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# ENHANCING PACKET SIZE IN WIRELESS BODY SYSTEMS: A QUALITATIVE ANALYSIS OF IMPROVED ILLUMINATION

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## *ABSTRACT*

*Poor channel conditions in WBANs can lead to increased failure rates for extended packets. In contrast, smaller packets could have more overhead. Therefore, selecting the appropriate packet's size becomes crucial for optimizing various performance metrics in WBANs. Recent research has presented several approaches for figuring out the ideal packet size for WBANs. However, most of the existing literature focuses on optimizing packet sizes for specific applications or transmission scenarios. This study aims to highlight current trends and strategies in reducing the size of WBAN packets, intending to motivate further research in this area. The paper provides insights into techniques and applications for reducing packet size in WBANs, while also addressing unresolved research questions and associated challenges.*

***Keywords: Packet Size Improvement, WBAN, Applications, Implementation Model***

## 1. INTRODUCTION

Wireless body area networks (WBANs) find applicability across many industries, including the military, commerce, astronomy, visual inspection, horticulture, transportation, and more [1-3]. WBANs incorporate body-implanted sensors that gather valuable metrics within a specific area [4]. These sensors collect data from the body and transmit it to a sink hub, which collects, filters, and sends the data to a main server for processing. Due to limited power sources, each component of WBAN must be carefully designed to efficiently utilize energy and prolong the system's life [5,6].

There are four general types of wireless sensor networks based on their deployment environments: body area networks system (BANs), continental wireless sensor networks system (WSNs), underwater WSNs, and wireless underground sensor networks (WUSNs). Each category possesses distinct characteristics influenced by the transmission

environment, and they present unique challenges due to diverse propagation conditions [7]. This study's evaluated research focuses mostly on optimizing the size of packets within specific functional areas or environments where WBANs are implemented. BANs exhibit key characteristics such as energy efficiency, provisioning for quality of service (QoS), adaptability, and sustainability [7], and listed sources go into further detail about these characteristics. Considerable efforts have been dedicated to reducing power consumption, addressing critical system conditions, and meeting the specific requirements of BAN applications, which vary based on their administrative needs such as productivity, energy efficiency, and reliability.

Different BAN applications have distinct requirements based on their deployment locations. For instance, military surveillance systems demand high levels of energy and efficiency, while healthcare and disaster prevention applications prioritize low latency. Consequently, packet size optimization strategies must align with the specific criteria of these BAN applications to effectively meet their demands.

Optimizing packet size in WBANs can be achieved by considering various networking factors [10-21]. Performance measures used as indications for packet size improvement include output efficiency & energy efficiency.For choosing the ideal packet size that maximizes total energy efficiency may be done by using energy efficiency as an improvement parameter [10].This study's primary goal is to better understand the packet size improvement techniques used in WBANs, while identifying unresolved challenges and obstacles in this research domain. By exploring these areas, we aim to contribute to the advancement of packet size optimization in WBANs.

## 2. REVIEWOFLITERATURE

Anastasi et al. [2012] conducted primary verification of the IEEE 802.15.4 standard, focusing on the phase of the mediator’s cycle. They conducted an examination that encompassed both growth and real-world display domains to understand how the dispersed bolted circle functions the evaluation of movement in edge bundles. The study also revealed that the IEEE 802.15.4 specification is unable to support wrestling is the central conflict foci reach a certain threshold. Additionally, they provided proof of that by appropriately defining restrictions on MAC values, the architecture can reach a packet communication rate of

100% but at the cost of reduced degrees of freedom. It's important to note that the analysis did not consider the quantity of packet transfers that occur during hibernation.

Chen et al. [2013] conducted research that specifically focused on analyzingthe mediation cycle device-triggered IEEE 802.15.4 signal. Have you thought of giving a presentation on this topic, specifically focusing on 2.3? Research explores the implementation of IEEE 802.15.4 in WBAN, utilizing an inspection replay approach that incorporates modifications superboard demand (SO) & pattern concern (BO) to adjust to changing traffic volumes. The study also investigates the practical applications of hierarchical sensors, such as automation control. As part of the project's creators' OMNET++ test system, an extra investigation was also carried out. The main objective of the study was to identify an optimal BO that minimizes the amount of time groups spend in regular private activities, while ensuring that the basic type per byte of conveyed information remains minimal.

## 3. IMPORTANT UNRESOLVED RESEARCH ISSUES

The majority of research in this field focuses on identifying the optimal packet sizes in BANs, taking into consideration factors such as energy efficiency, low latency, and high throughput. However, these investigations encounter various challenges due to the specific requirements of different applications and the proliferation characteristics of organizational settings. In the following section, we will address the research challenges that still need to be addressed by researchers in order to determine the most suitable packet sizes for BANs.

