

BODY AREA NETWORK: SENSOR COMMUNICATIONS THROUGH HUMAN BODY

Mrs.B.Annapurna

HOD, Department of Computer Science
CH.S.D.ST.Theresa's College for Women, Eluru, India
annapurnagandrey@gmail.com

Mrs.V.Sravanthi

Assistant Professor, , Department of Computer Science
CH.S.D.ST.Theresa's College for Women, Eluru, India
svsravanthi6@gmail.com

Mrs.P.Lakshmi Prasanna

Assistant Professor, , Department of Computer Science
CH.S.D.ST.Theresa's College for Women, Eluru, India
prasanna_mnsk@yahoo.co.in

Mrs.G.Prasanthi

Assistant Professor, , Department of Computer Science
CH.S.D.ST.Theresa's College for Women, Eluru, India
prasanthi.gudipudi@gmail.com

ABSTRACT

The budding field of Body space Networks provides new intending to the term "personal" in PCs. during a shell, the technology leverages wireless communications protocols that allow weak sensors to speak with each other and transmit information to an area base station and to foreign places like hospitals. For instance, little flat sensors placed on the skin, or perhaps thereunder, might be used to produce a "medical" body space network that has doctors support with period knowledge concerning their patients' bio-signs. Another key application is short-range person-to-person communications that might facilitate defend line troopers in combat. BAN technology continues to be in its infancy and thought adoption continues to be over the horizon as engineers and researchers work to beat challenges involving ability, sensing element style constraints (i.e. power and complexity), privacy, and security to call many. Once these problems are overcome, expect BANs to 1st revolutionize attention leaving ideas like telemedicine and eHealth to become real, and doubtless allow groundbreaking uses in communications, security, and sports.

Keywords: Power and Complexity, Short-Range Person-to-Person Communications

1. INTRODUCTION

The field of Computer Science is continually evolving to method larger information sets and maintain higher levels of property. At same time, advances in miniaturization permit for raised quality and accessibility. Body Area Networks represent the natural union between property and miniaturization. A Body Area Network (BAN) is outlined formally as a system of devices in shut proximity to a persons' body that get together for the good thing about the user. Generally BAN sound additional like phantasy than a true possibility, however many specialists within the field expect to visualize BAN in production for general use by 2020. Whereas this may appear like associate degree aggressive estimate, once place into context with the history and development of BAN up to the current purpose it becomes a far additional realizable goal. Within the paper we are going to come out introducing the reader to the history and development of BAN. We are going to cowl the medical heritage of BAN and the way the technology grew from an easy generalization of the construct of Body detector Networks (BSN). We are going to investigate current applications of BAN with a stress on applications within the medical sector.

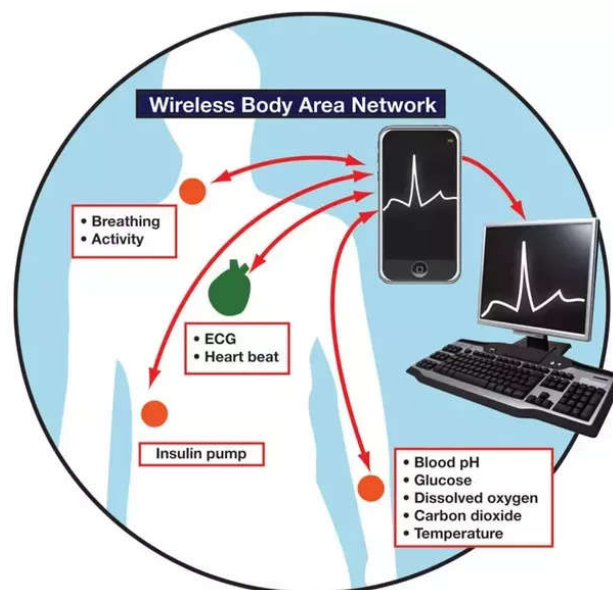


Fig.1: Body Area Network: BAN Overview

As we have a tendency to cowl applications of BAN, we are going to pay a portion of the paper distinguishing a number of technical issues facing BAN. Finally, we will conclude the paper with many solutions presently in development and the way they hope to address and overcome the challenges inherent to BAN.

