

AN INTELLIGENT PATIENT HEALTH MONITORING IN A UBIQUITOUS WIRELESS BANET

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ABSTRACT

Now a day, even a small child suffering from health problem like Heart attack, Low pulse rate, Blood pressure etc. so today society demanding more smart healthcare monitoring system for their comfortableness. Wireless Body Area Network (WBAN) is promising technology to monitor patient's health. WBSN need specific function for healthcare application. This system can detect the abnormal conditions and also can send SMS to the consultants immediately. The main advantage of this system is to take care of patient before they reach their critical condition.

1. INTRODUCTION

Wireless body area network system can help people by providing healthcare service like medical monitoring, medical data access, and communicating with healthcare provider in emergency situation

through the SMS or GPRS. This is a attempt to provide a device which will continuously monitor the body temperature and drip status of the patient. This system will also use Zig-bee technology. All these parameter are continuously measured using appropriate efficient low cost modules. Wireless body Area Network can provide long-term health monitoring without disturbing the privacy of a patient. The main aim of this system is not only to inform about the ICU and General ward patient condition details to the doctor, it is also send the details who are suffering in critical condition from home and also anywhere. In a large setup like clinical center or hospital where a single doctor attends many patients, it is difficult to keep informed about the critical conditions developed in each of the patient. This system is very helpful to monitor and to give patient status to the doctor easily.

2. WHAT IS WIRELESS BODY AREA NETWORK?

A Body Area Network (BAN) is also referred as Wireless Body Area Network (WBAN) or Body Sensor Network (BSN). The development of WBAN technology started around 1995 around the idea of using Wireless Personal Area Network (WPAN) technologies to implement communication on, near, and around the human body. A WBAN system also use WPAN wireless technologies as gateways to reach longer ranges. It is a wireless network of wearable computing devices. BAN device may be embedded inside the body or may be wearable on the body in fixed position. Humans can carry in different position, in clothing pockets, in hand or in various bags.

3. CONCEPT

The rapid growth in physiological sensors, wireless communication enabled a new generation of wireless sensor networks, now used for purposes such as monitoring traffic, infrastructure, health etc. The BAN is interdisciplinary area which allow inexpensive and continuous health monitoring with real time updates of medical records. The patient health information monitored and transmit

wirelessly to an external processing unit. The device transmit information in real time to the doctors throughout the world. If any emergency detected, the physician will immediately inform the patient through the computer system by sending SMS or alarms.

4. APPLICATIONS

A BAN network in place on patient can alert the hospital before they suffer from heart attack, through measuring changes in their vital signs. The patient can insert the sensor inside the body to monitor pulse rate as shown in fig 3.

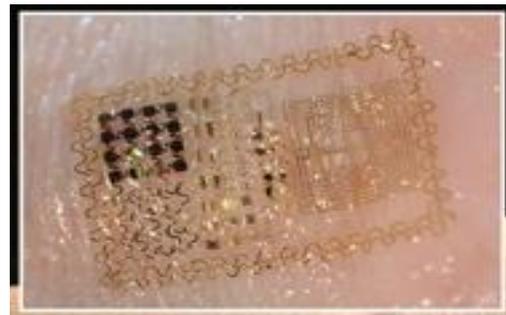


Fig 3. Sensor to check pulse rate.

There is some other application of this technology like sports, military or security.

5. SECURITY ISSUES IN WBAN

It is difficult to provide strong security for WBAN. There are more security protocols are there in general sensor networks. Security protocol for sensor

network is used to achieve security requirement like authenticity, confidentiality etc.. it use several symmetric key to encrypt the data. There is a deal with a scope of limited WBAN. The goal of WBAN is to implementation of body area network that can contact with everywhere in, on, and out the human body.

5. BODY AREA SENSING

Sensing is fundamental to all the types of network. Sensors falls in three categories:

1. Physiological
2. Biokinetic
3. Ambient.

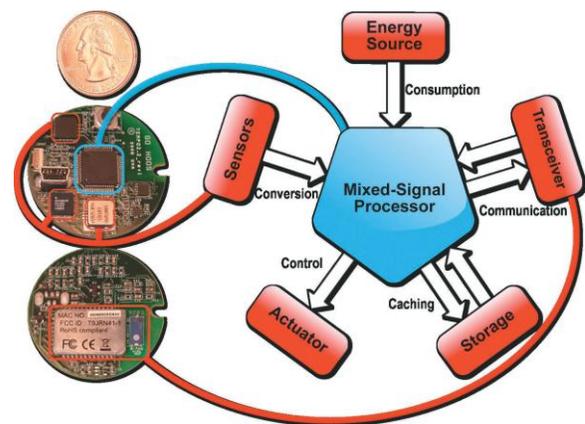
Physiological sensors is used to measure blood pressure, glucose monitoring, body temperature, electrocardiography etc.