## 4.PROVISIONING OF SERVICES

The quality of service (QoS) requirements for each BAN region can vary depending on the specific application. Consequently, the approach to optimizing packet size must align with the requirements of the particular application area, such as energy efficiency and low latency. It is crucial to carefully consider the remote network settings while identifying the best package size for achieve satisfactory configurations. Additionally, the choice of optimal kind of traffic may have an impact on the size of the packets, whether it is actual time or non-actual time. For actual time packages, smaller packet sizes are preferred due to the need for lower latency. On the other side, non-actual time & best-effort packets could benefit more from bigger packet sizes.

## 5.CONTROL OF TRANSMISSION POWER

Because sensor nodes' battery life is restricted, power consumption is a crucial factor to consider. Numerous investigations have already been made to establish the ideal packet size that can enhance energy efficiency. Many existing literature-related works emphasize the utilization of smaller packet's size to minimize communication overhead. However, it should be noted that in certain cases, the final packet size may be determined based on the network conditions governing the transmission process.

## 6. CROSS-LAYER CONSTRUCTION

A holistic cross-layer approach can be implemented to optimize packet size in BANs, incorporating multiple layers ranging from the physical to the application layers. Surprisingly, this comprehensive approach has not been extensively covered in the existing literature, particularly when considering different BAN scenarios. For instance, the physical layer can take into account various antenna types, such as omnidirectional or directional radio cables, while the link layer can consider different MAC protocols like TDMA or CSMA. By considering these factors, it becomes possible to determine the most suitable packet size for optimal performance in BANs.

## 7. WBANs THAT GATHER ENERGY

The incorporation of Energy Harvesting (EH) technology can enhance the implementation of WBANs by providing self-charging capabilities. This allows the utilization of available environmental energy sources including magnetic, thermal, & solar energy to power remote sensors. But the current packet measuring methodologies for WBANs (EHBANs) based on energy harvesting cannot be used directly.Energy availability in EHBANs varies over time rather than following a monotonically decreasing trend. Therefore, in order to effectively manage the compromise between energy uses and Quality of Service (QoS), it becomes necessary to determine optimal packet size configurations specifically tailored for energy harvesting WBANs.

## 8.CONCLUSION

The measurement of packets poses a significant challenge in expanding the functionality of BANs. Experts anticipate the need for various optimization strategies to increase the energy utilization of the system performance, throughput, latency, and additional

performance measures. These strategies can be categorized into different scientific domains, offering a systematic approach to addressing the challenges associated with packet measurement in BANs.

## REFERENCES

1. Prasad, Poonam (2015) Recent trend in wireless sensor network and its applications: asurvey.Sensor Review 35(2): 229-236.
2. Barcelo-Ordinas JM, Jean-Pierre Chanet, Hou KM, García Vidal J(2013) A survey ofwirelesssensortechnologiesappliedtoprecision agriculture.InPrecisionagriculture13:801-808.
3. Seema,Adolph,andMartinReisslein(2011)Towardsefficientwirelessvideosensornet works: A survey of existing node architectures and proposal for a Flexi-WVSNP design. IEEECommunicationsSurveys &Tutorials13(3): 462-486.
4. Akkaya, Kemal, Mohamed Younis (2005) A survey on routing protocolsfor wirelesssensornetworks. Ad hoc networks 3(3): 325-349.
5. Yildiz, Huseyin Ugur, Sinan Kurt, Bulent Tavli (2014) The impact ofnear-ground path loss modeling on wireless sensor network lifetime. In Military Communications Conference (MILCOM)pp. 1114-1119.
6. Kurt Sinan, Bulent Tavli (2017) Path-Loss Modelling for Wireless Sensor Networks: Areview of models and comparative evaluations. IEEE Antennas and Propagation Magazine 59(1):18-37.
7. Fulara, Yogesh Kumar (2015) Some aspects of wireless sensor networks. International Journalon Ad Hoc Networking Systems 5(1):15-24.
8. Feilong Tang, MinyiGuo, MingluLi,Zhijun Wangand Zixue Cheng 2008, "ScalableandSecureRoutingforLargeSensorNetworks",InstitutionofElectricalandElectronicEngineers / International Federation for Information Processing International Conference on Integrated and Ubiquitous Computing, Shanghai, Flug.2, pages 300 to 305
9. Heinzel man,WB ,Chandra kasan A Pand Balakrishnan, H2002," An Application

Specific Protocol Architecture for Wireless Micro sensor Networks", Institution of Electrical and Electronic Engineers Transactionon Wireless Communications, Vol.1, no.4, pages660-670.

10. Imrichchalamtac, Mario Confi, Jennifer, J & Liu, N 2003, "Ad-hoc mobile networks: imperatives and challenges ",Ad-hoc Networks Journal , volume 1,number 1, pp. 13-64.
11. Itanagonwiwat, C,Govindan, R&E strin, D2000" Directed Broadcast: Paradig mascalable and robust communication for networks of sensors ", Proceedings of the Association of Machine of Computing Mobicom2000, Boston, pp. 56-57.
12. Zhanshan(Sam)MaandAxelW.Krings2009,"ComputerInspiredInsectSensorSystems andCommunication " Ad Hoc Networks, Volume 7, No. 4.742-755