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Wednesday, November 17

Wednesday, November 17 9:15 - 9:30

Opening

Wednesday, November 17 9:30 - 10:15

Keynote 1: Human-Augmentation and the Future of Human-Computer Integration

Prof. Jun Rekimoto (III, The University of Tokyo)

Chair: Ken Ohta (NTT DOCOMO, INC., Japan)

Traditionally, the field of Human Computer Interaction (HCI) was primarily concerned with designing and investigating interfaces between humans and machines. However, with recent technological advances, the concepts of "enhancing", "augmenting" or even "re-designing" humans themselves are becoming feasible and serious topics of scientific research as well as engineering development. "Augmented Human" is a term that I use to refer to this overall research direction. Augmented Human introduces a fundamental paradigm shift in HCI: from human-computer-interaction to human-computer-integration, and our abilities will be mutually connected through the networks (what we call IoA, or Internet of Abilities, as the next step of IoT: Internet of Things). In this talk, I will discuss rich possibilities and distinct challenges in enhancing human abilities.

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Keynote 2: Practical Edge Computing for Mobile X Reality

Prof. Pan Hui (University of Helsinki & HKUST)

Chair: Youngtae Noh (Inha University, Korea (South))

Smartphone is now a necessity of people's daily life, and we are enjoying various services on it with numerous mobile applications. However, the resource and communication limitations of a single mobile device make it insufficient in satisfying the real-time and interactive constraints of some computation intensive applications, such as mobile Augmented Reality (AR) and mobile Virtual Reality (VR). To bridge the gap, we utilize the processing power of edge servers via task offloading and build practical mobile systems which significantly outperforms state-of-the-art mobile systems in terms of latency, scalability, quality of experience (QoE), and many other aspects. In the case of mobile Augmented Reality, large-scale object recognition is an essential but time-consuming task. To offload the object recognition task and enhance the system performance, we explore how the GPU and the multi-core architecture on the edge servers would accelerate the large-scale object recognition process. With the carefully designed offloading pipeline and edge acceleration, we are able to finish the whole AR pipeline within one camera frame interval while maintaining high recognition accuracy with large-scale datasets. In the case of mobile Virtual Reality, existing 360 degree video streaming systems are suffering from insufficient pixel density, as the video resolution falling within the user's field of view (FoV) is relatively low. We utilize the edge server for ultra-high resolution video transcoding and implement a system which streams tile-based viewport adaptive 360 degree videos onto the mobile client. With this edge proxy, we successfully achieve 16K 360 degree video streaming onto off-the-shelf smartphones, achieving high frame quality and fluent playback without overwhelming the processing capacity of the smartphones.

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