

# A Novel Approach to Monitor the Health of a Critical Patient through WBAN

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**Abstract:** WBAN is becoming significant technology in many fields such as medical, entertainment, sports, electronics, military applications etc. It is basically a short range communication in or on a human body. Recent advances in WBAN making it more facilitated in both hospital and home care environment. And this helps to provide better health care facilities for the human being. Basically, WBAN is a network of biomedical sensors and these sensors are attached or worn out by the human body. It brings out a set of changes in WBAN systems including system's scalability, efficiency, lifetime, security, sensors density etc. to make it more efficient. Many studies were performed to make the WBAN system secure, real-time monitored, flexible, and power efficient for suitable health care applications. To efficiently control and monitor a person's health as well as to reduce cost and maintenance a new wireless communication is developed as a new advanced technology for better health monitoring. WBAN in medical field provides many advantages as compared to other networks such as flexibility and economic for both users as well as for server.

**Keywords:** wireless body area network, wireless sensor network, medical health care.

## I. INTRODUCTION

Wireless Body Area Network (WBAN) provides a great opportunity for remote health monitoring. WBAN is a network of wireless biomedical sensors and these sensors are attached to the human body. WBANs have been researched in many fields such as medical, entertainment, sports and electronics. In the medical field, WBANs are used to monitor and record body parameters of the patient. It provides accurate and efficient data to the server through wireless link over a wide range of communication. With the tremendous advancement in wireless communication, the sensor network has also been widely used in many applications including medicinal and healthcare. WBAN is a special network that is designed for the functioning of separately connected different sensors that are located inside or outside the body of the user. WBAN in medical field as compared to other networks is flexible and cost-effective for both users as well as for the server.

By using WBAN system the mobility of the patient is possible, thus providing a location independent facility. So, the server can monitor the patient at a far place through wireless communication. A WBAN system consists of a number of independent nodes that can be used to search and select a suitable communication network to spread data to a far-off database server for storage. With the help of WBAN, patients can be regularly and easily monitored, while carrying out their regular activities at their homes thus, monitoring many patients easily in a short duration of time. A WBAN connects number of independent nodes (e.g. sensors and actuators) that are placed either beneath the skin or worn by the user. This wireless network with different nodes expands over

the whole body which are connected by a wireless communication network with real time accurate and reliable data. Body network transfers the data with these nodes which operate under limited energy and have limited availability of power. To avoid this limitation of energy and to make the system more efficient different routing protocols can be used.

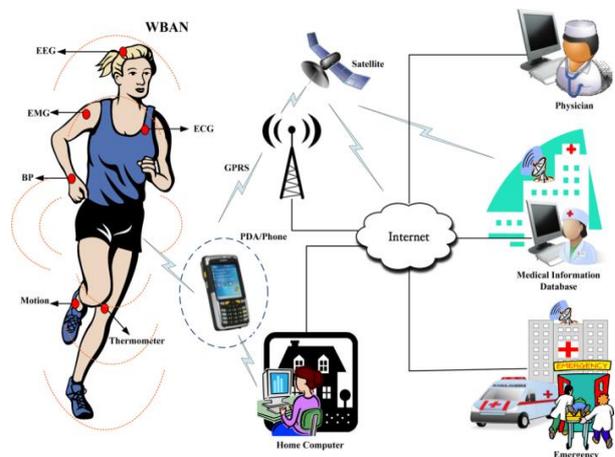


Fig. 1. An overview of the WBAN system concept

## II. WSN TO WBAN

WSN is rapidly growing in the research field because of their tiny size and wireless communication. Wireless sensor network consists of self-organized, highly distributed which is suited for number of applications such as military applications, health monitoring, Environmental

applications, home applications etc. There are number of tiny and cheap nodes in WSNs to compute, sense and communication. Basically wireless sensor networks were made for military applications for the security purposes. Now, WSN becomes crucial for health care applications [2].

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Fig. 2. WBAN and its environment

A typical Wireless body area Networks consists of small, cheap, lightweight, active and sensing devices that are attached on or implant in the human body which helps to establish a wireless communication link and monitors the

different body parameters. These devices are environment friendly and having long life time of power supply.

### III. PROPOSED WORK

As WBANs is an emerging technology in computer world and plays a vital role in monitoring health services. The main purpose of this research is to reduce the loads on hospitals and giving priority to the emergency cases. The proposed algorithm will overcome the following problems:

1. To get rid of any human errors in medical emergencies and critical situations.
2. To avoid time wastage for regular patients and other emergency cases.

Here, in figure3 a flow chart showing different steps the proposee system. This system will helpful for the emergency cases by giving priority to the person whose condition is critical according to measured values.

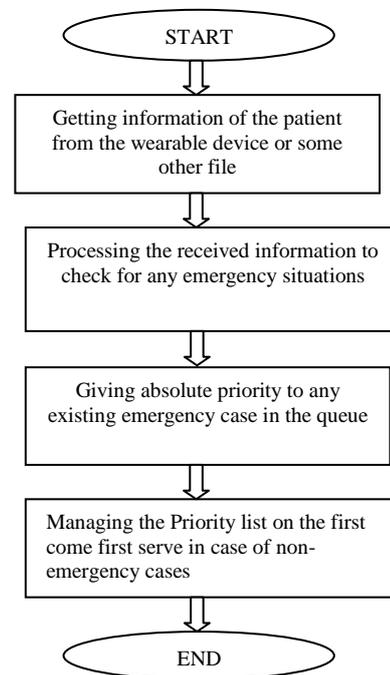


Fig. 3. Flow Chart of the Proposed System

WBAN is a promising technique for medical supervision. It was proposed to measure different parameters of number of patient to check their criticality and according to that give them priority for treatment. This system helps to save the time and giving priority to the emergency cases.