2. PREVIOUS WORK

Reza Khalilian et al.[2016] “An Efficient Method To Improve WBAN Security”, This paper introduces another strategy which enhances the security issues of WBANs. The objective of this paper is to diminish the required memory control parcels multifaceted nature, controlling cradle over stream and controlling the current harm by utilizing high exchanging pace of information between hubs. In this paper the security is enhanced by utilizing AES-256 plan.

Anurag Tiwari et al.[2016] “Security and Privacy in E-Healthcare monitoring with WBAN”, are to a great degree key for those individuals which are experiencing ailments like heart related maladies ,rationally furious patients ,pregnant lady, and so forth, they require ceaseless perception .Since because of web related every one of these exercises ,they require more security. So this paper exhibits a security and protection related issues.

AdwanAlanazi et al. [2016] “Optimized Node Selection Process for quality of service provisioning over wireless multimedia sensor networks” Several quality of service (QoS) routing strategies concentrate on the change of throughput and end-to-end delays in remote Sensor systems (WSNs). With development of remote mixed media sensor systems (WMSNs), information activity can be balanced into unwavering quality requesting information bundles and time-delicate information parcels. In such circumstances, hub advancement and burden adjusting can enhance QoS provisioning. In this way, the exchange off between system lifetime and guaranteeing the QoS provisioning has been of central significance. This paper presents the Optimized Node Selection Process (ONSP) approach for hearty multipath QoS directing for WMSNs. This methodology depends on deciding the enhanced hub that helps versatile course disclosure for enhancing the QoS parameters. The determination of streamlined hubs makes the strong chain for course choice utilizing residual energy and got signal quality pointer (RSSI). The second objective of this methodology is to delay the system lifetime by presenting the heap adjusting calculation, which decides the streamlined and interlaced ways. These ways maintain a strategic distance from bottlenecks and enhance throughput, end-to-end delay, on-time bundle conveyance and draws out the system lifetime.

Muhammad Moid Sahndhu et al. [2015] “BEC: A novel routing protocol for balanced energy consumption in Wireless Body Area Networks” Wireless Body Area Networks (WBANs) are getting developing interest on account of their appropriateness for extensive variety of medicinal and non-therapeutic applications. These applications request WBAN to stay utilitarian for a more drawn out time which requires vitality proficient operation. In this paper, we propose another steering convention for Balanced Energy Consumption (BEC) in WBANs. In BEC, hand-off hubs are chosen in light of a cost capacity. The hubs send their information to their closest hand-off hubs to course it to the sink. The hubs nearer to the sink send their information specifically to it. Moreover, the hubs send just basic information when their vitality turns out to be not exactly a particular edge.

Keeping in mind the end goal to disseminate the heap consistently, hand-off hubs are turned in each round taking into account a cost capacity. Reenactment comes about demonstrate that BEC accomplishes 49% expanded system lifetime than OINL (On Increasing Network Lifetime) calculation.

Ilkyu Ha [2015] “Technologies and Research Trends in Wireless Body Area Network for Healthcare: A Systematic Literature Review” This paper represents that WBAN has ecological attributes is not the same as that of existing WSNs. The advancements that connected to existing WSNs is not connected to WBAN on the grounds that remote sensors in BAN is connected to various parts of human body also it has an altogether different system environment contrasted and existing remote sensor systems.

