Biosignal Processing For Measuring The Physiological Parameters By Using Tms320c6416 Processor With Wbasn

N.Mohanraj[1], A.Srinivasan[2], D.Balasubramaniam[3]

PG Student, Digital Signal Processing, Department of ECE, G.K.M College of Engineering and Technology, India[1]
Associate Professor, Department of ECE, G.K.M College of Engineering and Technology, India[2]
Associate Professor, Department of ECE, G.K.M College of Engineering and Technology, India[3]

Abstract— *As today people facing many challenges on the health conditions due to various reasons. For this new technology introduced day to day life but it is not reached to the people or users and also not aware of it. Now people needs to know their health conditions by visiting to hospital and need to spend time on it. This is really as hazardous situation to the users. In order to solve the issue this project can be implemented. This Project is help to interact between Patients and Medical Staff to analysis the Patient Heat beat rate, Blood Pressure, Respiration, Body Temperature, Brain Activities and Muscle Activity through Wireless Body Area Sensor Network (WBASN) by using TMS320C6416 Processor. By this the Patient can monitor them individually when needed and take care of the health conditions. In this technology developed world, time is so precious. By this we can save time and data's can be stored and retrieved when needed. Future work required advancing the field towards accurate measurement of physiological parameters of human body with reliable systems and prospective characterizing is being discussed.*

Keywords— *WBASN, Wireless Sensors, TMS320C6416 Processor.*

I. INTRODUCTION

In today's time, people are facing multiple physical, physiological and psychological problems. Due to the advancement in technology and the researches carried out in medical advancement, the proximity of these actors underlying the different circumstances of Human Body has been solved to an extent.

This paper mainly revolves around the industrial workers making assurance of their health maintenance and safety during the work being carried by them in the industry or factory. The design of physiological measurement systems has been a growing research interest in the last decade, due to the potential applications in medicines, sports and security. The adoption of mobile health-care technology is promising to enhance the quality of life for the regular problems in industrial labors and the elderly, as well as healthy individuals. Furthermore, it offers the potential to monitor the current status of the labor and will help them to get rid of those problems which used to jolt them a lot and this can be done by using regular monitoring in changes of their physiological parameters and keep a record in their changes in the health during their working hours.

Wired and wireless sensing units are the two units on which many advancements has been done and again both of these things are associated with the measurement of physiological parameters of human body in actual to come up with better results. Wireless sensing technology helps address various drawbacks associated with wired sensors that are commonly used in hospitals and emergency rooms to monitor patients. The all too familiar jumble of wires attached to a patient is not only uncomfortable for patients leading to restricted mobility and more anxiety, but is also hard to manage for the staff. Quite common are deliberate disconnections of sensors by tired patients and failures to reattach sensors properly as patients are moved around in a hospital and handed off across different units.

Wireless sensing hardware that are less noticeable and have persistent network connectivity to backend medical record systems help reduce the tangles of wires and patient anxiety, while also reducing the occurrence of errors. Also At-home and mobile aging because as people age, they experience a variety of cognitive, physical, and social changes that challenge their health, independence, and quality of life. Diseases such as diabetes, asthma, chronic obstructive pulmonary disease, congestive heart failure, and memory decline are challenging to monitor and treat. These diseases can benefit from patients taking an active role in the monitoring process.

Wirelessly networked sensors embedded in people's living spaces or carried on the person can collect information about personal physical, physiological, and behavioral states and patterns in real-time and everywhere. Such data can also be correlated with social and environmental context. From such living records, useful inferences about health and wellbeing can be drawn. This can be used for self-awareness and individual

analysis to assist in making behavior changes, and to share with caregivers for early detection and intervention. At The same time such procedures are effective and economic ways of monitoring age-related illnesses.

II.   SYSTEM ARCHITECTURE

The system architecture of the proposed wearable sensors for remote healthcare monitoring system is composed of three tiers as shown in Figure 1.0 below.
1) Wireless Body Area Network (WBAN);
2) Personal Server (PPS) using IPDA;
3) Medical Server for Healthcare Monitoring (MSHM)
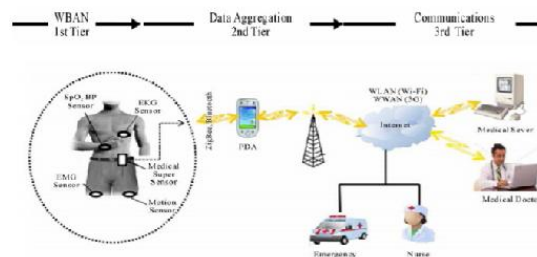
Figure.1.0. Architecture of wearable sensors for remote healthcare monitoring system

