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Intelligent Tutoring Systems

12th International Conference, ITS 2014
Honolulu, HI, USA, June 5-9, 2014
Proceedings

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Preface

The 12th International Conference on Intelligent Tutoring Systems (ITS 2014) was held during June 5–9, 2014, in Honolulu, Hawaii, USA. This biennial conference focuses on research that investigates the use of intelligent systems and advanced computing technologies with close ties to interdisciplinary research for enabling, supporting, or enhancing human learning. A major direction of the series of ITS conferences is using Artificial Intelligence technologies for adapting systems to learners, modeling those learners, and providing the best-suited learning material based upon both the learner and the context. An important emphasis within the ITS community is on supporting interaction with adaptive systems as well as on the social construction of knowledge.

Reflecting the importance of this interactivity, the theme of the ITS 2014 conference was *Creating Fertile Soil for Learning Interactions*. Much as the volcanic islands of Hawaii have, over time, developed fertile ground that supports iconic biodiversity, the ITS research community is poised to see decades of rich ITS research come together to produce highly interactive systems that support a broad diversity of learner needs. With an emphasis not only on developing technologies to support learning, but on making fundamental discoveries regarding teaching and learning, ITS 2014 brought together researchers from computer science, learning sciences, cognitive and educational psychology, sociology, cognitive science, artificial intelligence, machine learning, and linguistics.

Submissions were received within three tracks. The Main Scientific Program Track was chaired by Stefan Trausan-Matu and Kristy Elizabeth Boyer; the Workshops and Tutorials Track was chaired by Min Chi and Roger Azevedo, and the Young Researchers' Track was chaired by Winslow Burleson and Tsukasa Hirashima. The Young Researchers' Track papers are included in this volume, while Workshop proceedings were prepared separately by the workshop chairs and distributed alongside the electronic proceedings at the conference.

The international response to the call for papers yielded 177 papers to the main scientific track from 28 different countries. Reviewing these submissions was a highly diverse Program Committee of 162 members. There were a minimum of three reviews per submission including at least one senior Program Committee member. Below is the number of authors and PC members from each country that participated in this year's conference by submitting their work or by reviewing papers.

ITS 2014 followed a triple-blind reviewing process: reviewers did not see author names, authors did not see reviewer names, and reviewers did not see each others' names during the review and discussion process. We worked to ensure a high quality and fair reviewing process, and we are tremendously grateful for the senior PC and regular PC members who contributed to reviewing.

Conflicts of interest were identified so that no paper was assigned to a reviewer from the same institution or who was a close collaborator of the papers' authors. The program chairs made the final decisions for acceptance on the basis of the reviews, discussions, and meta-reviews. When needed, the program chairs carefully read the papers and sought additional reviews to resolve inconsistencies.

Country	Authors	PC Members
Algeria	-	1
Australia	9	1
Austria	-	1
Brazil	51	10
Bulgaria	-	2
Canada	38	14
China	2	-
Colombia	1	-
Cyprus	2	-
Denmark	-	3
Egypt	2	-
France	18	12
Germany	10	8
Greece	3	1
India	5	-
Ireland	-	1
Italy	5	5
Japan	32	10
Korea	-	2

Country	Authors	PC Members
Lebanon	1	-
Mexico	1	2
Netherlands	4	3
New Zealand	2	3
Philippines	7	2
Poland	1	-
Portugal	2	1
Qatar	1	-
Romania	2	2
Saudi Arabia	2	1
Slovakia	-	1
Slovenia	7	-
Spain	7	3
Switzerland	4	2
Taiwan	5	4
Turkmenistan	-	-
United Kingdom	3	13
United States	286	58

Of the 177 submissions to the main scientific track, 31 were accepted as long papers (17.5%). Additionally, 45 submissions were accepted as short papers, representing high quality work that was deemed by the reviewers to be perhaps slightly less mature than the work accepted as long papers. Both long papers and short papers were presented as oral presentations at the conference. Finally, 42 submissions were accepted as posters which were presented as interactive poster exhibits at the conference. One special panel, "Grand Challenges for Intelligent Tutoring Systems in STEM: Progress and Perspectives" was organized by Xiangen Hu, Benjamin Nye, Art Graesser, Neil Heffernan, Kurt VanLehn, and Beverly Woolf.

Long papers were provided 10 pages, short papers 6 pages, and poster papers 2 pages in the proceedings. Authors could optionally purchase up to 2 additional pages for each paper, resulting in long papers occupying up to 12 pages, short papers up to 8 pages, and poster papers up to 4 pages in this volume.

The papers within the main scientific track span a range of topics, and have been organized into groups in these proceedings in a necessarily subjective way. The major topics reflect the sessions in which the conference presentations were

organized: affect and metacognition; ITS scaling and assessment; collaborative learning; dialogue and discourse; data mining and student behavior; graphical representations and learning; game-based learning and simulation; dynamic hints and scaffolds; student strategies and problem solving.

Topic	Submissions	Accepted	Acceptance Rate	PC Members
Privacy and security in e-learning environments	-	-	-	3
Recommender systems for learning	7	3	0.43	32
Co-adaptation between technologies and human learning	7	3	0.43	20
Informal learning environments, learning as a side effect of interactions	9	3	0.33	14
Multi-agent and service-oriented architectures for learning and tutoring environments	9	6	0.67	11
Ontological modeling, Semantic web technologies and standards for learning	10	6	0.60	26
Non conventional interactions between artificial intelligence and human learning	10	8	0.80	10
Ubiquitous and mobile learning environments	10	6	0.60	11
Virtual pedagogical agents and learning companions	18	11	0.61	28
Instructional design principles or design patterns for educational environments	19	15	0.79	13
Dialogue and discourse during learning interactions	21	15	0.71	26
Simulation-based learning and serious games	22	17	0.77	30
Authoring tools and development methodologies for advanced learning technologies	22	14	0.64	26
Collaborative and group learning, communities of practice and social networks	26	15	0.58	39
Empirical studies of learning with technologies, understanding human learning on the Web	29	22	0.76	32
Modeling of motivation, metacognition, and affect aspects of learning	30	21	0.70	37
Domain-specific learning technologies, e.g., language, mathematics, reading, science, medicine, military, and industry.	35	23	0.66	18
Educational exploitation of data mining and machine learning techniques	43	35	0.81	34
Adaptive support for learning, models of learners, diagnosis and feedback	55	38	0.69	54
Intelligent tutoring	92	68	0.74	62

We wish to thank of all the authors, the members of the Program Committee and the external reviewers, the Steering Committee and in particular Claude Frasson and Stefano Cerri for their advice and help, and the Organizing Committee. Such an event would not have been possible without their commitment, professional effort and patience. We also wish to thank the creators and maintainers of the Easychair online conference management system, without which the review process and proceedings creation would have been tremendously difficult. Easychair's reliable and expansive set of functionality was a great help.

We hope that you enjoy these proceedings. It has been a great pleasure to serve the ITS research community by assembling them.

April 2014

Stefan Trausan-Matu
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With sincere thanks to the sponsors of the conference, including:



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