



Special issue on ambient intelligence and ergonomics in Asia 2017

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Published online: 19 September 2023

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The concept of ambient intelligence (AmI) was proposed in 2001. Over the years, many AmI applications have become more common and less expensive. Take the smart home, for example. A smart switch that can be controlled from a remote smartphone now costs less than \$100. However, after years of attempts, some AmI applications have proven to be unsuccessful, such as smart clothing, which is one of the key technologies for telemedicine. Until recently, technical, cultural, and market conditions did not support the widespread adoption of smart clothing.

This special issue contains selected papers from the 3rd International Conference on Ambient Intelligence and Ergonomics in Asia (AmIE 2017), held in Kyoto, Japan, 21–25 August 2017. AmIE 2017 is the third conference in this series. The conference attracted a large number of scientific papers, contributing to the state-of-the-art in the fields of ambient intelligence and ergonomics. After rigorous review, twelve articles from researchers around the world were finally accepted.

Identifying patients with potential acute coronary syndrome (ACS) in the emergency department (ED) is a critical task. To this end, one paper developed a new rapid assessment system for triaging patients with possible ACS in the ED. First, latent class analysis was applied to identify key symptoms and medical history. Significant variables from the latent class analysis were then used as predictors for the new classification system. The system performance was evaluated by indicators such as false alarm rate, hit rate, and discriminative index.

Fuzzy co-clustering is a promising approach to efficiently implement collaborative clustering. There are three main partitioning models for fuzzy co-clustering, namely user-objective partitioning, (weak) double-exclusive partitioning, and hybrid methods. Another paper conducted a

comparative study of the applicability of three partitioning models to two real datasets.

One paper investigated the impact of various stimuli on impulse buying, an important topic in m-commerce and personal recommendation. Based on the regulatory focus theory, it was hypothesized that the two personality traits of facilitation focus and prevention focus affect consumers' impulse buying, cognitive dissonance and satisfaction, and ultimately lead to consumer loyalty (attitudinal and behavioral loyalty). Data from 505 customers who bought clothes on the Internet were collected to test the conceptual model.

Measurement of joint angles is required in professional and amateur sports and health services to improve and evaluate human motion. To that end, another paper attached lightweight strain sensors to joints in human skin, allowing them to measure stretching of the skin without impeding joint movement. An algorithm was also presented to estimate the joint angles for skin stretching from a simple mechanistic model.

One paper combined social relationship analysis with the linguistic *viseKriterijumska optimizacija i kompromisno resenje* (VIKOR) method to evaluate projects introducing new AmI products. The proposed methodology evaluated the overall performance of new AmI products and the impact of AmI products on existing AmI products.

Another paper designed a learning aid system for school-aged children. To understand the behavior and psychology of the target population, empathetic design methods were applied. First, the behavioral phenomenon of school-age children was described through participant observation. Then, a stepped interview was conducted to obtain qualitative data. Based on the results, an entailment matrix analysis was performed, from which a streamlined hierarchical value map was created.

The risk of injury increases with the weight and frequency of lifting tasks. However, the combined effect of these two factors is unclear. One paper looked at the effect on injury risk of various combinations of weight and frequency of lifting tasks, assuming the same weight was lifted over a period of time. The risk of injury was measured using objective

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indicators such as oxygen consumption, heart rate, and weight lifting index (LI) proposed by the National Institute for Occupational Safety and Health (NIOSH) and subjective indicators such as the perceived exertion rating (RPE).

Another paper analyzed the effect of layout type and spatial information display type on elderly visitors' sense of presence and spatial recognition to find out which layout type was most suitable for creating a pleasant atmosphere. In this way, seniors had the opportunity to easily explore various artworks in a 3D virtual art gallery.

One paper examined factors that influence reading time, error rates, visual fatigue, and mental load in subjects wearing a monocular optical head-mounted display (OHMD). Experimental results showed that the 16.5:1 contrast ratio and 28 point font size in the sitting state and the 16.5:1 contrast ratio and 32 point font size in the walking state had the longest reading time and the lowest error rate. These results provided very useful reference information for OHMD interface design.

Frequent and repetitive neck flexion while switching between glances at computer screens and keyboards is a key cause of upper body musculoskeletal disorders. To address this issue, another paper designed a visual aid consisting of a video display program and a CCD camera to reduce neck bending and flexion. Experimental results showed that the use of visual aids can effectively improve body posture and reduce repetitive neck flexion without sacrificing typing speed.

Predicting possible engine failures is a critical task in aircraft maintenance control. To this end, one paper proposed a hybrid approach combining principal component analysis (PCA), classification and regression trees (CART), and backpropagation networks (PCA-CART-BPN). According to the experimental results, the proposed PCA-CART-BPN method improved the prediction accuracy by 39% over the existing PCA-CART method.

Another paper analyzed users' perceptions of charts presented using various visualization techniques, thereby establishing "principles of infographic design." They used Octopus network data collection software to collect tourism-related social big data on Facebook fan pages, and used Tableau visualization software to generate six different types of charts (10 charts in total). The experimental results showed that the element size, color, color gradient, data, sorting, and title of the chart significantly affected the user's perception of the chart.

We would like to thank JAIHC Editor-in-Chief Vincenzo Loia for his full support in launching this special issue. We thank paper contributors who share their research, and reviewers who take the time to review papers. We would also like to thank the journal staff. Without their support and professional assistance, the pre-publication process would not have been possible.

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