heart pulse rate Sensor
- Humidity Sensor
- LCD display
- Gyro sensor
- Blood oxygen sensor

C. Software Requirements

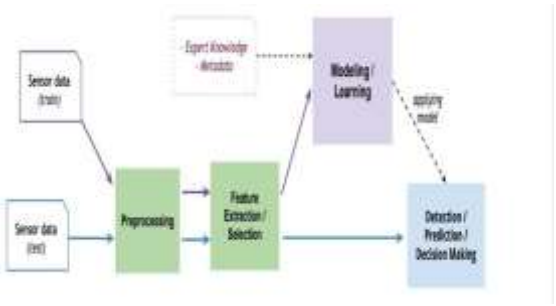
- Arduino Software (IDE)

D. Working

Real-time measurement of health parameters of critically ill patients such as heart rate, blood pressure, blood-oxygen saturation, temperature, and many other parameters has become a common feature of the healthcare monitoring system. There are many monitoring systems in medical centers used to collect and monitor patient's health, figure 3.1 shows the Critically ill patients require accurate monitoring and alarming system during their normal life. The existing paper proposed a venture which makes use of temperature and pulse rate sensor to degree the body temperature and pulse rate that is a critical parameter for seriously ill sufferers. So that health practitioner will monitor and may immediately take action straight away. If the circumstance turns into essential, the physician is alerted so that he can treat patient immediately. The proposed system explains the IoT Based Patient Health Monitoring System using ESP8266 & Arduino. Our system can be uses sensors to measure and monitor numerous parameters such as temperature, heart rate, and blood oxygen level in hospitals and at home, figure 3.2shows the temperature sensor measures the temperature and heartbeat sensor is used to measure the heartbeat of the patient. SPO2 sensors are devices that detect the amount of oxygen in your blood and also oxygen saturation respectively. The results can be recorded using Arduino. The Arduino processes the code and displays it to LCD Display.

RESULTS AND DISCUSSION

Here we proposed a cognitive radio system for health applications. It represents an example for smart hospital management approach to transfer medical data of the patient to the hospital based on priority of the patient health status and to monitor the patient health regularly. figure 5.1shows By this project the patient health can be monitored continuously to avoid emergency situation. The system can also be designed to efficiently track the location of the patients and elderly to provide timely medical services in an emergency. A embedded system is integration of hardware and software, the software used in
the embedded system is set of instructions which are termed as a program. The microprocessors or microcontrollers used in the hardware circuits of embedded systems are programmed to perform specific tasks by following the set of instructions.



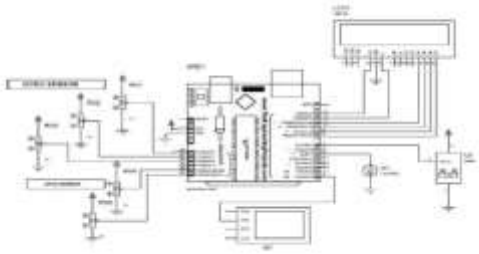


Figure 2 View of the proposed Circuit diagram

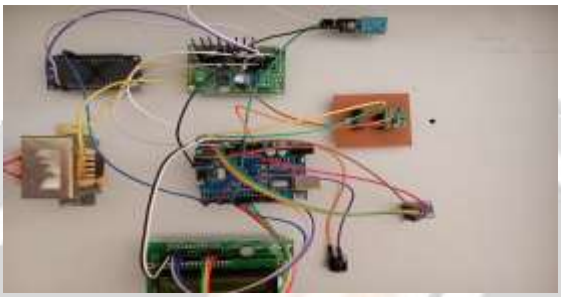


Figure 3 Prototype

II. CONCLUSION

The wearable sensors into the healthcare market have been relatively slow, despite the rapid development of devices in the lifestyle and fitness markets. However, advances in wearable sensor technology provide tremendous opportunities for deployment in healthcare, particularly in precision medicine, where wearable can enable high- quality, real-time measurements of an individual's health state. There are endless ways in which the IoT can improve medical care.These include reduced cost, and increased efficiency, accuracy, and performance. The benefits of using the IoT have made it possible to automate healthcare systems in the best way. Here we proposed a cognitive radio system for health applications. It represents an example for smart hospital management approach to transfer medical data of the patient to the hospital based on priority of the patient health status and to monitor the patient health regularly. By this project the patient health can be monitored continuously to avoid emergency situation.

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