

Guest Editorial- Special Issue on “Sensor/Recognition-based Learning in Contextual Surroundings”

Recent advances in sensors and recognition technology give a great potential for creating brand new environments for interaction and learning. Ubiquitous sensors and recognition technology can enhance interaction, learning and playfulness by employing sensors, recognition and advanced interactive technologies to create a joyful and meaningful interaction environment. They offer users flexible and tangible ways to interact with or learn from authentic environments with meaningful information through sensors and recognition technology. Sensors and recognition technologies can therefore facilitate users to have an authentic interaction with surroundings and explore the problems with useful information from digital space. The availability of sensors and recognition technology-based virtual reality/augmented reality environments is recognised as a key asset to investigate new interactive and learning models between human-to-computer and human-to-human interactions. Therefore, the sensors and recognition technology has been recognized as promising facilities in interaction, learning and entertainment. It will potentially integrate the physical and digital worlds providing a more joyful and highly interactive learning environment.

Sensors and recognition technologies are one of the major research topics in the field of technology enhanced learning and interaction recently. Researchers have designed applications or systems with multimedia, sensors and intelligent recognition to enhance learning and interaction in an authentic context from various aspects of pedagogical principles, activity designs and technological issues, etc. Technologically, context recognition applications employ advanced cloud computing and multimedia recognition technology while intelligent sensors devices utilize embedded chips and sensors together with ubiquitous technologies. Pedagogically, the key point to make sensors/recognition applications for learning/interaction successful is to enable active participation and social interaction with others and sharing their experiences together for facilitating individual/team work. The big challenge is how to sustain users' motivation and how to engage them in meaningful interaction and effective learning. Therefore, sensors and recognition based applications may offer new angles for exploring all those designing issues in education and interaction.

This special issue presents a range of studies exploring the challenges of using sensors and recognition technology to enhance learning, interaction and playfulness. It is hoped it will encourage interested experts and researchers to develop novel and imaginative ideas to explore and meet the needs of this rapidly expanding and exciting field of research.

In this special issue, we have tried to include best papers dealing with extended in-depth analysis of sensor-based and/or recognition-based learning in contextual surroundings, also taking into account the target audience of the journal, *Interacting with Computers*. We are thrilled to have accepted six papers

in this special issue; a brief synopsis of each now follows.

In the paper “*A Novel Sensor-based Methodology for Learner's Motivation Analysis in Game-based Learning*”, Ghergulescu and Hava Muntean present a novel methodology to measure and to analyze a learner's game-based learning motivation based on an Electroencephalography (EEG) sensor. The presented methodology outperforms the traditional one, as it measures and analyzes learning motivation automatically and in real-time, without breaking a learner's flow and immersion in a game.

Yang and Chiu discuss how the traditional note-taking process can be advanced in the paper “*Note-Taking for 3D Curricular Contents using Markerless Augmented Reality*”. An innovative note-taking approach is based on application of augmented reality and a combination of head-mounted displays with cameras and wearable computers. This approach allows learners to take notes on 3D interactive curricular content in contextual surroundings and its strengths and weaknesses are demonstrated through an analytic hierarchy process.

The paper “*A virtual experiential learning and students' ill-structured problem-solving ability*” Wang et al. reports on developed 3D virtual environment (3DVC) to facilitate students' problem-solving skills. 3DVC was developed by combining situational problem-solving learning and virtual reality and students' problem-solving learning can be significantly improved in the environment.

Chen et al. explored various effective strategies to guide students' learning in context-aware learning environments in the paper “*A Progressive Prompting Approach to Conducting Context-Aware Learning Activities for Natural Science Courses*”. A progressive prompt-based context-aware learning approach is proposed in the paper in order to improve students' learning performance. The authors compared this approach with a conventional one based on single-stage prompts and found that a progressive prompting approach is more beneficial for students' learning.

In the paper “*Learning with the body: An embodiment-based learning strategy enhances performance of comprehending fundamental optics*” by Hung et al., an embodiment-based learning strategy was explored, particularly with respect to how this strategy enhances learning. Accordingly, the feasibility of an embodiment-based learning strategy is tested in the paper and it is demonstrated that the proposed strategy can enhance learners' performance on fundamental optics compared to other traditional strategies.

Huang et al. in the paper “*Empowering classroom observation with an e-book reading behavior monitoring system using sensing technologies*” tried to understand students' reading processes in order to provide individual reading guidance. An e-book Reading Behavior Monitoring System, based on eye-tracking and touchscreen sensing techniques is proposed in the paper and it is usable and functional

in term of assisting educators to observe students' reading behavior.

In conclusion, we are hopeful that the selection of excellent papers in this Special Issue will inspire further exciting work in the area; all have highlighted the potential of sensor-based contextual learning and the future is promising. Finally, the Guest Editors of this Special Issue indeed thanks the following experts for sharing their expertise in the review of the articles in this Special Issue.

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