The internet of bodies

Description

“The Internet of Bodies (IoBs) is an imminent extension to the vast Internet of Things domain, where interconnected devices (e.g., worn, implanted, embedded, swallowed, etc.) are located in-on-and-around the human body form a network. Thus, the IoB can enable a myriad of services and applications for a wide range of sectors, including medicine, safety, security, wellness, entertainment, to name but a few. Especially, considering the recent health and economic crisis caused by the novel coronavirus pandemic, also known as COVID-19, the IoB can revolutionize today’s public health and safety infrastructure. Nonetheless, reaping the full benefit of IoB is still subject to addressing related risks, concerns, and challenges. Hence, this survey first outlines the IoB requirements and related communication and networking standards. Considering the lossy and heterogeneous dielectric properties of the human body, one of the major technical challenges is characterizing the behavior of the communication links in-on-and-around the human body. Therefore, this article presents a systematic survey of channel modeling issues for various link types of human body communication (HBC) channels below 100 MHz, the narrowband (NB) channels between 400 and 2.5 GHz, and ultrawideband (UWB) channels from 3 to 10 GHz. After explaining bio-electromagnetics attributes of the human body, physical, and numerical body phantoms are presented along with electromagnetic propagation tool models. Then, the first-order and the second-order channel statistics for NB and UWB channels are covered with a special emphasis on body posture, mobility, and antenna effects. For capacitively, galvanically, and magnetically coupled HBC channels, four different channel modeling methods (i.e., analytical, numerical, circuit, and empirical) are investigated, and electrode effects are discussed. Finally, interested readers are provided with open research challenges and potential future research directions.”

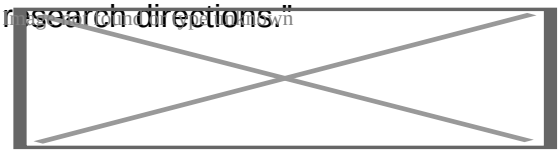
Celik, A., Salama, K. N., & Eltawil, A. M.. (2022). The Internet of Bodies: A Systematic Survey on Propagation Characterization and Channel Modeling. IEEE Internet of Things Journal

Plain numerical DOI: 10.1109/JIOT.2021.3098028
DOI URL
directSciHub download

Show/hide publication abstract

“The internet of bodies (iobs) is an imminent extension to the vast internet of things domain, where interconnected devices (e.g., worn, implanted, embedded, swallowed, etc.) are located in-on-and-around the human body form a network. thus, the iob can enable a myriad of services and applications for a wide range of sectors, including medicine, safety, security, wellness, entertainment, to name but a few. especially, considering the recent health and economic crisis caused by the novel coronavirus pandemic, also known as covid-19, the iob can revolutionize today’s public health and safety infrastructure. nonetheless, reaping the full benefit of iob is still subject to addressing related risks, concerns, and challenges. hence, this survey first outlines the iob requirements and related communication and networking standards. considering the lossy and heterogeneous dielectric properties of the human body, one of the major technical challenges is characterizing the behavior of

the communication links in-on-and-around the human body. therefore, this article presents a systematic survey of channel modeling issues for various link types of human body communication (hbc) channels below 100 mhz, the narrowband (nb) channels between 400 and 2.5 ghz, and ultrawideband (uwb) channels from 3 to 10 ghz. after explaining bio-electromagnetics attributes of the human body, physical, and numerical body phantoms are presented along with electromagnetic propagation tool models. then, the first-order and the second-order channel statistics for nb and uwb channels are covered with a special emphasis on body posture, mobility, and antenna effects. for capacitively, galvanically, and magnetically coupled hbc channels, four different channel modeling methods (i.e., analytical, numerical, circuit, and empirical) are investigated, and electrode effects are discussed. finally, interested readers are provided with open research challenges and potential future research directions."



