



# **A Review on WBANs Measuring Fatigue of Soldiers and Different Protocols**

Sandip D. Kale<sup>1</sup>, Prof. D. L. Bhuyar<sup>2</sup>

PG Student [ECT], CSMSS College of Engineering, Aurangabad, MS, India<sup>1</sup>

Assistant Professor, Dept. of ECT, CSMSS College of Engineering, Aurangabad, MS, India<sup>2</sup>

**ABSTRACT:** Wireless body area networks i.e. WBANs is a wireless sensor networks and are useful now a days. WBANs are capable of collecting continuous real time health data of human body. These WBANs systems process this data, aggregate, store and sent it to centralized healthcare database system or physician or doctors. WBANs systems are widely used for healthcare, entertainment, sport, research, business, industrial, viable lifestyles and military or defense application. WBAN provides real-time health monitoring for a long period of time. The paper also discusses the various works done in the WBAN systems.

**KEYWORDS:** WBAN, Human Body, Healthcare Database, Real-Time.

## **I.INTRODUCTION**

Wireless body area networks i.e. WBANs is advanced technology of wireless networks and useful in the specific communication system application. WBANs systems are widely used for healthcare, entertainment, sport, research, business, industrial, viable lifestyles and military or defense application. These type of systems are consists of small and intelligent devices which are attached on the human body and also these devices are capable to communicate with central system server continuously hence known as monitoring and real-time feedback systems. In the Wireless body area networks systems there are two types of devices are used sensors and actuators, where as the sensors are used to measure certain parameters of the human body either may externally or internally and actuators take some specific actions according to the data they receive from the sensors.

Mostly the sensors are used to measuring the heartbeat, body temperature, Glucose level or recording an ECG (electrocardiogram) and on the other side an actuator equipped with a built-in reservoir. Fig. 1 shows the general structure block diagram of WBANs. This block diagram consists of three levels. Level 1 contains human body and different sensors. Sensors like ECG sensors, glucose detection sensors, Oxygen level sensor, Electromyography sensor etc. Level 2 contains a Centralized Database System and Network; it may be wired or wireless network. This level collects measured parameters of the body and communicates with Level 3. Level 3 contains healthcare system or physician or doctors.

# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 3, March 2016

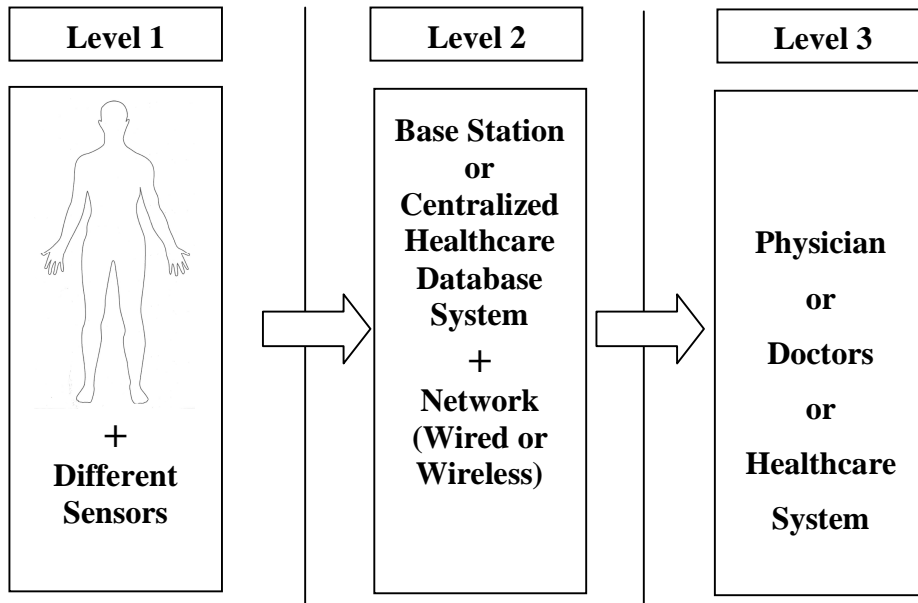


Fig. 1 General Structure of WBANs.

