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Title:

Advance in human machine interfaces（HMI）for VR/AR applications

Abstract:

It has been reported that significant progress in energy harvesting technology in the past few years. By scavenging the wasted energy and converts it into electrical energy, the energy harvesting technology shows itself as a potential inexhaustible source for low-power devices. With such energy harvested from human activities, we can also use such energy to power up the wearable sensors and electronics. The piezoelectric and triboelectric nanogenerators have been investigated as the platform technologies for wearable self-powered sensors. The human machine interfaces (HMI) have been improved from tactile sensors, such as touchpads and joysticks, to now including the accurate detection of dexterous body movements in more diversified and sophisticated sensors. In this talk, we discuss a few triboelectric based HMIs including gloves, socks, soft robotic manipulator, and exoskeleton for object recognition, gaming, VR/AR applications, rehabilitation and digital twin applications. In addition, artificial intelligence (AI) as an effective data analytics tool has been integrated with various HMIs to achieve intelligent monitoring and recognition system. On the other hand, a smart floor monitoring system is reported with the merits of low cost and high scalability for smart home applications.

Biography：

Dr. Chengkuo Lee received his Ph.D. degree in precision engineering from The University of Tokyo, Tokyo, Japan, in 1996. Currently, he is the GlobalFoundries Chair Professor and director of Center for Intelligent Sensors and MEMS at National University of Singapore, Singapore. He cofounded Asia Pacific Microsystems, Inc. (APM) in 2001, where he was Vice President of R&D from 2001 to 2005. From 2006 to 2009, he was a Senior Member of the Technical Staff at the Institute of Microelectronics (IME), A-STAR, Singapore. He has co-authored 390+ journal articles and 360+ conference papers. He holds 10 US patents. His google scholar citation is more than 16800+. He is the Associate-Editor-in-Chief of Trans. Nanotechnology (IEEE), and editor-in-chief of Intern. J. Optomechatronics (Taylor & Francis). He is in the Executive Editor Board of J Micromechanics and Microeng. (IOP, UK). He is the Associate editor of J. MEMS (IEEE). He is also the Editor of next journals: Scientific Reports (Springer Nature), Bioelectronic Medicine (BMC, Springer Nature), Internet of Things - Engineering Cyber Physical Human Systems (Elsevier), J. Optical Microsystems (SPIE), Journal of Sensors (Hindawi), Sensors (MDPI), and Micromachines (MDPI). He has chaired many conferences including IEEE NEMS’18, OMN ’16 and ’14, ISMM’14, and Bio4Apps’13 etc.