Editorial Preface

Standard Issue Featuring Selected MobileHCI'2017 Workshops

Jo Lumsden, Aston University, Birmingham, UK

Welcome to the latest issue of the *International Journal of Mobile Human Computer Interaction* (IJMHCI). Following on from similar previous issues, alongside regular articles this issue also showcases some of the interesting workshops run during the 19th International Conference on Human-Computer Interaction (MobileHCI'2017) in Vienna, Austria. The organizers of each of the MobileHCI'2017 workshops were invited to nominate their best paper for inclusion in this issue or to submit a position paper highlighting the focus of their respective workshops. One of the workshops nominated a best paper which has been extended for inclusion in this issue; another submitted a position paper which provides interesting, extended insight into the topic of the workshop – thus making a valuable addition to this issue and the field of mobile HCI more broadly. In addition to these two workshop highlights, we also have two regular articles, completing a varied and interesting selection of research for you to read.

WORKSHOP ON NATURECHI – UNOBTRUSIVE USER EXPERIENCES WITH TECHNOLOGY IN NATURE

- **Organisers:** Jonna Häkkilä (University of Lapland, Finland), Ashley Colley (University of Lapland, Finland), Keith Cheverst (Lancaster University, UK), Simon Robinson (Swansea University, UK), Johannes Schöning (University of Bremen, Germany), Nicola Bidwell (University of Namibia, Namibia & University of Pretoria, South Africa), and Felix Kosmalla (DFKI, Germany)
- **Position Paper:** *Reflections on the NatureCHI Workshop Series: Unobtrusive User Experiences with Technology in Nature* by Jonna Häkkilä (University of Lapland, Finland), Nicola J. Bidwell (University of Namibia, Namibia & University of Pretoria, South Africa), Keith Cheverst (Lancaster University, UK), Ashley Colley (University of Lapland, Finland), Felix Kosmalla (DFKI, Germany), Simon Robinson (Swansea University, UK), and Johannes Schöning (University of Bremen, Germany)

"The NatureCHI workshop which was held at MobileHCI'2017 was the second in a series of workshops that sought to bring together researchers and practitioners interested in the design of Unobtrusive User Experiences with Technology in Nature. The focus of the MobileHCI workshop was on the design of mobile interactive technologies and understanding how such technologies might support

an individual's engagement with nature rather than causing an unwelcome distraction. The workshop was organised by Jonna Häkkilä, Nicola Bidwell, Keith Cheverst, Ashley Colley, Felix Kosmalla, Simon Robinson and Johannes Schöning and included 14 paper presentations and two group design activities. All papers can be accessed from the workshop's web page at http://www.naturechi.net/". [Workshop Overview by Keith Cheverst (Lancaster University, UK)]. In their position paper, Häkkilä *et al.* introduce us to that research space and the workshop, outlining some of the interesting work presented in the 2017 workshop and setting out core future directions for this field of research.

WORKSHOP ON OBJECT RECOGNITION FOR INPUT AND MOBILE INTERACTION

- **Organisers:** Hui-Shyong Yeo (University of St Andrews, UK), Gierad Laput (Carnegie Mellon Univesity, USA), Nicholas Gillian (ATAP Google, USA), and Aaron Quigley (University of St Andrews, UK).
- **Best Paper:** *Non-Invasive Monitoring of Glucose Level Changes Utilizing a mm-Wave Radar System* by George Shaker (University of Waterloo, Canada & Research Institute for Aging, Canada), Karly Smith (University of Waterloo, Canada), Ala Eldin Omer (University of Waterloo, Canada), Shuo Liu (University of Waterloo, Canada), Clement Csech (Universite de Technologie de Compiegne, France), Udeshaya Wadhwa (University of Waterloo, Canada), Safieddin Safavi-Naeini (University of Waterloo, Canada), and Richard Hughson (University of Waterloo, Canada & Research Institute for Aging, Canada)

"Today, we are seeing an emergence of devices that incorporate sensing capabilities that go beyond the traditional suite of hardware (e.g., touch sensing or proximity). These devices offer a more fine-grained level of contextual information, such as object recognition, and they often vary in their size, portability, and form factor. Despite this diversity, the manifestations of these new-generation sensing approaches will inevitably unlock many of the ubiquitous, tangible, mobile, and wearable computing ecosystems that promise to improve people's lives.

These systems are brought together by a variety of technologies, including computer vision, radar, acoustic sensing, fiducial tagging, and in general, IoT devices embedded with computational capabilities. Such systems open up a wide-range of application spaces and novel forms of interaction. For instance, object-based interactions offer rich, contextual information that can power a wide range of user-centric applications (e.g., factory line optimization and safety, automatic grocery checkout, new forms of tangible interactions). Where and how these interactions are applied also adds a new dimension to these applications. Although the last few years have seen an increasing amount of research in this area, knowledge about this subject remains under explored, fragmented, and cuts across a set of related but heterogeneous issues.