## II. RELATED WORK

Kalyani P. Wagh and Supriya O. Rajankar [1] developed Real-Time Health Monitoring System using Wireless Body Area Sensor Networks (WBASN). This system provides doctor with ability to remotely monitor the patient health, diagnose it and accordingly treat the patient. Fig. 2 shows proposed system for WBAN. The WBAN architecture contains different layers like Base Layer, Intermediate Data Collector/ Aggregator Layer, Intermediate Data Collector/ Aggregator Layer and Server (Web based or Intranet). The first layer i.e. Base Layer consists of different biosensors, which are attached to the human body and continuously collects the vital parameters, processes and sends the collected data to next layer. Base Layer also contains several components like sensor hardware, a power unit, a processor, memory and a transmitter or transceiver. Second layer i.e. Aggregator Layer collects data from individual sensor or data aggregator and sends to the base station. Base Station Layer sends all collected data wirelessly to the server. This server gathers all the information acquired by the sensors and actuators and informs the user or doctor through internet. MAC protocols is used in this system, this MAC protocols in WBAN is to reduce power consumption and also MAC layer provides a channel access control mechanism to avoid collisions and to maximize throughput. MAC is useful in packet delivery schedule and packet loss probability.

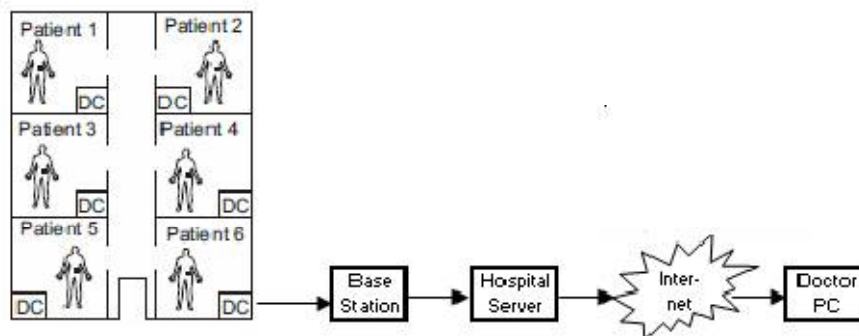


Fig.2 Proposed system for WBAN [2].

# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 3, March 2016

Narendra Kumar et al. [2], developed an wearable sensors for remote healthcare monitoring system. In this proposed system medical sensors were used to collect physiological data from patients. This collected data is send to the Intelligent Personal digital Assistant (IPDA). Fig. 3 shows architecture of wearable sensors for remote healthcare monitoring system. First layer is the core of this system known as the patient. First layer also contains wearable sensors; which are attached to the patient body to monitor changes in patient’s vital signs closely and provide real time feedback to help maintain an optimal health status and in this way wireless body area network (WBAN) is formed. In the second layer contains the personal server interfaces the WBAN nodes through a communication protocol using ZigBee. The third layer is MSHM i.e. Medical Server for Healthcare Monitoring. MSHM receives data from the personal server i.e. second layer; which is the backbone of the entire architecture. It is situated at medical centers where medical services are provided.

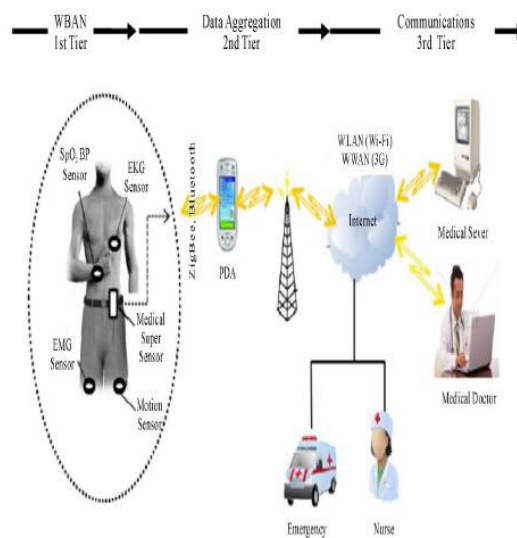


Fig. 3 Architecture of Wearable Sensors for Remote Healthcare Monitoring System [2].

### III. ROUTING PROTOCOLS

Wireless Sensor Network (WSN) energy consumption problem will occurs and because of the power restriction of sensor nodes so that efficient routing is a critical approach to saving node’s energy. Hence different protocols were used by the different developers in the existing system. Different developers used different protocols in their systems like Tree Routing (TR), Energy Aware Routing (EAR), Cluster Based Routing (CBR), low-energy adaptive clustering hierarchy (LEACH), Chain-Based Hierarchical Routing (CHIRON), PEGASIS, Fault-Tolerant Target Tracking (FTTT), MTE, distance aware intelligent clustering protocol (DAIC), etc.

Soyoung Hwang et al. [3] proposes an energy-aware data gathering method called Energy-aware Tree Routing (ETR) in Wireless Sensor Networks, because there are many routing protocols have been proposed for sensor networks where energy awareness and reliability are essential design issues. Energy Aware Routing (EAR) is improved from DD and it is a routing scheme which provides uniform energy consumption across the network. It also reliably transmits the data through a detour path when there is link or node failure. The results of the proposed system show that the proposed method outperformed traditional Tree Routing (TR) by 23%~55% in network lifetime.

