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EDITORIAL

Editorial of the Special Issue on Mobile Human–Computer Interaction

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Mobile and wearable devices (e.g., smartphones, FitBit, and Apple Watch) are among the most transformative technologies that have created a rapid worldwide impact on almost every aspect of our social and working lives due to their ubiquity, pervasiveness, and portability. Built-in sensors (e.g., accelerometer, gyroscope, and ambient lighting sensors) and external sensors have increased the variety of possibilities for interactions between users and those devices, such as touch-based and gestural interaction. Mobile and wearable devices are creating new ways of conducting business and changing how people communicate, interact, and entertain. Despite the increasing popularity of mobile applications, usability, accessibility, and interaction remain as significant challenges.

This special issue focuses on examining issues and techniques related to human–computer interaction (HCI) in mobile computing, hereafter referred to as mobile HCI. We received more than 30 submissions to the special issue. After two rounds of rigorous review process, seven articles were accepted for publication in this special issue. These articles present significant, cutting-edge research findings and best practices in the field, and build a bridge from current and emerging research to the future.

The first article entitled "The Effects of Visualization and Synchronization on Clustered-based Mobile Web Search" by Ashwag Alasmari and Lina Zhou examines the effect of the presentation of search engine results on the limited screen size of mobile devices on search efficiency, search effectiveness, and navigation efficiency in the context of close-ended (search target is one item) and open-ended (search target is multiple items) tasks. Drawing on cognitive load theory and information foraging theory, the authors hypothesize that the effect of synchronous versus asynchronous presentation of search engine results and list-based versus radial-based presentation of clusters of search engine results is moderated by the type of search tasks (i.e., close-ended versus open-ended). The findings of their experimental study suggest that radial visualization enhances search and navigation efficiency, particularly for open-ended tasks, whereas synchronous presentation improves navigation efficiency.

The second article, "Tripartite Effects: Exploring Users' Mental Model of Mobile Gestures under the Influence of Operation, Handheld Posture, and Interaction Space" by Kening Zhu, Xiaojuan Ma, Haoyuan Chen, and Miaoyin Liang, examines the effect of three types of text-related operations (caret positioning, input configuration, and text editing), three types of handheld postures (one-hand holding with one-thumb operating, one-hand holding with one-index-finger operating, and two-hand holding with two-thumbs operating), and three interaction spaces (on-screen, mid-air, and combined) on users' mental models through user-defined mobile gestures. The results of their experimental study indicate that each of the three factors has an effect on users' mental models. The findings suggest that users assign different meanings to on-screen versus mid-air gestures, and the types of user-defined gestures in mid-air are more functionality oriented than those that are on-screen. Different gestures are also likely to be assigned to different fingers such that both thumbs can access the "hard-to-reach" area of the device screen or specify an area on the device screen. It is easier to evoke mental images using text editing operations than caret movements or input configurations, and caret movements have higher conceptual complexity than text editing and input configurations.

The third article entitled "Adapting the Navigation Interface of Smart Watches to User Movements" by Fan Mo, Jia Zhou, and Shuping Yi used a within-subjects experimental study to assess the effect of user movement (sitting, walking, and running) and navigation aids (no aids, static aids, and animated aids) on task effectiveness, task efficiency, perceived ease of use and usefulness, perceived cognitive workload, and flow experience. The results suggest that the use of smart watches while running has a negative effect on task effectiveness (i.e., success rate of operations), perceived ease of use and usefulness, perceived cognitive overload, and flow experience. There is a moderating effect of user movement and type of navigation aids on perceived cognitive overload and perceived ease of use and usefulness, such that static navigation aids are more suitable for sitting and walking, whereas animated navigation aids are more appropriate for running.

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The fourth article, "ContextZoom: A Single-Handed Partial Zooming Technique for Touch-Screen Mobile Devices" by Jianwei Lai, Dongsong Zhang, and Sen Wang, presents ContextZoom, a single-handed interaction technique that supports zooming with a thumb on touch-screen mobile devices. Different from existing zooming methods, ContextZoom allows users to specify any location on a mobile device screen as a zooming center, which will remain at the original location after zooming to avoid the common problem of losing a target on the screen. In addition, ContextZoom enables partial zooming, namely zooming in/out of a portion of a viewport, so that users can maintain a sense of context and a mental model of the navigation space. An empirical evaluation of ContextZoom through a controlled laboratory experiment shows that, when equipped with ContextZoom, users' performances with the Google Maps' single-handed zooming technique and the button-based zooming technique in partial viewport zooming were improved significantly in terms of task completion time and number of discrete actions. Higher levels of perceived effectiveness and overall satisfaction were observed with ContextZoom than without it.

The fifth article entitled "Visual Impairments and Mobile Touch screen Interaction: State-of-the-Art, Causes of Visual Impairment, and Design Guidelines" by Radu-Daniel Vatavu presents factors that cause visual impairments for touch and gesture input on smart mobile devices. It groups these factors into users, devices, and environments, and provides design guidelines to improve the accessibility of such devices for people with visual impairments. Mobile accessibility has been drawing increasing attention from researchers due to the rising number of smartphone users with cognitive and physical disabilities. In the past decade, there has been an increasing amount of research focusing on developing new interaction techniques and tools to make mobile devices and applications more accessible and easier to use for users with visual impairments (e.g., color blindness and legal blindness).

The sixth article entitled "Human Robot Engagement and Acceptability in Residential Aged Care" by Rajiv Khosla, Khanh Nguyen, and Mei-Tai Chu presents a case study on the use of assistive social robots to enhance emotional, visual, behavioral, and verbal engagement of people with dementia. The results indicate that social robots can enhance emotional, visual, and behavioral engagement of people with dementia. Overall, these robots were well received by people with dementia.

The seventh and last article, "Inviting Strangers to Participate in Collaborative Consumption through Mobile App" by Hong Chen, Chee Wei Phang, and Chenghong Zhang, used a field experiment to examine the effect of four (i.e., 2×2) conditions (i.e., morning versus afternoon, and active versus passive message framing) on extending invitations to strangers to participate in a collaborative consumption opportunity through a mobile app. Drawing on ego depletion theory, the authors hypothesize that there are a greater number and proportion of stranger invitations in the morning than in the afternoon, and that an actively framed promotional message is more effective in extending stranger invitations in the morning whereas a passively framed message is more effective in the afternoon. It is found that people invite a greater number and proportion of strangers in the morning than in the afternoon. Additionally, an interaction effect is observed where the main effect of message framing on the number of stranger invitations is significant in the morning but not in the afternoon. The main effect of message framing on the proportion of stranger invitations is significant in both the morning and afternoon. In general, the use of actively framed messages is highly encouraged in the morning for extending invitations to strangers.

Each of the above seven articles included in this special issue addresses a unique challenge in mobile HCI. We would like to thank the co-editors-in-chief of IJHCI, Drs. Gavriel Salvendy and Constantine Stephanidis, for giving us the opportunity to edit this special issue and all of the reviewers for their contributions to make this special issue possible.