2.1. First Tier

The core of this system is the user called the patient. Wearable sensors are attacked to the patient body forming Wireless body area network (WBAN) to monitor changes in patient's vital signs closely and provide real time feedback to help maintain an optimal health status. The medical sensors typically consist of five main components:

1) **Sensor** (2) **TMS320C6416 Processor** (3) **Memory** (4) **Radio Transceiver** (5) **Power supply**

Sensor nodes can sense, sample, and process one or more physiological signals. For example, an electrocardiography (ECG) sensor can be used for monitoring heart activity a blood pressure sensor can be used for monitoring blood pressure, a breathing sensor for monitoring respiration, an electromyogram (EMG) sensor for monitoring muscle activity, and an electroenphalogram (EEG) sensor for monitoring brain electrical arrive for each sensor. In the design above, a sophisticated sensor is integrated into the WBAN called Medical Super Sensor (MSS). This sensor has more memory, processing and communication capabilities than other sensor nodes as shown in **Figure 1.0** above. MSS uses a radio frequency to communicate with other body sensors and ZigBee is used as a communication protocol to communicate with the Personal Server ZigBee/IEEE 802.15.4 standard; have a short range, low power consumption, low cost technology, capable of handling large sensor networks up to 65,000 nodes and reliable data transfer. Therefore, ZigBee is adopted to transmit physiological signals from WBAN to the patient server. Other reasons why ZigBee technology is used: security, scalability and interoperability. However, Medical Super-Sensor (MSS) unobtrusively samples, collects multiple sensed vital signs by the body sensors, filtering out all redundant data thereby reducing large volume of data transmitted by BSNs, store them temporarily, process and transfer the relevant patient's data to a personal server through wireless personal implemented using ZigBee/IEEE 802.15.4. This improves overall bandwidth utilization as well as reducing power consumption of the BSs because each nodes does not need to transmit sensed data to the IPDA but to the collector which is MSS and it is closer to the BSs than IPDA and extending battery life of each sensor node.

2.2. Second Tier

The personal server interfaces the WBAN nodes through a communication protocol using ZigBee. It is implemented on an Intelligent Personal Digital Assistant (IPDA). It holds patient authentication information and is configured with the medical server IP address in order to interface the medical services. It collects physiological vital signals from WBAN, processes them, and prioritizes the transmission of critical data when there is sudden clinical change in the current patient condition and data content for example changes in cardiovascular signals, temperature, oxygen saturation, and forward it to the medical server. 3G communications is used to connect personal server and third tier together but other long range communications protocols can also be used like GPRS, WWAN. In order for IPDA to improve the overall quality of service for data transmission, in terms of latency, bandwidth and power consumption a differentiated service based on two schemes are presented. They are Priority Scheduling and Data Compression. Table 2.0 gives various physiological signals and their arrival time.

Table 1.0 Data Obtained

Physiological Signal	Parameter Range	Data Rate(Kbps)	Data Arrival Time(ms)
Electrocardiograph(ECG)	0.5 – 4 mv	6.0	0.002
Blood Flow	1 – 300 ml/s	0.48	0.025
Blood Pressure	10 - 400 mmHg	1.2	0.01
Body Temperature	32 - 40∘	0.0024	5

It prioritizes all the received physiological data and send to the medical server based on the priority order so that the medical staff will be adequately prepared before the patient gets to them or send ambulance immediately to pick the patient so as to save his/her life.

2.3. Third Tier
The third tier is called Medical Server for Healthcare Monitoring (MSHM). It receives data from the personal server. It is situated at medical centers where medical services are provided. It is intelligent because it is capable of learning patient specific thresholds and learns from previous treatment records of a patient [15]. MSHM keeps electronic medical records (EMRs) of registered patients, which are accessible by different medical staff, including general practitioners, specialists and doctors from their offices in the hospital over the internet. The present state of the patient can be observed by the medical staff. MSHM is responsible for user authentication, accepting data from personal server, format and insert the received data into corresponding EMRs, analyze the data patterns. The patient's physician can access the data and its patterns from his/her office via the intranet/internet and examine it to ensure the patient is within expected health metrics. If the received data is out of range (*i.e.* deviation from threshold) or recognize serious health anomalies condition, medical staff in the emergency unit can be notified to take necessary actions. However, if the patient is in the remote area, the specialist doctor will observe the physiological data of the patient diagnose it prescribe the necessary treatment and drugs for the patient. This information will sent back to the doctor in the remote hospital via the internet. The MSHM also provides feedback instructions to the patient, such as physician's prescribed exercises. Figure 2.0. is shows as overview of wearable sensors for remote healthcare monitoring system.