Samer A. B. Awwad et al. [4] propose cluster based routing protocol for mobile nodes in wireless sensor network.

In Wireless Sensor Network (WSN) packet are lost due to mobility of the sensor nodes is one of main challenges. To overcome this problem adaptive Time Division Multiple Access i.e. TDMA scheduling and round free cluster head protocol called Cluster Based Routing (CBR) protocol for Mobile Nodes in Wireless Sensor network (CBR Mobile-WSN) was used in this proposed system. Wireless Sensor Network (WSN) with energy consumption problem will occurs due to the mobility of the sensor nodes. In this protocol cluster head receive data from member during the TDMA allocated time slot as well as received from sensor nodes .in this proposed system CBR Mobile-WSN protocol



# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 3, March 2016

is evaluated using MATLAB. From the result it is observed that the proposed protocol reduces the packet loss by 25% compared to LEACH Mobile protocol.

Kuong-Ho Chen et al. [5] proposed Chain-Based Hierarchical Routing Protocol also known as CHIRON for the Wireless Sensor Networks. The working of CHIRON is, first split the sensing field into a number of smaller areas. Once this splitting is done, it creates multiple shorter chains to reduce the data transmission delay and redundant path, and therefore effectively conserve the node energy and prolong the network lifetime. The proposed CHIRON can achieve about 15% and 168% improvements on average data propagation delay, 30% and 65% improvements on redundant transmission path as compared to the Enhanced PEGASIS and PEGASIS protocol respectively. By using this CHIRON protocol network lifetime can also be extended to about 14%~7% and 50%~23%.

Chong Wang et al [6] provide LEACH protocol for application-specific wireless sensor networks which employs localized coordination to balance the energy usage. This paper provides an improved LEACH protocol focuses on saving the energy cost induced due to redundant nodes and balancing the energy consumption among sensor nodes by splitting large clusters into smaller ones. LEACH provides different advantages like it is completely distributed, requiring no control information from the base station (BS), and nodes do not require knowledge of the global network. Also it runs with many rounds and each round begins with a set-up phase when the clusters are organized, followed by a steady-state phase when data are transferred from the nodes to the cluster head and on to the Base Station (BS). Simulation results, compared with LEACH, demonstrate that the proposed protocol can reduce energy consumption and hence prolong the lifetime of WSN.

## VI.CONCLUSION

In this paper, we reviewed the key aspects of Wireless body area networks i.e. WBANs is advanced technology of wireless networks and useful in the specific communication system application. We also discussed energy consumption problem in routing protocol section of this paper with different existing protocol for WBAN. Finally we outlined some of the key aspects of Wireless body area networks (WBAN) and the routing protocol.

## REFERENCES

- [1] Kalyani P. Wagh and Supriya O. Rajankar, "Wireless Body Area Network: Real-Time Health Monitoring System", International Journal of Computer Applications (IJCA), 7-8 April 2012, pp. 7-11.
- [2] Narendra Kumar, Alok Aggrawal and Nidhi Gupta, "Wearable Sensors for Remote Healthcare Monitoring System", International Journal of Engineering Trends and Technology, Volume 3, Issue 1, 2012, pp.37-42.
- [3] Soyoun Hwang, Gwang-Ja Jin, Changsub Shin and Bongsoo Kim, "Energy-aware Data Gathering in Wireless Sensor Networks", Consumer Communications and Networking Conference, 6th IEEE, 2009, pp. 1 – 4.
- [4] Samer A. B. Awwad, Chee K. Ng, Nor K. Noordin, and Mohd. Fadlee A. Rasid, "Cluster Based Routing Protocol for Mobile Nodes in Wireless Sensor Network", Collaborative Technologies and Systems, 2009. CTS '09. International Symposium on, 2009, pp. 233 – 241.
- [5] Kuong-Ho Chen, Jyh-Ming Huang and Chieh-Chuan Hsiao, "CHIRON: An Energy-Efficient Chain-Based Hierarchical Routing Protocol in Wireless Sensor Networks", Wireless Telecommunications Symposium, 2009, pp.1-5.
- [6] Chong Wang, Jiakang Liu, Jingming Kuang, Abdul Sattar Malik and Huihui Xiang, "An Improved LEACH Protocol for Application-Specific Wireless Sensor Networks", Wireless Communications, Networking and Mobile Computing, WiCom '09, 5th International Conference, 2009, pp.1-5.