BAN technology continues to be associate rising technology, and intrinsically it's a awesome short history. BAN technology emerges because the natural byproduct of existing device network technology and medicine engineering. Academic Guang-Zhong rule was the primary person to formally outline the phrase "Body device Network" (BSN) with publication of his book Body device Networks in 2006. BSN technology represents the boundary of power and information measure from the BAN use case eventualities. However, BAN technology is kind of flexible and these area unit several potential uses for BAN technology additionally to BSNs. Some of the lot of common use cases for BAN technology are:

- Body Sensor Networks (BSN)
- Sports and Fitness Monitoring
- Wireless Audio
- Mobile Device Integration
- Personal Video Devices

3. WORKING OPERATION

A body area network (BAN) is the interconnection of multiple computing devices worn on, affixed to or implanted in a person's body. A BAN typically includes a smartphone in a pocket or bag that serves as a mobile data hub, acquiring user data and transmitting it to a remote database or other system.

Other devices in a BAN might include:

Wearable computing devices such as Google Glass, gaming headsets, smartwatches, wristbands, smart rings and heads-up displays. Mobile medical devices, often in the form of sensors and actuators that monitor health data like blood pressure, heart rate, glucose level and medication compliance. Health and fitness devices such as the popular Fitbit wristband that tracks data for things like exercise activities, sleep quality and vital signs.

BANs are categorized in various ways, for example as a wearable BAN or an implanted BAN. A medical body area network (MBAN) is a special-purpose BAN that provides telehealth services through remote patient monitoring (RPM) and can initiate alerts and even care, such as the delivery of medication.

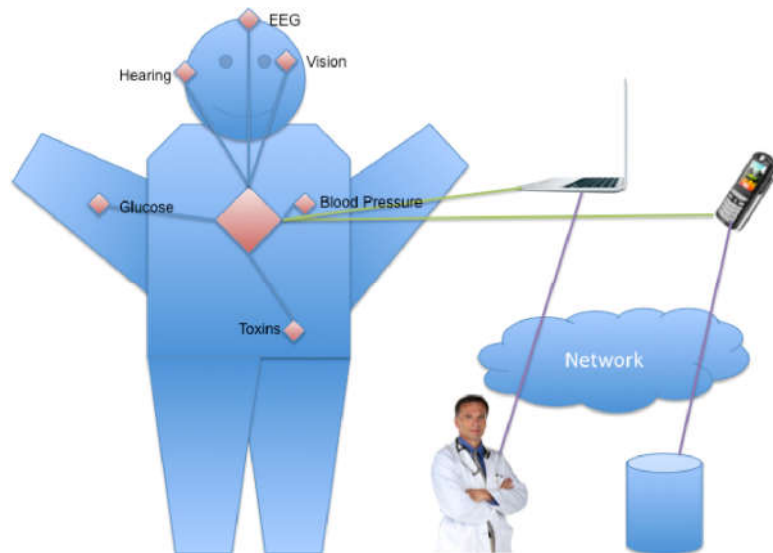


Fig.2 – Body Area Network: MobiHealth Data Processing

4. WORKING OPERATION

This paper demonstrates the use of the BAN technology. We discussed the history and development of BSN and how that grew into the more general concept of BAN. We then introduced refinements of the BSN. We discussed Human usable platform and the advantages and disadvantages with BAN technology. We discussed MobiHealth as a mature example of BAN technology. We then continued on to take a look at a case study involving MobiHealth and the monitoring cardiac data. We concluded the paper by looking at some challenges related to BAN. We covered signal and path loss in the human body and some of the challenges associated with communication and power within the human body. We covered usability and the fusion of cutting edge technology and textiles and how it is shaping wearable technology.

