Editorial

Peter Brusilovsky and Mike Sharples

Dear Readers,

We are pleased to introduce the last issue of the *IEEE Transactions on Learning Technologies* for 2013. With this issue, we are completing the sixth year of the journal's existence. This issue features eight papers that advance two popular research subfields in the area of Learning Technology: Computer-Supported Collaborative Learning (CSCL) and Intelligent Educational Systems. Within these subfields, the variety of approaches and domains explored by the papers is very large, so we hope this issue will be of interest to the broad community of researchers.

The first paper, "Using Speech Recognition for Real-Time Captioning and Lecture Transcription in the Classroom" by Rohit Ranchal and colleagues, describes the use of commercial speech recognition software to produce real-time captions of lectures and to provide students with post-lecture multimedia transcripts that combine the instructor's recorded voice and Microsoft PowerPoint slides with a written transcript. A pilot study of the post-lecture transcription with nine students on a graduate-level course found significantly increased scores on optional online quizzes and on compulsory class exams compared to scores by the same students on a later part of the course without the transcription service.

In their paper "Providing Collaborative Support to Virtual and Remote Laboratories," a team from the Open University of Spain (UNED) and Alicante University describe an extension of the Moodle and Easy Java Simulations to support collaborative working with Virtual and Remote Laboratories (VRLs). Distance learning students were able to engage in reciprocal teaching, problem-based learning, and cooperative work while interacting with simulated physics experiments. A cohort study of students using collaborative tools showed benefits, including increased engagement, compared to the previous year where students only had individual access to the VRL.

The paper "Enabling Teachers to Deploy CSCL Designs across Distributed Learning Environments," presented by a research team from the University of Valladolid, attempts to bridge the "deployment gap" between learning design tools and the different platforms that "enact" the designs with a teacher-friendly, platform-independent tool called GLUE!-PS for developing and deploying learning designs. The evaluation of the new tool demonstrated its feasibility and provided insights for further work.

The next two papers are devoted to two special groups of educational recommender systems: the new research area on the crossroads of artificial intelligence and learning technology. The paper "Tag-Based Collaborative Filtering Recommendation in Personal Learning Environments" by Mohamed Amine Chatti and colleagues presents an extensive offline and online user evaluation of 16 different tag-based recommendation algorithms. Among other results, the paper demonstrates that the offline evaluation of recommender systems does not necessarily correlate with their user evaluation, thus emphasizing the importance of user evaluation of educational recommender systems.

The paper "An Effective Recommendation Framework for Personal Learning Environments Using a Learner Preference Tree and a GA," authored by Mojtaba Salehi and colleagues, explores a recommendation approach based on preference trees and genetic algorithms. The authors demonstrate that the proposed approach can alleviate cold-start and sparsity problems and also generate a more diverse recommendation list.

The next two papers bring us back to a more traditional application of artificial intelligence in education: Intelligent Tutoring Systems (ITS). Philippe Fournier-Viger and colleagues, in their paper "A Multiparadigm Intelligent Tutoring System for Robotic Arm Training," explore a rather unusual domain for this category of systems: industrial robotics. The challenges of this ill-defined domain led the authors to explore a multiparadigm approach. The results of this work demonstrate that combining several paradigms can help overcome each paradigm's limitations because different approaches may be better suited for different parts of the same ill-defined task

The paper "A Theory-Driven Approach to Predict Frustration in an ITS" by Ramkumar Rajendran and colleagues proposes an automated approach to detecting frustration in users of ITS systems based on a definition of frustration as "an emotion caused by interference preventing one from reaching a goal." This was operationalized in a model to detect learners' frustration when using the Mindspark mathematics ITS. A study of 27 high school students showed that the model gave high scores for accuracy and precision in predicting frustration when validated against human observation of the students' facial expressions. The theory-informed approach also performed better for precision and was equal in accuracy compared to previous data-driven approaches.

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In their paper "Machines that Learn and Teach Seamlessly," Gary Stein and colleagues describe a study of a Learning And Teaching Agent (LATA) that can learn to perform a task in a simulated environment by a combination of observing expert human performance and practicing the task, and then teaching that task to other human learners. The PIGEON algorithm uses an artificial neural network and genetic algorithm techniques to learn and then teach a task to control a simulated crane moving boxes around a flat surface. Teaching was performed by haptic feedback to the human learners. A trial with student volunteers indicated that the test subjects were able to use the LATA coach to gain a high level of task proficiency, though there was not conclusive evidence that the haptic training was more effective for this task than learning the skill through self-managed practice.

Enjoy your reading!

Peter Brusilovsky, *Editor-in-Chief*
Mike Sharples, *Associate Editor-in-Chief*