
Editorial

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Biographical notes: Marina Čičin-Šain is a Professor at the Faculty of Economics and Business Administration, University of Rijeka, Croatia and the Head of the Computer Science Department at the same faculty (from 2000). She obtained her Degree in Mathematics from the University of Zagreb, Croatia. Before her academic career, she spent ten years in industry, working for Ina Institute and IBM Systems as a Software Engineer. She has an extensive publication list with over a hundred scientific papers. She is Chair and a founder of MIPRO's Computer of Education conference.

Jadranka Sunde received her Degree in Mathematics from the University of Zagreb, Croatia in 1984 and her PhD from the University of Adelaide, Australia in 1997. She was involved in teaching mathematics using computers during her time with University of Adelaide before joining Defence Science and Technology Organisation (DSTO) in 1997, working in the communication area (simulation and modelling), then biometrics (face recognition) and object detection. Her main fields of interest are object detection and human system integration.

MIPRO¹ (Micro and PROcessor) is both the name of the Croatian Society for Information and Communication Technology, Electronics and Microelectronics, and the name of the international convention organised by this society. MIPRO was established in 1978 as one of the first gatherings on the application of micro-computers in the central part of Europe. Today MIPRO is not only an academic gathering, but a meeting of researchers and practitioners from the areas of economy, science, education, state

administration and local government and it is organised as ten conferences, several tutorials, workshops and exhibition:

- 1 MEET - Microelectronics, Electronics and Electronic Technology
- 2 GVS - Grid and Visualisation Systems
- 3 CTI - Telecommunications and Information
- 4 CTS - Computers in Technical Systems
- 5 CIS - Intelligent Systems
- 6 CE - Computers in Education
- 7 DE - Digital Economy
- 8 ISS - Information Systems Security
- 9 BIS - Business Intelligence Systems
- 10 GLGPS - Government, Local Government, Public Services.

The majority of papers selected for this special issue are from the 'Computers in Education' conference founded by Marina Čičin-Šain and Pavle Dragojlović. The scope of this conference is education and methods of teaching computer science, implementation of computer technology in schools, distance learning, computer aided learning and computer aided education.

The first Computers in Education (CE) conference organised under MIPRO was held in 1997, with seven contributed papers in the Croatian language only. From 1998, English was added as an official language and since then, the number of papers contributed has grown steadily from 17 that year; 24 in 1999, 25 in 2000, to 84 in 2009. In 2001, reviewing by two independent reviewers was introduced.

Teaching computer science is not like teaching other subjects, mainly due to intensive developments in information and computing technologies. Apart from computer science, new technologies are being used in other educational subjects which often at the same time frighten and excite teachers. Because of this, continuing education of teachers is needed.

MIPRO's CE conference provides a forum where teachers and others involved in continuing education can meet and exchange ideas and experiences. Its audience is mainly comprised of those that look after education and the application of new technology and those who use computers when educating others. It attracts interest from teachers of computer science, from primary school to undergraduate level, including teachers of other subjects, such as mathematics, economy and geography. There is also interest from industry (those using computers in their business have an interest in continuing education of their staff), early childhood educators, teachers working with people with disability, students, school principals with organisational issues, and hardware, software and web maintenance specialists.

The first group of papers selected deal with the visual interaction between a student or an operator and the image-based computing system, with an emphasis on ways of improving the effectiveness of the interaction:

- The paper by Hanton et al. reports on ways of increasing the human operator effectiveness in detecting and identifying objects in infrared imagery using image enhancement techniques such as super-resolution image reconstruction and deconvolution. In this paper, a technique for assessing image quality improvement is proposed by looking at operator performance and applying a variety of different cognitive and perceptual tests to identify possible innate ability.
- The paper by Bedi et al. looks at virtual identification using avatars. Within an online course that was administered using Moodle LMS, “Manipulating images with GIMP”, the students were given the opportunity of setting up avatars in order to create visual identities.
- The paper by Ceraj et al. describes how StarBiochem, a protein visualisation tool is used to assist in teaching key structural biology concepts in an interactive manner. StarBiochem allows for the visualisation and manipulation of protein data bank molecules in a 3D environment. Examples of StarBiochem usage in undergraduate courses at the Massachusetts Institute of Technology (MIT), Brandeis University, and in high school outreach programs at the Broad Institute of Harvard and MIT, and at the MIT Museum.
- The paper by Cerovac et al. describes a computer simulation of approximate methods concerning multiple-diffraction developed in MATLAB to help students studying network design, and to understand how the diffraction phenomenon works.

The second group of papers look at data warehouses, economy and information systems in organisation merging;

- The paper by Pighin and Ieronutti looks at data warehouses and how design strategies, including as the structure and content of the original databases influence the effectiveness of such tools. A solution is presented that based on a set of metrics measuring different characteristics of the original data sources, effectively supports the creation of data warehouses with examples provided.
- In the paper by Pivac et al. the authors provide a user-friendly approach that could help users to easily solve complex statistical and mathematical calculations, which could be useful for students of economic sciences in quantitative analysis using Excel. Economics concepts are studied according to the basic postulates of the Engel curve and the results presented, interpreted and analysed.
- The paper by Jaakkola et al. looks at enterprise migration, the process in which two or more companies merge into one, with particular emphasis on the integration of information systems of the merged organisations. In addition, some migration and adaptation cases based on publicly available information are introduced and analysed.

The third group of papers look at computer based assessment of students and student motivation:

- In the paper by Čupić, a case study based on multiple-choice tests for university level courses such as digital logic and artificial intelligence is presented. Multiple-choice questions can be used to assess the student's knowledge – not only student's recall, but also the verification of the student's analysis and synthesis abilities. An open source application developed by authors is presented that can foster such a process.
- Petković et al. look at standardised multiple-choice online questions tests. During the last two years in teaching the course 'Signals and System', both online and written, proctored and non-supervised, multiple-choice questions tests were used in production environment (in vivo) and results compared.
- Jadrić et al. examine the extrinsic and intrinsic motivational factors influencing the success of students in a non-moderated e-learning course on the topic of online communication and psychological aspects of internet use are investigated. Data on a study involving students of economics is presented.

The final papers deal with intelligent agents and information:

- In the paper by M. Nadrljanski and Batinica, the current state of the intelligent agents' research area is presented, with examples of some applications. The paper describes the usage of personal interactive TV, which is adapted for each individual user. Functionality of an interactive digital and personal electronic programme guide is described as the example of personalisation, which refers to a particular problem of selecting TV channels by means of the intelligent agent.
- Dj. Nadrljanski and Božić give an interpretation of the meaning of the term 'information'. The ways in which information is quantified, the existence and influence of primary information barriers, and several crucial questions concerning the information capacity of different kinds of media are discussed.

The guest editors would like to express their appreciation to the authors for their contributions to this Special Issue on MIPRO Computers in Education, to the referees and to the Editor-in-Chief Professor Lakhmi Jain for his support.

Notes

- 1 More can be found at www.mipro.hr.