Biokinetic sensors is used to measure acceleration and angular rate of rotation from human movement.

Ambient sensors measure environmental phenomena like humidity, sound level, light etc.

Signal Processing

Signal processing need to extract valuable information from capturing data. BAN may need capture, process and forward information to different stakeholders.



The power consumption of wireless transceivers and microprocessors in popular BAN and WSN platform is used to transmit the data correctly. Microcontroller is used to send the data using GPRS. By the use of that, the doctor can view the patient health details wherever the patient will be.

6. WEARABLE BANET

To form a wireless body area network, it is proposed that each user should wear a wireless body sensor which are technically placed on his/her body. The primary functions of these sensor nodes are

to transfer relevant data to a personal server through wireless personal network implemented using Zig-Bee. The sensors fitted on the body, that are supposed to measure blood pressure, heart beats, liver, functioning of lungs etc. *fig1* shows various sensors such as ECG, accelerometer, blood pressure monitor are fitted on a wearable suit to monitor a patient every second. The sensor information collected and transferred wirelessly to a smart sensor, that analyzes the ECG and other sensor data locally. The smart sensor process the sensor data and monitor patient's well-being, in case of emergency it will automatically generate the alarms and forward the analyzed data to nearest gateway with the help of network connectors in multi-hop fashion. In indoor environment the network connector considered as a sensor with higher processing capacity.

The following tasks are supposed to perform by network connector (NC):

- Control and monitor WBAN nodes.
- Processing and integration of data from various sensor providing better insight into the user state.
- Initialization, configuration, and synchronization of nodes.

- Secure communication with remote health care provider via gateway nodes.

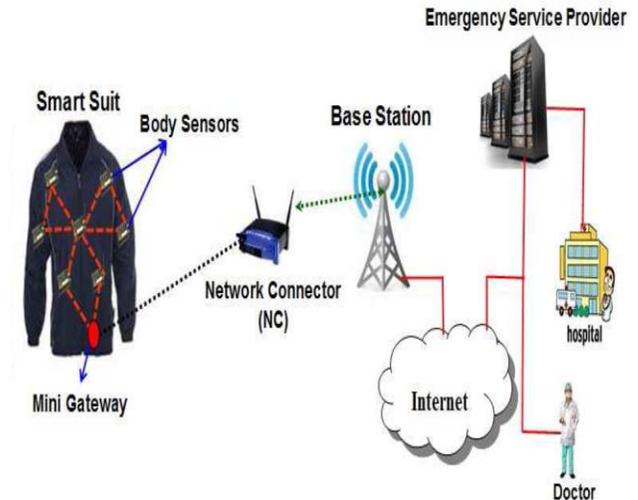
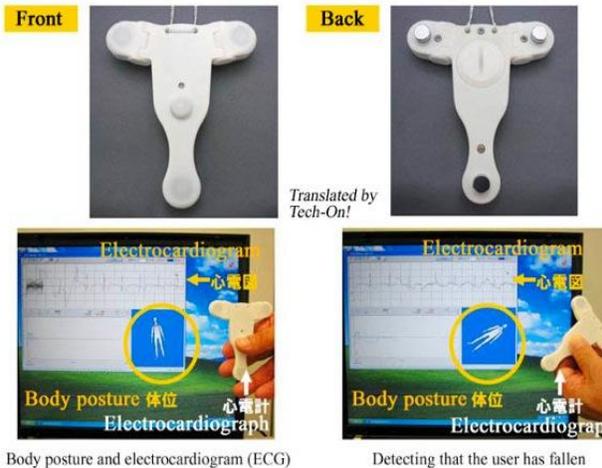


Fig 1. Wearable sensors to health monitoring.

The base stations are powerful sensors with longer communication range, higher processing and more battery power. Those are connected to the internet to transfer the data to the Emergency Service Provider (ESP) and doctor.

Fig 2 shows about another wearable sensor. By using this sensor, doctors can find the heart rate of patient in the hospital monitor. If the patient getting down from his/her normal conditions, the system represent the body posture of that patient and pulse rate.



So through this monitoring system the doctor can give the suggestion to the patient before they enter into the critical condition.

CONCLUSION

This system develops a ubiquitous healthcare system that allows the patient to be managed and have their health monitor anytime and anywhere. The patient record can be sensed and derived personally from this patient monitoring system and it cannot be mixed with other patient. The WBAN security must be implemented with low computational complexity and high power efficiency. Where ever the patient travelling, the doctors can monitor his/her health condition. There are many other vital parameter to monitored in a patient like heartbeat, pulse rate, breathing etc. By the help of this system pregnant ladies can use this concept from home itself and the doctor

can monitor their health condition from their clinic itself. So it is helpful to everyone who are suffering from health problem

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