

# Preface to Special Section on Student Research in Informatics and Information Technologies

Mária Bieliková

Faculty of Informatics and Information Technologies, Slovak University of Technology, Ilkovičova 3, 842 16 Bratislava, Slovakia  
bielik@fiit.stuba.sk

Pavol Návrat

Faculty of Informatics and Information Technologies, Slovak University of Technology, Ilkovičova 3, 842 16 Bratislava, Slovakia  
navrat@fiit.stuba.sk

We are pleased to present a collection of papers on various topics within the area of Informatics and Information Technologies (IIT). The whole collection has been authored by students. We approached selected authors of papers originally presented at the annual IIT Student Research Conference, IIT.SRC 2011 which was organized by the Slovak University of Technology and attended by its students studying various study programmes at its Faculty of Informatics and Information Technologies.

The IIT.SRC Conference has been organized in its present format for seven years already, building up gradually a very successful tradition. The Conference is attended by students of all three levels of university education, i.e.

- the undergraduate ones,
- the graduate (Master) ones and
- the postgraduate (doctoral) ones.

They present results of their research as conducted within the framework of their studies. It is organized very similarly to any regular conference. It has its program committee, reviewers, reviewing process and accepting/rejection procedure. Perhaps the objective is slightly different, since we aim at offering a forum for a widest possible attendance of students, provided their papers meet at least some standard criteria of scientific merit without striving for low acceptance ratio.

This year, the IIT.SRC Conference attracted 98 research papers from which 89 were accepted (11 bachelor, 53 master, 25 doctoral students as authors) submitted by 134 student authors, which bears as a consequence that roughly 13% of all students are actively engaged in research to the extent they are able to write a paper on it.

The Conference was organized in five sections:

- Web Technologies and Engineering,
- Information Processing,
- Software Engineering,
- Computer Systems, Computer Networks and Security,
- Artificial Intelligence, Computer Science, Computer Graphics and Multimedia.

Students presented their papers in poster sessions organized in two time slots. This opened space for discussions on research projects also among the student authors. Most of the program committee members not only discussed with students their work but also served as evaluators. Papers and presentations of each section were evaluated by four members committees and best students were awarded.

## Dean's Award

### *Computer Systems, Networks and Security*

Filip Burda: Decreasing Packet Loss of VoIP Calls by Optimising Transport Network (supervisor: Margaréta Kotočová)

### *Web Technologies and Engineering*

Pavol Bielik, Peter Krátky, Štefan Mitrík, Michal Tomlein: Motivating Children to Increase Physical Activity by Means of Reward (supervisor: Michal Barla)

### *Information Processing*

Tomáš Kramár: Detecting Search Sessions Using Document, Metadata and Implicit Feedback (supervisor: Mária Bieliková)

### *Software Engineering*

Ján Súkeník: Solving of Image Similarity Puzzle – Singular Value Decomposition (supervisor: Peter Lacko)

### *Artificial Intelligence, Computer Graphics and Multimedia*

David Chalupa: Discovering the Ability of Graph Coloring Heuristics to Find Substructures in Social Networks (supervisor: Jiří Pospíchal)

## Best Paper Award

### *Bachelor (Bc.) Degree Program Category*

Jakub Ševcech: Automatic Web Content Annotation (supervisor: Mária Bieliková)

### *Master (Ing.) Degree Program Category*

Andrej Fogelton: Initialization of Multiple Objects Tracking using Flocking Behavior of KLT Features (supervisor: Matej Makula)

### *Doctoral (PhD.) Degree Program Category*

Peter Magula: An Extension of Stateless Wireless Ad hoc Networks Quality of Service Model (supervisor: Margaréta Kotočová)

## ACM Slovakia Chapter Prize

- Ján Zdechovan: Improving Aspect-Oriented Change Modeling with Reusable Aspect Models (supervisor: Valentino Vranič)
- Martin Uhlík: The Similarity Detection in Slovak Texts by Compression Method (supervisor: Daniela Chudá)
- Marián Šimko: Hybrid Approach to Automated Domain Model Creation for Adaptive Social Learning System (supervisor: Mária Bieliková)

- Peter Mindek: Visual Artefacts Removal in Volumetric Visualization (supervisor: Peter Kapec)
- Mária Pohronská: Architectures for Hardware Acceleration in Knowledge-Based Embedded Systems (supervisor: Tibor Krajčovič)

#### Czechoslovakia Section of IEEE Prize

- Aurel Paulovič: Bee Nest-Site Selection Clustering (supervisor: Pavol Návrat)
- Peter Vilhan, Peter Marko: 10 Minutes Approach for Better Network Security (supervisor: Ladislav Hudec)
- Michal Kottman: Planar Object Detection Using Local Feature Descriptors (supervisor: Vanda Benešová)
- Martin Labaj: Recommendation and Collaboration Based on Implicit Feedback in Web-Based Learning (supervisor: Mária Bieliková)
- Ľubomír Lackovič: Parallel Game Tree Search Using GPU (supervisor: Peter Lacko)

The Conference was opened by a keynote lecture given by Jiří Wiedermann titled *Singularity: the day when computers outperform human intelligence*. Jiří Wiedermann is a Professor at the Institute of Computer Science, Academy of Sciences of the Czech Republic. His research interests include theoretical computer science, models of sequential and parallel computational systems, neuro-computing, non-standard computing, artificial life, embodied cognition. He is also active in history and prospects of informatics topics.

