



Precision Health Informatics

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Pervasive Computing for Real-time or Unobtrusive Monitoring and Detection of Selected Health Problems

ABSTRACT:

Objects with embedded intelligence and ambient sensors built in will be connected to the Internet and work together for achieving special purposes (such as identification, monitoring, detection, and prediction), so that the future computation will not only focus server-based high performance computation, but also wearable- or mobile- based computation on diverse connected devices. Recent advances in wearable/embedded devices with intelligent algorithms are enabling this capability by providing health/environmental measurements as well as higher fidelity sensor data. The embedded computing system will be smarter, which means better safety, reduced energy consumption, faster performance, and easy to use. In order to achieve this kind of intelligent embedded computing systems, there needs to be not only practical embedded systems and platform, but also theoretically solid models and intelligent algorithms. Well-developed models and intelligent algorithms that closely related to the wearable/embedded devices make the traditional intelligent systems more powerful, sustainable, practically useful, and highly reliable. In this talk, Dr. Kim will present his previous and on-going works regarding the issues, development and applications of real-time and unobtrusive monitoring on selected healthcare problems in pervasive computing. He will discuss the concepts, technologies, intelligent algorithms and systems introduced in his research centered around three major themes: (a) Energy efficient embedded or wearable system design, (b) Real time or unobtrusive monitoring, and feature extraction and (c) Intelligent analytics for events detection. More specifically, three research projects related to health problems will be presented: (1) Real-time Heart Attack Detection based on Wearable and Energy Efficient Embedded System; (2) IoT based Smart Home System for Supporting Well-Being; and (3) Clinical Methodologies for Detecting Sleep Related Breathing Disorders.

BIO:

Jung-Yoon Kim received the B.S. degree in electronics and the M.S. degree in electrical and computer engineering from the University of Ulsan, Korea, in 2004 and 2006, respectively, and the Ph.D. degree in information sciences and technology from Pennsylvania State University, University Park, PA, USA, in 2014. He is a research professor of University National Institute of Science and Technology, Ulsan, South Korea. His areas of experience and expertise are in smart health and wellbeing, especially in real-time cardiovascular disease, sleep related breathing disorder, depression and stress monitoring, physiological sensor design, and intelligent analytics for decision supports; environmental monitoring and assessment especially in air quality monitoring and cut slope movement monitoring; and ubiquitous computing—especially in embedded system design, energy efficient processing, and programming model for networking performance.

