Preface

This volume contains a number of selected and extended contributions to ICTERI 2016, the 12th International Conference on Information and Communication Technologies (ICT) in Education, Research, and Industrial Applications: Integration, Harmonization, and Knowledge Transfer.

The conference was held in Kiev, Ukraine, during June 21–24, 2016, with a focus on research advances in ICT, business/academic applications of ICT, and design and deployment of ICT Infrastructures.

ICTERI 2016 continued the tradition of hosting co-located events, this year by offering three workshops and a PhD Mentors Panel. The workshops addressed: (1) long-standing research aspects of reliability modeling and assessment, (2) cross-disciplinary issues in the use of information technology in economics and finance, and (3) new uses of information technology for life-long learning. The PhD Mentors Panel provided the opportunity to PhD candidates to listen to and discuss promising topics for research offered by several renowned experts.

As in previous years, the ICTERI 2016 proceedings have been published as a CEUR-WS volume (http://ceur-ws.org/Vol-1614/), containing 62 papers selected from a total of 122 submissions. Of these papers, the 18 best were chosen by the program and workshop chairs to be submitted in substantially extended and revised versions for the proceedings volume. Out of these, 16 were resubmitted. Again, these papers were reviewed by at least two experts regarding scientific and technical quality, anticipated reader interest, and coverage of the conference scope. Finally, the Proceedings Committee selected the ten most mature and interesting papers for publication after further revision. The acceptance rate thus is 8.2% regarding the overall number of ICTERI 2016 submissions.

The papers in this volume focus on architecture, augmented reality, case-based reasoning, multi-state systems, cloud computing, scalable parallelism, artificial neural networks, malicious code and intrusion detection, deterministic and stochastic models, didactic models in practice, research-based education and mobile learning environments, and teaching strategies.

In their invited paper, Sandra Stinčić Clarke, John Davies, and Mike Fisher explain the role of an information broker in an open ecosystem, address the challenge of data interoperability in the IoT context and describe the Hypercat standard. This standard allows for a uniform access to distributed data repositories (data hubs) analogously to standard Web protocols and formats like HTTPS, JSON, and REST. Several examples of IoT applications that use data from Hypercat-enabled data hubs are presented.

Mykola Tkachuk et al. present a three-level architecting approach to adaptive resource management in mobile augmented reality systems (MARS). This approach proposes an ontology of adaptive MARS resources on the conceptual level, a generic algorithmic model on the logical level, and a reference software architecture on the physical level.

Myroslav Komar et al. discuss the integration of artificial immune systems (AIS) and artificial neural networks (ANN) as a basis for intelligent cyber defense systems. The idea is to detect network attacks and malicious code based on AIS principles and detectors that have an ANN structure.

Elena Zaitseva et al. present an approach that uses ordered fuzzy decision trees to overcome the problem of constructing a system's structure function in the case of incomplete information.

Eugene Tulika et al. describe the use of rewrite-rules for transforming legacy Fortran applications to be executed in the cloud. Resource allocation is optimized by adopting service choreography.

Gregory Zholtkevych et al. present an approach to reveal relationships between components of natural systems with feedback. Two models are discussed that allow one to determine the direction of pairwise relationships in the deterministic case and the direction and strength of relationships in the stochastic case.

Leo van Moergestel et al. address the process of redesigning a computer science (CS) curriculum and introducing blended learning in a CS educational program. The successes of the new program as well as the problems encountered are discussed.

Yuriy Kondratenko et al. discuss the correlation between research-based education, government priorities, and research funding with a special emphasis on the role of ICT in the education of engineering students. As an example, the use of modeling methods for the implementation of prosthesis and robotics research projects is presented.

Mariya Shyshkina describes a cloud-based learning environment and proposes some indicators for quality evaluation.

Nataliya Osipova et al. address the systematic use of mobile learning technologies for facilitating learning as well as ensuring accessibility, equity, individualization, and flexibility. As an example, a model for learning English phonetics is proposed.

Finally, Nataliya Kushnir et al. report on experiences made when preparing school teachers and university lecturers to use ICT in the educational process. The approach applied was that of master classes, which comes with the advantage of being short term and allowing for productivity at work.

This volume would not have materialized without the support of many people. First, we are very grateful to all the authors for their continuous commitment and intensive work. Second, we would like to thank the Program Committee members and additional reviewers for providing timely and thorough assessments. Furthermore, we would like to thank all the people who contributed to the organization of ICTERI 2016. Without their efforts there would have been no substance for this volume.

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Athula Ginige
Heinrich C. Mayr
Dimitris Plexousakis
Mykola Nikitchenko
Vadim Ermolayev
Grygoriy Zholtkevych
Aleksander Spivakovskiy

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