Singularity is a situation when artificial intelligence reaches the level of the human one. Some experts estimate singularity will occur sometime around middle of this century. From that moment on, an explosion of intelligence can be expected chiefly due to the fact that computers (or robots) will be able to improve their intelligence by evolution. In the lecture, some practical consequences of reaching the singularity were discussed. On the one hand, they are as bold as difficult to imagine, on the other hand, expectations should be tempered down by considerations related to computational complexity.

Besides the poster sessions where 89 accepted papers were presented, there were several accompanying events organized. The RoboCup Exhibition is organised as a part of IIT.SRC since 2005. RoboCup is an attractive project with free participation, designed to support education and research in artificial intelligence, robotics and information technologies. Through several years, our students achieved interesting results, which were presented during the Conference. RoboCup exhibition presented both the way the RoboCup simulated league is played and also the progress of current students' research in this field. Three years ago a new RoboCup league – three-dimensional (3D) robotic simulation was introduced. The extension of the simulation to the third dimension shows the continuous progress in RoboCup and in our students' skills.

We organized for the third time space a showcase of TP-Cup projects. TP-Cup is a competition of master students' teams aimed at excellence in development information technologies solutions within two semester long team project module. The competition has four stages. Seven teams managed to achieve this stage and presented their projects during IIT.SRC.

Accompanying events included the programming contest for the fourth time in a row. The contest follows a long tradition at

the Slovak University of Technology in Bratislava and its Faculty of Informatics and Information Technologies in organizing programming contests, especially the ACM International Collegiate Programming Contest competitions and other similar ones.

We continued this year with FIITAPIXEL exhibition, which took place for the first time as an IIT.SRC accompanying event last year. FIITAPIXEL brings together both students and staff of the Faculty as well as its potential students and alumni in an effort to create, share and judge pictures. It is organized as an ongoing event, where anyone can contribute pictures. The IIT.SRC FIITAPIXEL exhibition presented this year contest best pictures.

As a part of the IIT.SRC Conference we organized for the second time a tournament in one of our games with a purpose developed by our students. Games with a purpose represent a way of harnessing the power of the human brain for producing useful artefacts or solving computational problems through computer gaming. They are interesting not only for the research opportunity itself but also for promotion and popularization of research. This year's game was PexAce, a modification of the popular Concentration game (also known as Pexeso), which acquires textual annotations for digital images.

New accompanying event was IIT.SRC Invent. IIT.SRC Invent provides a room for presenting inventive student works of applicative nature within the topics of the conference. Within this year's IIT.SRC Invent, two competitions devoted to application design were organized: Design a Mobile Application and Design an Application for a Better World.

There were given also technical presentations related to current information technologies given by the Conference sponsors. An interesting talk on photography was given by FIITAPIXEL expert jury chairman Ľubomír Horník.

The presented numbers regarding the Conference active students' attendance with their research projects and acceptance ratio do not imply the papers are of a low quality. On the contrary: not only the overall quality of all accepted papers is very reasonable, but there are always a significant number of papers that would easily qualify for some recognized international conference or even for a scientific journal. This is not just a presupposition. Experience of several past years has been proving that indeed our students succeed in getting their papers accepted at various well respected, even the most prestigious international conferences such as IFIP World Computer Congress, User Modelling, Adaptation and Personalization, IEEE/WIC/ACM Web Intelligence, IEEE Services, ACM Hypertext, etc.

These facts put the present selection for this special section into a proper perspective. There are 25 papers included in this special section. This means that less than one third of the papers presented at the Conference is published. To be more precise, one should mention that there are also a few students whom we also invited to submit their revised Conference papers but who politely declined because they have already submitted or were in the process of submitting their paper elsewhere. These 25 papers give a reasonably good overview of scope and quality of the student research at Slovak University of Technology in Bratislava in the areas of Informatics and Information Technologies. Reader will find here papers from various fields, such as software engineering, computer engineering, information systems, artificial intelligence, multimedia and computer graphics. We hope this special section will encourage our students even more to work hard in their research to achieve excellent results. We also hope their results will be interesting to a wider community.