References

- [1] Reza Khaliliani, Abdalhossein Rezai, Ehsan Abedini, "An Efficient Method to Improve WBAN Security," vol.64, pp 43-46, 2016.
- [2] Anurag Tiwari, Prabhat Verma, "Security and Privacy in E-Healthcare Monitoring with WBAN", International Journal of Computer Applications, February, 2016.
- [3] Adwan Alanazi "Optimized Node Selection Process for quality of service provisioning over wireless multimedia sensor networks" IEEE International Conference on Mobile and Secure Services, pp- 1 – 5, 2016.
- [4] Muhammad Moid Sahnadu, Nadeem Javaid, Muhammad Imran, Mohsen Guizani, Zahoor Ali Khan, Umar Qasim "BEC: A Novel Routing Protocol for Balanced Energy Consumption in Wireless Body Area Networks", IEEE, pp653- 657, 2015.
- [5] Ilkyu Ha "Technologies and Research Trends in Wireless Body Area Networks for Healthcare: A Systematic Literature Review" International journal of Distributed Sensor Networks vol.2015, pp 14, 2015
- [6] Mehreen Shah "Interference Aware Inverse EEDBR protocol for Underwater WSNs" IEEE International Conference on Wireless Communications and Mobile Computing, pp- 739 – 744, 2015.
- [7] Sobia Omer "An LQI based dual-channel routing protocol for Wireless Body Area networks" IEEE International Conference on Telecommunication Networks and Applications, pp- 320 – 325, 2015.
- [8] Xiaofei Chen "Design and implementation of a body monitoring baseband system for human body communication" IEEE International Conference on ASIC, pp- 1 – 4, 2015.
- [9] Chirihane Gherbi "Distributed energy efficient adaptive clustering protocol with data gathering for large scale wireless sensor networks" IEEE International Conference on Programming and Systems, pp- 1 – 7, 2015.
- [10] Nidhi Goel "Smart grid networks: A state of the art review" IEEE International Conference on Signal Processing and Communication, pp- 122 – 126, 2015.
- [11] Karthiga I. "A study on routing protocols in wireless body area networks and its suitability for m-Health applications" IEEE International Conference on Communications and Signal Processing, pp- 1064 – 1069, 2015.

- [12] NavpreetKaur “BERP: Balanced Energy Routing Protocol for routing around connectivity holes in wireless sensor networks”IEEE International Conference on Recent Advances in Engineering & Computational Sciences (RAECS),pp- 1 – 6,2015.
- [13] M. Ambigavathi “Priority based AODV routing protocol for critical data in Wireless Body Area Network” IEEE International Conference on Signal Processing, Communication and Networking,pp- 1 – 5,2015.
- [14] Kshitiza Singh “An energy efficient fuzzy based adaptive routing protocol for Wireless Body Area Network” IEEE International Conference on Electrical Computer and Electronics,pp- 1 – 6,2015.
- [15] MadhumitaKathuria “Reliable delay sensitive loss recovery protocol for critical health data transmission system” IEEE International Conference on Futuristic Trends on Computational Analysis and Knowledge Management,pp- 333 – 339,2015.
- [16] Pengfei He et al. “Performance analysis of wban based on aodv and dsdv routing protocols” IEEE International Conference on Future Information and Communication Technologies for Ubiquitous HealthCare,pp- 1 – 4,2015.
- [17] Kiran ,Pooja“ A Review on Wireless Body Area Network”,vol 3,Issue 6,June 2015.
- [18] PriyaJuneja “Tree based energy efficient routing scheme for body area network” IEEE International Conference on Computer Engineering and Applications,pp- 940 – 947,2015.
- [19] Md. Tanvir Ishtaique ul Huque et al. “Body Node Coordinator Placement Algorithms for Wireless Body Area Networks” IEEE International Conference ,pp94 – 102,2015.
- [20] S. Yousaf“CEMob: Critical Data Transmission in Emergency with Mobility Support in WBANs” IEEE International Conference on Advanced Information Networking and Applications, pp-915 – 919, 2014.



Mrs. B .Annapurna MCA, M.Tech,(Ph.D.),is currently working as HOD in Department of Computer Science since 1996 , CH.S.D.ST.Theresa’s college for women , Eluru , West Godavari district , A.P . Published many papers in national and international journals, resource person for various workshops, seminars and conferences.