Figure.2.0. Overview of wearable sensors for remote healthcare monitoring system

III. SUMMARY OF HEALTH APPLICATIONS

A list of healthcare applications enabled by WSN technologies include:
(1)Monitoring in mass-casualty disasters,
(2)Assistance with motor and sensory decline,
(3)Large-scale in-field medical and behavioral studies,
(4)Vital sign monitoring in hospitals,
(5)At-home and mobile aging health challenges monitoring and subsequent reporting.

IV. CONSLUSION

In this paper, the architecture of wearable sensors for remote healthcare monitoring system which composed of three tiers was described. A differentiated services scheme based on priority scheduling and data compression methods were presented in second tier. The method not only reduces transmission delay of physiological vital signs but also improves its bandwidth utilization. The role of wireless technology in healthcare applications is expected to become more important with an increase in deployment of mobile devices and wireless networks. This new technology has potential to provide many ad-vantages to patients, medical staff, and society at large through continuous monitoring of various physiological vital signs and provide real-time feedback to the user and the medical staff.

V. SCOPE OF THE STUDY

The advancements in technologies are always being the part of the research which is being added in life of the society. The parts of research have been carried in for the measurement of physiological parameters of human body which is to be recorded on mobile devices has taken leap involving the use of wearable technologies. There could be possibility which can be further part of extension to integrate the active clothing which would be a proposed system in itself to measure human physiological; and environmental parameters. It could be prejudice on the basis development which would be carried out in the field of measuring of physiological parameters of human body through the process of sensor technology helping doctors in the clinics as well as industrial workers working in an industry. WBASN technologies sourcing on-body/in-body networked systems. The technical advancement in the field of medical field is being enriched with all these implementations of technologies and would be great attire for getting a help in measuring of physiological parameters of human body recorded on any platform on the basis of environmental parameters.

REFERENCES

[1]. K. Malhi, .Wireless sensors network based physiological parameters monitoring system, M.S. thesis, Massey University, Palmerton, New Zealand, 2010.
[2]. S. C. Mukhopadhyay and G. Sen Gupta "Towards the development of an Integrated Sensing System for Health Monitoring" 978-1-4244-1938-8/08/$25.00 C 2008 IEEE.
[3]. Ademola Philip Abidoye, Nureni Ayofe Azeez, Ademola Olusola Adesina, Kehinde K. Agbele, and Henry O. Nyongesa, Journal of Sensor Technology, 2011, 1, 22-28, doi:10.4236/jst.2011.12004 Published Online June 2011 http://www.SciRP.org/journal/jst.
[4]. S. Vijendra, "Efficient Clustering for High Dimensional Data: Subspace Based Clustering and Density Based Clustering," Information Technology Journal, Vol. 10, No. 6, 2011, pp. 1092-1105. doi:10.3923/itj.2011.1092.1105.
[5]. M. Seyyed, et al., "Fuzzy Logic Expert Systems in Hospital: A Foundation View," Journal of Applied Sciences, Vol. 11, No. 12, 2011, pp. 2106-2110.
[6]. J. Ko, J. Lim, Y. Chen, R. Musaloiu-E.A. Terzis, G. Masson, T. Gao, W. Destler, L. Selavo, and R. Dutton, BMEDiSN: Medical emergency detection in sensor networks,[ACM Trans. Embedded Computer. Syst., vol. 10, 0.1, pp. 11:1–11:29, 2010, article 11.
[7]. Cook, D.J.; Augusto, J.C.; Jakkula, V.R. Ambient Intelligence Technologies, applications, and opportunities. Pervasive Mob. Comput. **2009**, 5, 277- 298.
[8]. Otto, C Milenkovic, A.; Sanders, C.; Jovanov, E. System architecture of a wireless body area sensor network for ubiquitous health monitoring. *JMM* **2006**, *1*, 307-326.
[9]. V. Jones, et al., "Biosignal and Context Monitoring: Distributed Multimedia Applications of Body Area Networks in Healthcare," 2008 IEEE 10th Workshop on Multimedia Signal Processing, Cairns, 8-10 October 2008, pp. 820- 825.
[10]. S.Ohta, H. Nakamoto, Y.Shinagawa, and T. Tanikawa, .A Healthmonitoring system for elderly people living alone. J. Telemedicine and Telecare, vol. 8, no. 3, pp. 151.156, Jun. 2002.