First Getting information of the patient from a wearable device for e.g. a wearable wrist band then it measure different body parameters for processing on the information received and to check for any emergency case. Give preference to the emergency case and also give the basic treatment urgently. If there is no emergency case then give priority to the first come first serve. In this proposed algorithm a system is designed accordingly when

patient enters to the hospital then the temperature and heart rate of the patient is checked, then a unique id is generated corresponding to every patient. Then a comparison is performed for every patient to find out the patient either with higher temperature or higher heart rate. On the basis of these two parameters patient is selected for treatment. The advantage of this system is that the patient with critical condition does not have to wait for his turn. From the results it is observed and concluded that this system performs well as compare to earlier systems.

#### IV.RESULTS

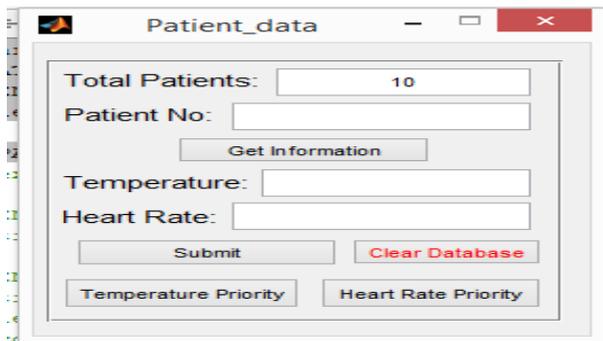


Fig.4. Number of patients enters

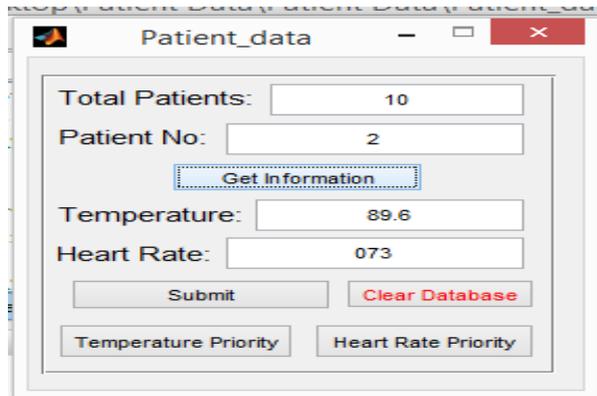


Fig.5. Measured values of patient

Information saved and after receiving data of other patients a set of values created. From that values system finds the priority according to temperature and heart rate.

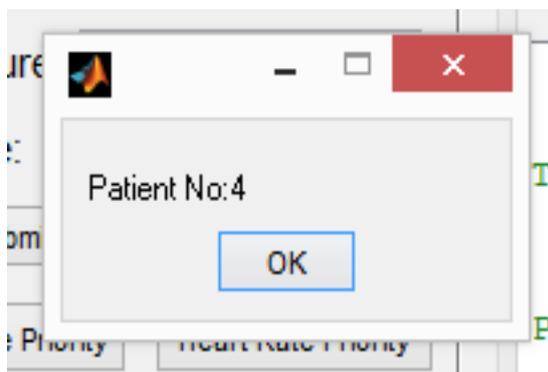


Fig.6. Priority given to 4<sup>th</sup> patient according to measured values

#### V. APPLICATIONS

1. **Health monitoring at home:** - This type of device can be used by the elder people to regularly monitor their health related parameters and transmit the data to the server so that immediate action can be taken by their family members in case of emergency.

This type of device can be used by pregnant ladies who live in nuclear families to regularly monitor their health related parameters and transmit the data to the husband through wearable device so that immediate action can be taken.

2. **Police recruitment in India-** It can be used for recruiting people in police department where they need to go through physical examination. By using this wearable band, health related parameters can be measured which would be helpful for finding critical people and they would be prohibited for physical test.

#### VI.CONCLUSION

In this project a hospital management system is designed which serves the patients on the basis of their condition. When the patient enters the hospital the system scans the basic readings i.e. temperature and heart rate of the patient. After that, a unique ID is generated corresponding to every patient. Then a comparison is performed for every patient to find out whether the patient has a higher temperature or heart rate. On the basis of these two parameters, patient is selected for treatment with preference given to critical patients. The advantage of this system is that the patient with critical condition does not have to wait for his turn. From the results it is observed and concluded that this system performs well as compared to earlier systems.

#### REFERENCES

- [1] Saleem, Shahnaz, Sana Ullah, and Kyung Sup Kwak." A study of IEEE802.15.4 security framework for wireless body area network." Sensors 11.2 (2011): 1383-1395.
- [2] Barakah, Deena M., and Muhammad Ammad-uddin." A survey of challenges and applications of wireless body area network (WBAN) and role of a virtual doctor server in existing architecture." Intelligent System, Modelling and Simulation(ISMS), 2012 Third International Conference on. IEEE,2012.
- [3] Aileni, Raluca Maria, Pascal Bruniaux, and Rodica Strungaru. "Wearable sensors modeling for healthcare." Fundamentals of Electrical Engineering (ISFEE), 2014 International Symposium on. IEEE, 2014.