

Internet of Bodies/Internet of Sports

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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.

■ **INTERNET OF BODIES** (IOB) is an evolving paradigm where effectively the human body is connected to the Internet in such a way that the everyday human routine can be optimized by services and knowledge available more broadly. A specialization IOB has also emerged as The Internet of Sports (IoS) that further defines IoB for devices and software that monitor human activity in the fitness and competitive sports domain. The advanced capabilities and performance of these high-tech biological devices open a full array of opportunities and challenges as health care professionals develop the next generation of medical solutions and assistive technologies. Although there is increasing number of IoB applications associated with personal mobile devices, there are also new and exciting devices, such as smart contact lenses for adapted vision correction, cochlear implants for

enhanced hearing, and electronic pills that monitor your internal organs. The field of IoB spans the traditional computing disciplines of Internet computing, software engineering, human-computer interaction, and data and networking technologies.

While there are many opportunities in this area, there are also open questions that must be addressed in the creation of next-generation IoB/IoS/IoT technologies. From a hardware standpoint, network technologists must consider protocols and interfaces that support human-oriented sensing/functions. A new evolving area is how to incorporate the body of knowledge in fitness such that it is codified within the sensor networks and workflow protocols in computing in the area of IoS. The human body is a complex “machine” with unlimited nuance. How can/should software represent the activity of the body in machine-interpretable language to assist developers who would like to make the human-machine interfaces seamless? Sensor networks for biological monitoring and enhancement might be a new area of computing. In an era

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where security and privacy seem to be an afterthought, how do developers protect consumers from the nefarious activities of hackers? After all, when health is involved, there is substantial personal risk. Finally, the list of application and services is unlimited. This might be a new area to support entrepreneurial efforts that provide applications that support our aging population, globally.

This special issue aims to collect the most recent practical and theoretical advances to IoB and IoS, including cutting-edge techniques for system development/implementation, networking approaches, privacy and security considerations, and human-sensor interactions. There are three articles featured in this special issue.

For “WellBeat: A Framework for Tracking Daily Well-Being Using Smartwatches,” the authors developed a framework for collecting and analyzing physiological data using smartwatches. The authors use real-world studies to capture the distinct patterns in human heart rate variations in such a way to understand their happiness, awakenedness, and relaxedness. The authors address a longitudinal approach to aggregate the data and derived information over a period of time.

There is an evolving area where sensor networks are actually ingested into the body. In “Intelligent Ingestibles: Future of Internet of Body,” the author demonstrates how ingestibles can be applied for smart e-healthcare and services. The interplay between these ingestibles and IoT systems will further allow the unlimited knowledge on the Internet to be leveraged for the well being of the ingestible consumer. This approach has longer term implications machine learning for medical diagnosis and treatment.

In “The Internet of Bodies Needs a Human Data Model,” the authors synthesize and categorize the information important for the exchange of data between IoB interfaces. In practice, developers and systems integrators must manually gather the information from the evolving number of IoB services and personal devices. The authors propose the Human Data Model which consists of a programming framework that facilitates the

computations of IoB information while managing computer-human interaction.

We hope this special issue will elevate and highlight the area of the health-oriented sensor networks and IoB. The authors present a diversity of thought and inquiry in the area. The readers should be motivated to pursue innovative projects that might build on this exciting emerging area. The Guest Editors would like to thank the reviewers for their insights and the Editor-in-Chief, George Pallis, for his leadership during the preparation of the special issue.

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