Lee, M., Boudreaux, B., Chaturvedi, R., Romanosky, S., & Downing, B.. (2020). The Internet of Bodies: Opportunities, Risks, and Governance. The Internet of Bodies: Opportunities, Risks, and Governance

Plain numerical DOI: 10.7249/rr3226
DOI URL
directSciHub download

Show/hide publication abstract

“The work described in this report was conducted as part of a fellowship awarded by the rand corporation’s center for global risk and security. this report describes emerging technologies, herein referred to as the internet of bodies; analyzes their benefits and risks; and suggests ways various stakeholders can balance those benefits and risks. this report should be of interest to the general public, internet of bodies and medical device makers, health-care providers, and policy decisionmakers. the research was conducted within the center for global risk and security between february 2019 and september 2019.”
Makitalo, N., Flores-Martin, D., Berrocal, J., Garcia-Alonso, J., Ihantola, P., Ometov, A., … Mikkonen, T. . (2020). The Internet of Bodies Needs a Human Data Model. IEEE Internet Computing

Plain numerical DOI: 10.1109/MIC.2020.3019920
DOI URL
directSciHub download

Show/hide publication abstract

“Today, creating innovative internet of bodies solutions requires manually gathering the needed information from an increasing number of services and personal devices. in this article, we tackle this challenge by presenting human data model-a programming framework for combining information from several sources, performing computations over that information to high-level abstractions, and then providing these abstractions to proactively schedule computer-human interactions.”
Boddington, G.. (2021). The Internet of Bodies—alive, connected and collective: the virtual physical future of our bodies and our senses

. AI and Society

Plain numerical DOI: 10.1007/s00146-020-01137-1
DOI URL
directSciHub download

Show/hide publication abstract

“This paper is going to discuss, what will be called, ‘the internet of bodies’. our physical and virtual worlds are blending and shifting our understanding of three key areas: (1) our identities are diversifying, as they become hyper-enhanced and multi-sensory; (2) our collaborations are co-created, immersive and connected; (3) our innovations are diverse and inclusive. it is proposed that our bodies have finally become the interface.”
Blake, M. B., Kandasamy, N., Dustdar, S., & Liu, X.. (2020). Internet of Bodies/Internet of Sports. IEEE Internet Computing

Plain numerical DOI: 10.1109/MIC.2020.3026924
DOI URL
directSciHub download

Show/hide publication abstract

“As healthcare solutions and augmented monitoring of human mobility overlap with the new concepts of the internet of things, an emerging area of interest leverages sensor networks that monitor personal health data and human activity. this special issue presents research innovation that address advances in this evolving paradigm of internet of bodies/internet of sports.”
Ray, P. P.. (2020). Intelligent Ingestibles: Future of Internet of Body. IEEE Internet Computing

Plain numerical DOI: 10.1109/MIC.2020.3023484
DOI URL
directSciHub download

Show/hide publication abstract

“In this article, we first provide the basics of ingestibles. then, we provide a detailed survey on ingestibles as per their applicability in leveraging gastrointestinal disease detection, management, and treatment. next, we show how ingestibles could be related with the concept of internet of body. lastly, we discuss various key challenges and future directions to mitigate these issues.”
El-Khoury, M., & Arikan, C. L.. (2021). From the internet of things toward the internet of bodies: Ethical and legal considerations. Strategic Change

Plain numerical DOI: 10.1002/jsc.2411
DOI URL
directSciHub download

Show/hide publication abstract

“The proliferation of the internet of things makes the gray area of ethics darker and lighter simultaneously, and the law is currently not construed to accompany the steady progression toward the internet of bodies. the internet of things is challenging the traditional construct of ownership, and users are progressively losing control over their iot devices. the internet of bodies is the awaiting new normal where human bodies and minds form a connected network pervaded by the internet. the integrity of human bodies will rely more and more on the internet. in this context, the future calls for a balance between divergent interests of appealing technological progress and vital human safety.”

Category

1. General

Date Created
26. January 2022
Author
web45