The purpose of this workshop was to bring together active and interested researchers in sensing techniques, particularly those that advance input and interaction using novel capabilities (e.g., object recognition and radar sensing) across a range of modalities (e.g., mobile devices or wearables). Traditionally, and as part of the MobileHCI'2017 program, the focus was on mobile computing but other themes such as wearable computing, ubiquitous computing and tangible interaction were welcomed.

During this one day workshop, we fostered a scholarly environment for sharing approaches and experiences to identify research and deployment challenges. In addition, we engaged in hands on sessions to envision the next generation of applications that rely on widely deployed sensor systems, paying close attention to not just one but an ecosystem of sensing and sensor systems.

The workshop was indeed a stimulating one. There were 3 keynote speakers, 7 paper presentations, an exciting and engaging demo and poster session, and two breakout/work-group sessions. There were

over 20 participants from different parts of the world, including people from academia (ETH Zurich, Waterloo, Bristol, Newcastle, St Andrews, Oldenburg, etc.) and industry (Infineon, Vodafone, Google).

During the workshop we uncovered and considered many of the challenges with building the underlying system infrastructures for object recognition for mobile interaction. Questions we are left to ponder include: Where are the standards and operating system requirements going to emerge from?; Can vision, radar or acoustic sensing or tagging systems, which exist in multiple mobile and wearable elements, act in a coordinated manner to reliably determine object interaction?; Can the fusion of multiple sensing systems, each with inherent uncertainties, be employed in ways people can trust to realise new forms of contextual interaction?

At the end of the workshop, we created a poster summarizing our findings which we presented during the MobileHCI poster session (see Figure 1).

The best paper (*Non-Invasive Monitoring of Glucose Level Changes Utilizing a mm-Wave Radar System*) received among the highest scores from reviewers. This paper discusses recent experiments with the Google Soli sensor, specifically focusing on the gross detection of glucose levels within liquids. Ultimately, the paper aims to transform the Soli sensor into a stand-alone glucose monitoring system, which circumvents the need for invasive "pricking," among other hefty requirements. Reviewers were impressed by the potential contributions of this paper. If successful, it is something quite remarkable, especially since it highlights a clever appropriation of an accessible sensing technology. Moving forward, the paper should focus on honing down a set of targeted experiments, primarily tackling the overarching question of feasibility. The reason this was selected as the best paper was due to the concept and the planned studies which can be expanded upon in a full paper with more space for results. The work already shows great promise and we look forward to reading a full journal submission based off this short workshop paper." [Workshop Overview and Best Paper Introduction by Hui-Shyong Yeo (University of St Andrews, UK) and Aaron Quigley (University of St Andrews, UK)].

The first of the two regular articles in this issue is "*Factors Influencing Mobile Search Engine Users' Continuance Behavior Under the Context of Service Harm Crisis Event*" by Min Zhang, Guoqing Tang, and Yan Zhang. In this, the authors introduce us to the concept of 'product-harm crisis' – that being an occasional or well-known incident involving a product that is deemed deficient or dangerous for consumers – which they suggest is a relatively difficult management problem to solve. The authors extend the concept to the internet service arena, considering service-harm crises as occasional incidents which result in harm to users or which put them in danger. They note the popularity of mobile search engines (such as Google) as attractive options for advertising and targeted marketing and thus conclude that mobile search engines could result in service-harm crisis incidents as a result of incorrect or inaccurate online advertising information. Noting the lack of information available about continuance of use of mobile search engines in the context of service-harm crises, the authors analysed the factors influencing mobile search engine users' continuance behavior under such conditions. They claim that their research can "…not only help mobile search engine service providers prevent and handle business crises, but also provide other internet enterprises with practical and valuable […] suggestions on warning, intervention and remediation to reduce their users' loss…"

In the final article – "*Interactive Design of 3D Dynamic Gesture Based on SVM-LSTM Model*" – Tao Wang, Xiaolong Cai, Liping Wang and Haoye Tian recognize that innovation in methods for interacting with technology has led to a move to more "natural, efficient and intelligent" interaction techniques. They further recognize the ubiquity of visual hand gestures for supporting human interaction with technologies as a result of the realism and degrees of freedom of movement of such interaction, providing users with a more expansive, unencumbered interaction space. The authors present a Leap Motion-based SVM-LSTM hybrid model and system to support 3D dynamic gestural interaction. The authors assert that their method can automatically define the start and end of gestures,

Figure 1. Summary of findings

and report a recognition accuracy of over 96% as well as users' capacity to "quickly grasp" this method of interaction.

As always, I sincerely hope that you enjoy reading the broad spectrum of articles included in this issue of the IJMHCI!

Joanna Lumsden
Editor-in-Chief
IJMHCI